ECOFaith: Creating an environmental sustainability program for religious communities

A 2011 Group Project submitted in partial satisfaction of the requirements for the degree of Master's in Environmental Science and Management

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March 2011

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As authors of this Group Project report, we are proud to archive this report on the Bren School's website such that the results of our research are available for all to read. Our signatures on the document signify our joint responsibility to fulfill the archiving standards set by the Bren School of Environmental Science & Management.

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The Group Project is required of all students in the Master's of Environmental Science and Management (MESM) Program. It is a three-quarter activity in which small groups of students conduct focused, interdisciplinary research on the scientific, management, and policy dimensions of a specific environmental issue. This Final Group Project Report is authored by MESM students and has been reviewed and approved by:

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Oran Young Date

ACKNOWLEDGEMENTS

We would like to extend a sincere thank you to the following people and organizations for their guidance and support throughout this project:

Oran Young, project advisor, Professor, Bren School of Environmental Science & Management
Zoe Elizabeth, external advisor, UCLA Institute of the Environment and Sustainability
Ivor John, external advisor, Ryerson, Master & Associates, CEC
Simone Pulver, external advisor, UCSB Environmental Studies
Ed Bastian, ECOFaith Director, Spiritual Paths Foundation
Pastor Wallace Shepherd, Second Baptist Church, Santa Barbara
Onja Brown-Lawson, Second Baptist Church, Santa Barbara
Fr. Ludo DeClippel, Holy Cross Catholic Church, Santa Barbara
Reverend Lynn Bruer, Grace Lutheran Church, Santa Barbara
Normah Abdul Halim, Islamic Society of Santa Barbara
Iman Mehai, Islamic Society of Santa Barbara
Afaf Turjoman, Islamic Society of Santa Barbara
Maureen Earls, St. Barbara Parish
Noel Fuentes, St. Raphael Catholic Church, Santa Barbara
Rabbi Alyson Solomon, Congregation B'nai B'rith, Santa Barbara
Terre Sanitate, Trinity Episcopal Church, Santa Barbara
Drusilla van Hengel, Trinity Episcopal Church, Santa Barbara
Sangwon Suh, Assistant Professor, Bren School of Environmental Science & Management

ABSTRACT

Religious communities are well-positioned to shape environmental values due to their influence over personal moral development. With over three-quarters of Americans self-identifying as religious, and with more than 50,000 congregations in California alone, the potential for faith communities to guide environmental action is substantial. Our client, ECOFaith, is a diverse coalition of congregations in the Santa Barbara area whose mission is to improve energy efficiency and conservation in worship places and to encourage congregants to adopt sustainable lifestyles. From 2008 to 2010, the organization implemented four pilot projects to test its initial process. Our project assessed these early efforts and built upon ECOFaith's original model to develop a comprehensive program we named the ECOFaith Path of Sustainability. The program's backbone is a refined process that integrates congregation education with worship building energy efficiency in a unified framework. We also developed a toolkit that includes a do-it-yourself energy audit, a cost-benefit analysis tool, educational resources, and an enhanced congregation pledge—all of which participants can apply right out-of-the-box to implement their environmental initiatives. As a consequence of our flexible design, our tools have the potential to enable faith communities all over Southern California and beyond to motivate and enact environmental change.

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Project Background

The modern environmental movement has encouraged a profound shift towards science, technology, and policy to solve large problems. Yet, environmentalists are increasingly aware that our current climate crisis will require more than just solutions based in hard science—these efforts must be accompanied by a widespread and deep-rooted change in individual norms and behavior. Framing environmental action as a moral necessity is particularly important considering that many national and international agreements concerning climate change have stalled.

Religious communities are well-positioned to shape environmental values due to their influence over personal moral development. With over three-quarters of Americans self-identifying as religious, and with more than 50,000 congregations in California alone, the potential for faith communities to drive environmental action is substantial.

ECOFaith was founded in 2008 by a diverse group of religious leaders in the Santa Barbara area as a way to bridge the gap between traditional religious teachings and modern environmentalism. The main goals of the group are defined as follows:

1. Work towards energy efficiency and conservation in places of religious faith
2. Educate and encourage members of their congregations to adopt environmentally sustainable lifestyles as a dimension of spiritual practice
3. Partner with a broader community to create a healthy environment

Four congregations participated in pilot projects to improve energy efficiency in their houses of worship and to educate their congregations. After interviewing the pilot project leaders and evaluating their progress, we identified several areas for improvement in the original ECOFaith program. As a result of these interviews and our quantitative assessment of the pilot projects, we decided to develop an enhanced sustainability program that would fulfill the following objectives:

1. To improve data collection and measurement of progress, the program structure should encompass a robust record-keeping framework.
2. In the face of limited participant time, funding, and expertise, program tools should be easy-to-use and customizable. Recommendations should also include a variety of feasible, low-cost solutions.
3. To overcome disconnectedness between the worship building and education goals, efficiency retrofits and conservation measures should be linked with congregation education in a unified approach.
4. To make the most efficient use of ECOFaith's energy and resources, our tools should help participants prioritize the most cost-effective, high-impact, and relevant solutions.

We named our new program *The ECOFaith Path of Sustainability*.

What is the Path of Sustainability program?

The main components of the ECOFaith Path of Sustainability are:

1. A refined process that provides a step-by-step guide to program participation, emphasizing data collection and follow-through;
2. A set of resources for implementing educational action plans;
3. An enhanced congregation pledge that contains a comprehensive collection of actions to encourage individuals to reduce their personal GHG emissions, with an accompanying Pledge Tally Form that aids ECOFaith members in setting congregation goals and displaying results;
4. A do-it-yourself energy audit that aids congregations in identifying potential energy efficiency or conservation actions in the worship building, without the help of professional auditors;
5. A cost-benefit analysis tool that helps participants prioritize different energy efficiency or conservation recommendations; and
6. A colorful, easy-to-use tool that assists users in creating an action plan that satisfies the Path of Sustainability requirements.

What would participants in the ECOFaith Path of Sustainability ideally experience?

A faith community embarking on the ECOFaith Path of Sustainability would follow these steps:

1. Organize congregation leadership into a united, committed group.
2. Form a Green Team tasked with oversight of environmental activities.
3. Develop an action plan for the congregation to pursue over a one-year period. The action plan will include:
    a. 6 weekly sermons/messages or congregation-wide educational classes that incorporate environmental themes;
    b. 4 energy efficiency or conservation actions, including at least one from each of the following categories: behavior-changing, high-impact, and high-visibility;
    c. 6 educational activities, including at least one from each of the following categories: hands-on, visual/display, and presentation/discussion; and
    d. Administration of the CEC Get Energized Pledge to promote individual environmental action.
4. Inform congregation of progress through a poster that visually displays an implementation timeline and the completion status for each action.
5. Interact with other ECOFaith congregations through regular meetings and "buddy" or mentorship pairings.

How will the Path of Sustainability tools help participants develop and implement their action plans?

To help congregations implement the Path of Sustainability program, we developed a set of easy-to-use tools and resources.

Educational Actions

We compiled a list of 23 education actions and developed resources to help participants implement each one. To ensure that our educational resources are effective, we conducted an extensive literature review on best practices to motivate personal environmental action, which we incorporated into our program in the following ways:

1. Because repetition of an environmental message helps to reinforce learning, we determined that implementation of six education items during each year of participation would be an effective yet reasonable request.
2. To increase the chances of desired behavior change, it is important to relay these lessons in a variety of formats. In our program, participants must choose several types of educational action items: hands-on, presentation, and display.
3. For environmental issues in particular, informing participants about why a problem exists and what they specifically can do about it increases the likelihood of action; we therefore decided that each educational action item option would include a concise summary of the "Big Picture Problem" as well as sections on the "Solution" and "Details" of how to carry out the activity, complete with localized information and resources.

Pledge

The CEC Get Energized is an integral part of ECOFaith's education program, reinforcing and connecting the separate educational activities that will have taken place throughout the year. Our literature review revealed that asking for a pledge is an extremely effective strategy to bring about sustained environmental action. To improve the effectiveness of the pledge, our program incorporates a yearly follow-up into the Path of Sustainability process. We also developed a congregation-wide goal-setting tool to encourage increased congregation participation. Other enhancements we made to the pledge were to improve the accuracy of the greenhouse gas (GHG) emission and water reduction estimates, and to adjust the pledge to appeal to ECOFaith communities' diverse demographics.

Energy Efficiency Actions

The energy efficiency and conservation actions in the worship building showcase to congregants and other building users the measures they can take in their own lives to reduce GHG emissions. Our program requires participants to publicize the building's energy efficiency measures through informative signage that provides information on the action's environmental benefits and financial savings, as well as instructions on how to implement the action.

To help ECOFaith members identify possible energy efficiency and conservation practices for their particular worship building, we provide instructions for a do-it-yourself (DIY) energy audit. A DIY tool enables religious institutions to conduct energy audits themselves, freeing up resources that would have been spent on professional auditors to instead invest in energy efficiency retrofits or educational events. We designed our DIY energy audit to be:

1. User-friendly to those lacking prior training in energy auditing;
2. Regionally relevant to religious institutions in Santa Barbara;
3. Concise enough for green team volunteers to complete the audit walk-through within a couple hours; and
4. Focused on high-impact, reasonably-priced action items.

Once congregations have a comprehensive list of potential energy actions for their worship building, they can use our cost-benefit tool to prioritize the most cost-effective and high-impact recommendations. The tool's list of practices includes a number of inexpensive or no-cost actions for participants with budget constraints. To use the tool, participants input information they gathered during the energy audit, enabling the tool to customize its estimates of GHG reductions and utility savings for the user's particular building. In analyzing these costs and benefits, the tool uses locally-relevant cost data and expertise.

The Path of Sustainability includes a comprehensive set of resources that ECOFaith members can use right out-of-the-box to implement their environmental programs. As a consequence of our flexible design, our tools have the potential to enable faith communities all over Southern California and beyond to motivate and enact environmental change.

Recommended Next Steps for ECOFaith

We encourage ECOFaith to initiate a new set of pilot projects to test our Path of Sustainability program. These new congregations can provide ongoing feedback on the tools and concepts we developed so that ECOFaith as an organization can continue to improve and grow. We also suggest that ECOFaith leadership implement regular coalition-wide meetings to maintain program momentum. Finally, to better serve its members, ECOFaith can act as a centralized resource for all congregations participating in the Path of Sustainability program.

PROJECT OBJECTIVES AND THEIR SIGNIFICANCE

A Context for Religion in Environmentalism

Some critics of the modern environmental movement believe that many environmentalists have abandoned support for broad ethical reforms in favor of technological, legal, scientific, and policy-driven solutions,[1] while others have gone further in condemning contemporary or "third wave" environmentalism as amoral.[2] These detractors assert that addressing the ecological crisis must involve widespread and deep-seated shifts in individual attitudes and behavior.[3] Environmental journalist Mark Dowrie recognized this need when he wrote that "environmentalism needs to penetrate every institution, ideology, and religious faith in our culture. It needs to be seen as a social as well as a political movement."[4]

Framing environmentalism as a moral necessity for individuals is particularly valuable considering that many national and international agreements on energy use and climate change have stalled. Policy decisions are occurring instead at the state, municipal, and organizational levels. While California legislation such as the Global Warming Solutions Act of 2006 (AB 32) and its supporting legislation (AB 811) mandate reductions in greenhouse gas emissions, many other campaigns are designed to be voluntary. Cities such as Santa Barbara and local organizations such as the Community Environmental Council (CEC) have established action plans and strategies aimed at a sustainable energy future, but these efforts are highly dependent on an interested and engaged public.

With over three-quarters of Americans self-identifying as religious [5] and with 50,000 congregations in the state of California alone,[6] faith-based groups such as churches, synagogues, and mosques are in an excellent position to bring an ethical component to what has become a heavily scientific field. While such communities are only one of several influences in the typical person's life, they often play a vital role in determining what individuals view as acceptable and desirable behavior. Their ability to create strong social bonds and shape personal norms makes them outstanding instigators for change. In the absence of monetary or legal incentives, religious values can be an effective motivator and should not be ignored by the environmental community.

Client Background

ECOFaith was founded in 2008 by a diverse group of religious leaders in the Santa Barbara area as a way to bridge the gap between traditional religious teachings and modern environmentalism. Many of these leaders were already active in social causes, and were particularly inspired by issues of environmental justice and by the idea that humans are meant to be caretakers of the earth rather than simply harvesters. These original stakeholders designed an organization they hoped would help them make better decisions in their home institutions and impact the lives of their members.

The main goals of the group were defined as follows:

1. Work towards energy efficiency and conservation in places of religious faith

2. Educate and encourage congregations to adopt environmentally sustainable lifestyles as a dimension of spiritual practice
3. Partner with a broader community to create a healthy environment[7]

With these goals in mind, ECOFaith conducted four pilot projects. Each project was set in a different faith community in the Santa Barbara area: Second Baptist Church, Grace Lutheran, the Islamic Society, and Holy Cross. To accomplish the first goal, a professional energy auditor analyzed each community's main worship buildings (except for the Islamic Society, which currently leases its space while its own building is still in the process of being built). The auditor developed a list of recommendations for each project, and members of the faith communities organized to try and implement them.

To accomplish the second goal, each community developed an education plan based on its own spiritual texts and traditions. In order to preserve the ability of each congregation to operate according to its own core beliefs, ECOFaith required very little structure for the education plans. These plans were implemented over the course of the pilot projects. Each congregation also asked its members to take the CEC Get Energized pledge, which encouraged participants to list what energy-reducing practices they would implement in their own lives.

The third goal, a partnership between communities, developed naturally as the ECOFaith pilot members met to discuss their projects and progress. However, interaction beyond these meetings was limited.

Project Objectives

ECOFaith originally approached the Bren School with the aim of developing a quantitative evaluation tool for its completed pilot projects. The hope was that this information could be used in grant proposals to secure additional funding and expand the organization. In starting our project, our group realized that a quantitative tool would be much more effective as a seamlessly integrated piece of a broader program. Therefore, our project goal evolved into designing an improved, comprehensive sustainability program for our client. Our deliverable would include a suite of easy-to-use resources that ECOFaith members could use right out-of-the-box to implement their environmental initiatives. Furthermore, we wanted our design to be flexible so that our tools could have the potential to enable faith communities all over Southern California and beyond to effectively motivate and enact environmental change.

BACKGROUND INFORMATION

Overcoming the threat of climate change will require researching and conceptualizing the issue from all angles. In addition to identifying and advancing the technical strategies and science used to improve energy conservation and efficiency, we must also learn how to educate and motivate individuals to enact impactful lifestyle changes. The religious congregations of ECOFaith are one coalition of communities that has shown the energy and impetus to address this aspect. Within the context of this project, we have explored both technical solutions and strategies to motivate behavior change. To provide important context and background for our work, we began by researching a range of subjects that spoke to the state of environmentalism and its interface with both spiritual life and practical application.

The following is a high-level summary of our research on religious environmentalism, faith-based environmental organizations, and the role of green building and energy efficiency in countering climate change. For the complete version of our literature review, please see APPENDIX II.

Understanding Faith-based Environmentalism

A common concern amongst faith-based environmental organizations is that their secular environmental partners do not understand the religious community and its cultural, political, and organizational functioning.[8] Therefore, this literature review seeks to provide a historical and cultural context for our project, an understanding of the obstacles and challenges under which our client operates, as well as a perspective on our client's unique motivations and opportunities.

Background and History

Modern faith-based environmentalism emerged around the same time as the mainstream environmental movement. One particularly catalytic event was the 1967 publication of Lynn White's article titled, "The Historical Roots of Our Ecological Crisis," in *Science*. In his article, White pursued the thesis that Western Christianity is largely to blame for the current ecological crisis. Calling Christianity the "most anthropocentric religion the world has ever seen," White pointed to Christian teachings that promote human domination over other living beings and man's duty to exploit nature for his own ends. Yet, despite his strong censure of Christianity, White firmly believed that environmental disasters would be averted not through science and technology but through "a new religion, or [a rethinking of] our old one." Indeed, he asserted that, "Since the roots of our trouble are so largely religious, the remedy must also be essentially religious."[9]

While White was not the first to verbalize these views, his article provided fertile ground for debate and induced a wide range of responses, especially among laypeople and scholars within the Abrahamic traditions of Judaism, Christianity, and Islam. Prompting a variety of reactions, White's article seems to have spurred many religious communities to establish

or refine an eco-theology to defend their faith—an action that eventually resulted in the development and proliferation of environmental consciousness in mainstream faith communities.[10]

Theological Context for Environmentalism

Though ECOFaith is an interfaith organization that welcomes all religions, an individual treatment of every religion and its relationship with the environment is outside the scope of this review. Therefore, this section focuses on the faiths represented by the four ECOFaith pilot projects: Christianity and Islam.

Christian Environmental Engagement

One study examining Christian environmentalism in the U.S. using interviews, observation, and literature review identified three general models of Christian eco-theology[11]:

- *Christian Stewardship* is founded on the biblical mandate for humans to take care of the earth and reinterprets the Genesis commandment of dominion as a divine decree to steward creation. They seek a balance between biology and the Bible, looking for ways to incorporate scientific knowledge within a religious worldview.

- *Creation Spirituality* adopts cosmological physics as a starting point, reorienting the creation story around the creation of the universe. This model rejects the traditional hierarchical relationship between humans and nature, establishing instead that humans are merely one part of the whole of creation. They aim to address the environmental crisis by integrating spirituality and science and rejecting the dualism omnipresent in contemporary society.

- *Eco-Justice* focuses on changing society's institutions and structures rather than individuals. Adherents of Eco-Justice have expanded their traditional focus on social justice issues to include environmental degradation, especially as it relates to poverty, oppression, and injustice. Their preferred method of addressing the ecological crisis is through grassroots organizing and government reform.

Islamic Environmental Engagement

Early ecologically-oriented Islamic thinking was rooted in the notion of *wahdat al-wujud* ("unity of being"), based in the verse, "Withersoever you turn, there is the Face of God" (Qur'an 2:115). In suggesting an alternative to the then-dominant anthropocentric viewpoint, however, this philosophy was rejected by orthodox Islam as dangerously approaching pantheism.[12]

Islamic environmental thinking has not figured prominently in contemporary discussions of religion and the environment, especially in the United States where the Muslim population is relatively small. Muslim writers typically characterize environmental

degradation as stemming from a subset of humans (usually Westerners) taking more than their fair share of the world's resources. In general, however, mainstream Islamic thought is more focused on the relationship between Allah and humanity; the world and its environmental problems are merely a passing concern.[13]

Despite this apparent disinterest, some Islamic environmentalists have in recent years published essays that ground a stewardship ethic in scriptural sources. Others have highlighted passages in the Qur'an commanding the good treatment of animals and plants and condemning those who despoil the earth. Finally, hadith have also been explored for instructions on environmentally-conscious behavior. For example, a hadith enjoining Muslims from relieving themselves on public pathways or into water sources has been modernized into a prohibition against pollution.

Faith-Based Environmental Organizations

ECOFaith is one of several dozen existing faith-based environmental organizations operating in the U.S. Due to the relatively recent emergence of this movement, however, few scholarly articles have critically studied these groups. Smith and Pulver (2009), based on research conducted by Smith (2006), provide an analysis of the organizations' motivations and priorities.

Several critics of the mainstream environmental movement have voiced concern over the movement's preoccupation with political, technical, or legal solutions while neglecting to promote a broader, more sustainable environmental ethic.[14] Faith-based environmental organizations with their ethical focus and moral command are well-positioned to fill that void, and many of them are heeding the call. Smith and Pulver's research indicates that these groups view ethics-based work as integral to generating lasting environmental change. Furthermore, they see changing value systems as the particular specialty of the faith community, where influence over ethics is expectedly strong. They recognized that religion's doctrinal basis for environmental stewardship and its moral and humanitarian focus could appropriately guide the environmental movement within the faith community.

In their study, Smith and Pulver differentiated between "issues-based" and "ethics-based" environmentalism. Issues-based environmentalism addresses specific environmental issues such as climate change or biodiversity loss and urges action on that particular issue. Ethics-based environmentalism focuses on achieving attitudinal and behavioral changes by establishing a broader ethical framework through which actions and issues can be viewed. Nearly all participants in the Smith and Pulver study, believed that ethics-based and issues-based work should be complementary. None of the groups engaged in consciousness-raising or educational activities without also tying them to specific issues and actions, from lifestyle changes to political advocacy or activism. Furthermore, groups recognized that ethics-based work occurs on a long timeframe and that some environmental issues may require immediate action. Those situations compel the groups to engage in issues-based work, though the products of this type of work are widely seen as less permanent than the products of ethics-based work.[15]

Though perhaps more permanent, the results from ethics-based work are less calculable. Aside from reported personal testimonies, there are few objective ways of measuring ethics-based efforts as tracing, quantifying, and even recognizing changes in ethics is inherently difficult. Issues-based work is typically more quantifiable and hence more readily funded, the researchers therefore stress the importance of developing measures to assess the effectiveness of ethics-based work, both to attract funders as well as to facilitate self-evaluation.[16] Finding a suitable set of metrics may well be one of the most significant challenges facing organizations undertaking ethics-based environmentalism.

ECOFaith congregation leaders should consider these studies when designing their education plan. The ideal system would provide specific, action-related information, would be presented in such a way that people can accept the encouraged behavior as socially acceptable and would remove potential barriers by showing people how changes can be economically beneficial and will not require a major time commitment. The potential for deep and lasting behavior change from such an organization in major, and may be the nation's best hope in achieving a new environmental consciousness.

The Role of Energy Efficiency in Countering Climate Change

Humans have contributed to the net warming of the earth's atmosphere that has already occurred and that is expected to continue to occur via the release of greenhouse gases (GHGs).[17] Carbon dioxide (CO_2) is deemed to be the most important contributor to net warming, with the primary source from the combustion of fossil fuels.[18] In the current absence of overarching global treaties and action plans to address climate change, efforts instead must be focused on local and regional ways to address the reduction of GHG emissions into the atmosphere.

Technology changes that contribute to mitigating climate change have been identified as[19] "reducing demand for carbon-intensive products, increasing energy efficiency, and switching to low-carbon technologies."[20] Among these, improving energy end-use efficiency is said to be "the largest, least expensive, most benign, most quickly deployable, least visible, least understood, and most neglected way to provide energy services," (Lovins, 2005).[21]

When we filter down to what can be done to increase energy efficiency, we find that buildings account for approximately 40% of national energy usage.[22] Even in the temperate region of Santa Barbara where heating and cooling loads are minimal, approximately 37% of energy use is still linked to buildings.[23] The buildings sector in particular has been found to have the potential to reduce CO_2 emissions over 40% at costs below $\$20/tCO_2$.[24] Changing the way we design, construct, and retrofit the built environment in order to more efficiently use energy and water will be a necessary component to countering global climate change caused by this enormous source of greenhouse gas emissions. This is evidenced by the many policies that have been drafted at the federal, state and local level in recent years as well as the incentives that have been put in place in order to financially motivate and support these initiatives.

Additional motivation for utilizing green building practices has developed by way of rating and certification systems for energy efficient building and design practices such as the US Green Building Council's LEED rating program. The exponential growth in participation in these voluntary programs indicates not only the growing public concern with climate change and energy efficiency, but also the enhanced social and economic value placed on individuals, businesses, and communities that take responsible action to improve energy efficiency.

The number of religious organizations listed in the United States is 350,000,[25] and an estimated 50,000 congregations exist in California.[26] By this count, the number of houses of worship in the United States encompasses a significant number of buildings and therefore has the potential to reduce GHG emissions considerably. Although ECOFaith itself has 21 organizations under its umbrella, the scope and applicability of ECOFaith's measures and actions could become replicable across a very large community. ECOFaith's participating institutions can indeed utilize many valuable and technically applicable elements from existing energy efficiency resources and green building rating systems in order to improve their process and assess their projects.

PATH OF SUSTAINABILITY

Methodology

In order to develop the Path of Sustainability program, we needed to learn from the ECOFaith pilot projects' experience and explore other existing programs and tools that might be useful to our client. First, we conducted interviews with ECOFaith leadership and pilot project participants; these interviews highlighted the challenges ECOFaith faced and helped us to determine our project scope. Then, through an in-depth assessment of the pilot projects, we identified gaps in ECOFaith's current process and opportunities for improvement. Finally, research and analysis of other environmental programs aimed at faith-based communities helped us determine whether any of these programs or tools would fit ECOFaith's needs. Based on the results of these steps, we concluded that the optimal solution for our client would be a new process and toolkit that included best practices from other programs as well as additional elements that none of the existing programs included. Our new comprehensive sustainability program would be catered to the specific needs of our client, addressing the diversity of its membership by incorporating flexibility into every program component. The following section describes the specific methodology we employed to determine both the problems our client originally confronted in its pilot projects and our ultimate deliverable to ECOFaith: the Path of Sustainability program.

Framing the Problem: Initial Steps

To understand the challenges ECOFaith faced in implementing its original program, we started by learning about how the organization had functioned to date. ECOFaith is organized and led by Ed Bastian of Spiritual Paths Foundation. Mr. Bastian helped develop the initial program for implementing green building practices and environmental education within the coalition's faith-based communities. Subsequently, the organization chose four ECOFaith pilot project congregations to test out the new program (hereafter referred to as the "original program") from December 2008 until approximately March 2010.[27] The chosen congregations represented a diversity of denominations and faiths as well as congregation demographics.

An introductory meeting with Mr. Bastian, the Program Director, and representatives from the four pilot projects revealed several challenges ECOFaith encountered within its original program. Their main concerns were that:

- There were no metrics to quantify the direct and indirect reductions in carbon dioxide emissions resulting from their actions
- The energy audits were both too detailed and too expensive for their needs
- Faith communities did not have enough funding to implement many of the actions the energy auditor suggested
- The process could have been more flexible, allowing for different approaches based on varying congregation demographics and needs.[28]

The meeting participants also recommended looking at other programs designed for faith-based communities, such as ENERGY STAR for Congregations and Interfaith Power & Light, as well as efforts by other local religious communities such as the Santa Barbara Unitarian Society's Energy and Green Building Plan. Furthermore, the ECOFaith members asked the Bren group to identify a method to quantify the actions already achieved as well as to investigate ways to improve the original program.

Through this meeting, we identified our client's main needs as:

1. A metrics-based assessment of the ECOFaith pilot project achievements
2. A strategy for increasing the effectiveness of their sustainability program

Identifying Opportunities for Improvement: Pilot Projects

From our initial meeting, we determined that an overall evaluation of the pilot projects could help us identify opportunities for program improvements. Our group developed a two-pronged plan to assess the pilot projects' achievements. First, we interviewed the pilot project faith community leaders individually. Personal interviews can yield rich data and allow the interviewer the flexibility to explore topics in depth.[29] Our aim was to understand ECOFaith members' goals, priorities, constraints, and obstacles in implementing the ECOFaith projects so that we could highlight the successes of the original ECOFaith program as well as generate recommendations for improvement. Specifically, we wanted to determine:

- Which of the planned energy efficiency actions had been implemented and the approximate date of completion;
- Of the recommendations that had not yet been implemented, which they still hoped to complete and which they felt were not currently feasible;
- How ECOFaith had helped them complete their projects, as well as any barriers or obstacles to implementation for the actions that had not been completed;
- How they chose and prioritized the actions they did complete, and how they felt overall about their accomplishments;
- Their vision for the education plans and how they personally assessed the success of their education initiatives; and
- How ECOFaith might help them in the future.

Second, we decided to perform a quantitative analysis of the resulting changes in greenhouse gas emissions from the pilot project actions. This part of the assessment was based on:

- Utility bills (electricity, gas, and water) for a year before and after the project period, if data was available;
- The Community Environmental Council Get Energized pledges that congregants had completed during the pilot project initiatives; and
- Suggested inputs on congregation energy use from Cool Congregations, ENERGY STAR, and other carbon calculators that helped quantify the environmental impacts of each completed energy efficiency action.

The interviews and quantitative assessment would help us identify what worked for the pilot projects and provide valuable information we could use to shape a future sustainability program.

Qualitative Assessment of Pilot Projects

We conducted in-depth personal interviews with faith community leaders and/or Green Team members in the spring and fall of 2010.[30] From these interviews emerged a few major themes about the successes and challenges that each congregation faced.

In general, interviewees viewed the following as the successes of the original program:

- ECOFaith gave the impetus for starting an environmental program within the church
- ECOFaith offered a body of resources, such as energy audit experts, to show what retrofits were need or (in the case of the Islamic Society, which does not own its building) grant money to encourage personal environmental action amongst congregants
- Belonging to the ECOFaith community helped to maintain momentum and motivation for environmental action
- Participating in a community of diverse faiths and denominations provided a strong and supportive network of different beliefs working toward a common goal
- ECOFaith was "tremendously" helpful in providing expertise in designing a new green building and also helped to drive "green" planning for future buildings (e.g., senior housing, apartment complex)

Interviewees also identified key challenges that they confronted during the pilot projects:

- Many of the Green Teams and faith leaders did not have the expertise to choose the most appropriate energy efficiency actions for their situation. They often had difficulty prioritizing the among the worship building and education action items.
- Recommended items in the pilot projects' action plans (provided by the energy auditor) were often not implemented because they were not financially feasible
- The membership of ECOFaith is extremely heterogeneous, with communities having different needs, cultures, awareness, demographics, and buildings. Therefore, choosing actions that were feasible, affordable, measurable, impactful, and "right-sized" for each community was challenging.
- ECOFaith members viewed metrics collection as frustrating, since the energy usage reported in utility bills did not always reflect the positive changes that the communities had implemented. A multitude of factors could account for this discrepancy, including increased building usage or weather variability. Because metrics-gathering had not been built into the original program, no baseline data had been recorded.
- Some Green Team committees lacked the time and focus required to execute their action plan.

Additionally, the interviewees suggested numerous ways in which ECOFaith could enhance its original program, including:

- Incorporating an implementation and results phase into the process, since the original process included three main steps: introduction to ECOFaith, an in-depth energy audit by an energy professional, and a planning phase, but did not emphasize implementation.
- Filtering the enormous amount of information about environmental sustainability into actions that provide the most impact for the least cost
- Providing cost data and expertise that is locally-focused
- Sourcing specific educational modules as well as general environmental educational materials from a centralized location
- Providing grant money and/or supplies as a motivational tool for resource-strained communities; in the absence of funding, recommending low-cost or no-cost action items for communities and individuals
- Developing a network of environmentally-minded religious communities in order to share environmental experiences among members
- Meeting more regularly as a coalition to maintain momentum and share knowledge, and inviting the non-pilot project congregations
- Obtaining bulk or group discounts for "green" purchases
- Providing content for newsletter articles with environmental facts and tips

Through these interviews, we also inferred the following:

- Educational measures tended to focus primarily on the spiritual value of environmentalism. Information on specific issues or actions members could take was typically secondary, though almost always present.
- Lessons were not generally tied to improvements taking place in the building, and members were not always informed as to what upgrades had occurred.
- Attendance at educational events varied, but faith leaders reported a general feeling that members were supportive of the ideas being presented.
- Faith community representatives expressed the desire to follow-up on the CEC pledges, but so far none had done so. In addition, pledge participants were not able to keep the form they filled out as a reminder of what they promised.
- Meetings between the pilot congregations tapered off over time as the group lost some of its momentum.
- Communications between ECOFaith and community organizations such as the CEC were strong, but further cultivation of those relationships could have helped to maintain momentum.

The results of these interviews revealed the challenges and successes of the pilot projects and offered visions for a future ECOFaith. As such, they gave our group a strong foundation for framing an improved sustainability program for our client.

Quantitative Assessment of Pilot Projects

In order to fully understand what the pilot projects were able to achieve, as well as to satisfy the James S. Bower Foundation grant funding requirements for ECOFaith, we sought to quantify the amount of greenhouse gas reductions achieved by the pilot project actions in terms of pounds of carbon dioxide equivalent (CO_2e) reduced annually. We looked at both the action items completed in the worship building and what congregation members individually pledged to do when they took the Community Environmental Council's Get Energized Pledge. We also discussed how we might quantitatively assess the education plans implemented by the pilot projects and how to measure behavior change through congregation action. Because the plans had already been implemented, however, little data was available for quantitative assessment. We therefore decided to use the CEC pledges as a proxy measurement of congregation behavior change and education plan success. Though an imperfect solution, without having been through the process with the congregations, there was little other than anecdotal evidence that we could use for education plan assessment.

From our interviews with the pilot projects, we had gathered a list of the actions that had been completed through their participation in ECOFaith. Implemented worship buildings actions included items such as replacing incandescent light bulbs with CFLs, replacing old fluorescent lamps with new ballasts, replacing old exit lights with LED exit lights, insulating water heaters, and installing waterless urinals and low-flow toilets. Due to the time constraints for responding to the Bower Foundation request, our client instructed us to use the estimates on the Get Energized pledge to quantify GHG reductions where possible, and to find suitable alternatives where action items were not on the CEC pledge. We recognized that the CEC pledge was targeted at residences and might therefore understate the reductions achieved by similar actions in worship buildings; however, for our client's purposes, the time constraint was more important than strict accuracy, and the totals would at least be conservative. Moreover, all except one of the estimates we used were for single appliances and so would have produced the same GHG reductions regardless of building size. For some actions, such as creating a community garden, not enough data existed to quantify any associated GHG reductions. In those cases, the action was included in our report, but it did not contribute to the GHG reduction totals.

The GHG reductions associated with each action item as well as the assumptions made in each calculation can be seen in APPENDIX III. We also collected and graphed the electricity, gas, and water bills for each congregation for all months available between 2006 and 2010 (some years were not available, depending on the congregation), which is also available in APPENDIX III [note that the Islamic Society is not included because they do not receive utility bills from the property manager]. It was difficult to deduce any overall trends in energy usage from the graph, likely due in part to changing building occupancy and weather anomalies. We also gathered the actual CEC pledges of each congregation in order to assess the amount of greenhouse gases each congregation had pledged to reduce. The data we used to total the GHG reductions from congregation actions can also be found in APPENDIX III. The table below provides our estimates for the quantity of GHG reductions (in lb CO_2e) achieved through ECOFaith's activities to green its worship buildings and through congregation pledges.

Table 1: Pilot Project Estimates of Greenhouse Gas Reductions (in lbs of CO_2e)

	Grace Lutheran	Islamic Society	Second Baptist	Holy Cross	Totals
Worship Buildings	506	9,840*	3,061	591	13,998
Pledged Actions	30,129	29,791	19,117	60,440	139,477
Totals	30,635	39,631	22,178	61,031	153,475

* Low range estimate of CO2e savings for a LEED-certified religious building over a conventional building

Originally, we had planned to enhance this basic report with a more in-depth quantitative assessment of the pilot projects once the Bower deadline had passed. We proposed to identify two or more congregations in the coalition that had not participated as a pilot project to act as a control group for a statistical analysis. We would then have gathered similar data on energy use and performed a Before-After-Control-Impact-Paired Series (BACIPS) analysis to determine if ECOFaith pilot projects had achieved statistically significant reduction.

However, our client, external advisors, and an interview with Professor Sangwon Suh of the Bren School led us to abandon the idea of a baseline assessment for the pilot projects. Ed Bastian believed that given the pilot projects' "modest" achievements in CO_2e reductions, our time could be better spent developing an improved program that would maximize the future GHG reductions that faith communities could achieve.[31] Furthermore, our client believed that a deeper "assessment" of the pilot projects might appear judgmental and could serve to dis-incentivize further participation in ECOFaith and/or discourage the pilot projects. In addition, during our project review, our external advisors noted that occupancy, resource usage, and emissions usually rise over time, so a direct comparison of utility bills from year-to-year may not yield the most meaningful results. Rather, it may be more appropriate to examine usage and emissions trends and see if the actions caused the trends to change.[32]

In a separate meeting, Professor Suh corroborated our own observations that the time constraints of faith leaders and Green Teams as well as the fact that various outside community groups utilize the worship buildings could make baseline data challenging to collect.[33] He further explained that in carbon footprinting analyses, the carbon footprint is expressed as emissions per unit of functionality, and that functionality is typically fixed. However, in our case, the functionality (defined as person-hours of building use) is constantly fluctuating given the varying schedules of the worshippers and outside groups. Professor Suh suggested that project accounting as described in the GHG Protocol[34] may be the best approach for our project. Project accounting calculates marginal changes in carbon emissions over a certain period of time (e.g., if the project is to replace an inefficient furnace with a new, more efficient furnace, then the carbon emissions reduction is calculated as the difference between the emissions from the installation and operation of the new furnace and emissions from the continued operation of the old furnace). As a result of these discussions, we decided that the initial quantitative assessment of the pilot

projects would be sufficient for our client, and a statistical analysis would add minimal value to our project.

Our quantitative assessment highlighted the difficulties in gathering metrics that accurately reflected the GHG reductions achieved through implemented actions. In addition, the exercise demonstrated the importance of providing a quantitative reporting solution that would be feasible for ECOFaith members, given their level of resources and expertise. We also observed that, because a high percentage of ECOFaith's available funding was used to hire professional energy auditors, little money was left over to implement most of the recommendations. Therefore, we saw an opportunity to improve the efficiency of our client's spending. Finally, our report to Bower showed that GHG reductions from personal congregant actions had the potential to vastly outstrip any reductions that could be achieved in the worship building. The combined energy saved from actions that members pledged to implement in the CEC pledge was generally ten times that of the calculated results from upgrades to the building.

Opportunities for Improvement

From the multitude of data we collected, several challenges emerged as the most important to address in our future program. In general, the main themes we identified were:

Record-Keeping: ECOFaith had no centralized or ongoing data collection. When we attempted to analyze utility usage, for example, we had to contact each congregation individually and compile their records. Similarly, most congregations did not keep track of which congregants had pledged to do what on the CEC pledge. Since much of this information was well over a year old, it could not be easily recovered once missing, and we identified several data gaps. Several ECOFaith members expressed a desire to understand what impact their initiatives had made; without accurate and consistent record-keeping, that goal would be difficult to achieve.

Implementation Obstacles: While ECOFaith developed thorough energy efficiency upgrade plans, members found they could not implement many of the recommendations due to their limited funds, time, or expertise. The original ECOFaith process focused primarily on drafting the initial plan and therefore offered little support to overcome major implementation roadblocks.

Divided Focus: ECOFaith defined building improvements and congregation education as two separate goals, and this separation ended up creating an artificial distinction that reduced the strength of both components. The education plans often did not publicize changes in the building, forgoing an important chance to lead by example. Considering the huge potential to reduce GHG emissions through personal congregant actions, the main impact of worship building retrofitsis likely in its ability to educate and motivate building occupants.

With these opportunities in mind, we determined our program should meet the following objectives:

1) To improve data collection and progress measurement, the program structure should encompass a robust record-keeping framework.
2) In the face of limited participant time, funding, and expertise, program tools should be easy-to-use and customizable. In addition, recommendations should include a variety of feasible, low-cost solutions.
3) To overcome disconnectedness between worship building and education goals, efficiency retrofits and conservation measures should be linked with congregation education in a unified approach.
4) To make the most efficient use of ECOFaith's energy and resources, our tools should help participants prioritize the most cost-effective, high-impact, and relevant solutions.

Other Environmental Programs for Energy Efficiency

The interviews described above cast light on the challenges that the pilot projects faced and provided suggestions for resources ECOFaith could offer in the future. Our next step was to conduct an extensive review of existing programs to see if they could, in full or in part, satisfy the needs expressed during these interviews. We researched both general programs as well as programs aimed at faith-based communities, looking specifically for the resources that the ECOFaith pilot projects mentioned would be useful. These programs included the Greenhouse Gas Protocol, Energy Star for Congregations, Interfaith Power and Light, and GreenFaith. Please see APPENDIX IV for our assessment of each program and its ability to meet ECOFaith's needs.

No tool, process, or program that we evaluated provided a comprehensive energy efficiency and education program for faith-based institutions that included a complete process, an individualized cost benefit analysis of options, a way by which to measure achievement, and specific, locally-focused educational resources and actions. Many of the existing programs would do little to help ECOFaith members prioritize between different GHG-reducing actions, and most tools required a high level of expertise to operate. While some groups provided resources more appropriate for ECOFaith's needs, they charged a fee for their services and were therefore unaffordable for many of the more resource-constrained communities. Finally, no program addressed the wide diversity of size, needs, and resources amongst ECOFaith members.

Results & Discussion

Because the research and interviews that we conducted led us to conclude that existing programs would not be sufficient for ECOFaith, we decided to create our own sustainability program that capitalized on the strengths of the programs we examined yet filled in the gaps based on ECOFaith's particular needs. Our program, which we named the Path of Sustainability, integrates both educational action items and worship building energy efficiency and conservation action items in a resource kit simple and flexible enough for any faith community to follow.

ECOFaith Path of Sustainability: The Participant's Experience

A faith community embarking on the Path of Sustainability would follow these steps:

1. Organize congregation leadership into a united, committed group.
2. Form a Green Team tasked with oversight of environmental activities.
3. Develop an action plan for the congregation to pursue over a one-year period. The action plan will include:
    a. 6 weekly sermons/messages or congregation-wide educational classes that incorporate environmental themes;
    b. 4 energy efficiency or conservation actions, including at least one from each of the following categories: behavior-changing, high-impact, and high-visibility;
    c. 6 educational activities, including at least one from each of the following categories: hands-on, visual/display, and presentation/discussion; and
    d. Administration of the CEC Get Energized Pledge to promote individual environmental action.
4. Inform congregation of action plan progress through a poster that visually displays an implementation timeline and the completion status for each action.
5. Interact with other ECOFaith congregations through regular meetings and "buddy" or mentorship pairings.

Main Program Components

To help congregations implement the Path of Sustainability program, we developed a set of easy-to-use tools and resources. The sections that follow describe in detail our methodology for developing each of the major program components, and our reasoning for including the resource in our toolkit. The major components are as follows:

1. The ECOFaith Refined Process that integrates educational action items and building efficiency items to create a unified program. Congregations on the Path of Sustainability commit to accomplishing six educational action items every year, and four energy efficiency or conservation actions in their first year and two in each subsequent year. We also provide a suite a tools that aid congregations in implementation of the Path of Sustainability;
2. A do-it-yourself energy audit that promotes self-sufficiency and a way for congregations to identify potential energy efficiency or conservation action items within the worship building;
3. A cost-benefit analysis tool to help prioritize and quantify energy efficiency or conservation actions;
4. A set of resources for implementing educational action plans;
5. An action pick list that allows users to create an Action Plan by choosing energy efficiency action items and education action items; and
6. A revised CEC pledge to encourage congregation members to implement personal environmental actions, with an accompanying Pledge Tally Form that aids ECOFaith members in setting congregation goals and displaying results.

For an example of the Path of Sustainability program and all of its supporting resources, please see APPENDIX I.

REFINED PROCESS

Motivation & Objectives

Our client's Program Director and pilot project leaders expressed several concerns with the original process for implementing a sustainability program and recommended several ways in which that original process could be improved. The major recommendations by ECOFaith were: include an implementation phase, provide specific energy efficiency and educational resources and actions, and include a cost-benefit analysis for energy efficiency items (for a list of all of the recommendations and concerns, please see Framing the Problem: Initial Steps on p. 12). We therefore sought to provide a new, refined process that followed non-profit organizational best practices and incorporated ECOFaith's feedback to have flexibility and usability built into the process yet retained the elements that worked well for ECOFaith during the pilot projects. Our revised process incorporates several new aspects that promote the vital components of implementation, self-sufficiency, follow-through, and evaluation to achieve a process that can include any congregation of various size and capability that wishes to join ECOFaith and embark on the Path of Sustainability program.

Methodology

As discussed in the prior section, we first interviewed the Program Director and the pilot project leaders to determine ways in which they believed the process could be improved from the original process. We went through the original process and brainstormed ideas that would address the pilot projects' concerns. We then researched non-profit organizational best management practices to determine how nonprofits can best achieve their goals. Sowa et al. (2004)[35] outlined methods for organizations like ECOFaith to use for maximum organizational effectiveness. First, the success of an organization like ECOFaith can be tied to programmatic success, but that the efficacy of the program must be stated to the stakeholders through displays of visual success. Second, the organization must allow for variability in its structure to accommodate specific contexts. Third, programs can be useful if a mission statement is clearly defined and if the strategic plan is specific in its goals and ways by which to measure achievements. Pawlak and Vintner (2004)[36] state that a well-formulated plan will include objectives that promote concrete and measurable terms, with the criteria to determine whether or not the goals have been attained. The National Science Foundation has a resource list of how to conduct programs in order to have meaningful evaluation for NSF-funded programs,[37] which includes a step-by-step framework for listing goals, objectives, evaluation questions, and stakeholder involvement; this type of analysis worked well within our framework for building a program that emphasizes process and results. We therefore used elements of this type of design and evaluation of their programs to rewrite and reframe the original process.

We next looked into certification programs for ECOFaith, but abandoned the idea when our client stressed the importance of not being too "judgmental" if organizations did not reach intended goals (Ed Bastian, personal communication, July 21, 2010). We also contacted

various nonprofit or government organizations that had implemented certification programs, such as the Santa Monica Green Business Certification and Sustainable Seafoods, and concluded that certification programs can take years to develop and test and therefore would not fit into the timeframe of our project.

Although we had decided not to pursue a full certification program, we felt that some aspects of other programs could help ECOFaith congregations maintain the momentum that had been lacking for in the pilot projects. We therefore interviewed one of the leaders of GreenFaith, a similar East-Coast based organization, (see the section entitled GreenFaith on p. 215 for a full description of this interview) who highlighted some of the elements of the GreenFaith certification program that could work well in the ECOFaith process. GreenFaith's outlined process[38] and Start-Up Kit[39] contain some of the elements that would serve to meet our client's goals for ECOFaith, such as progress reports, tips on how to form a Green Team, and the value of requesting that participants make a formal commitment to ECOFaith.

Results & Discussion

After conducting this extensive research, we were ready to create a revised process that would incorporate our client's feedback and organizational best practices, and yet be flexible enough for any congregation's needs. We retained several important elements from the original ECOFaith process, such as the planning phase, the CEC pledge administered to congregations, . However, the major items that we changed from the original process to the refined process were to incorporate the vital components of implementation, self-sufficiency, follow-through, and evaluation (a visualization of both the original process and the refined process can be found in Table 2 on p.27).

In order to encourage self-sufficiency, we replaced the energy audit conducted by an energy professional with a do-it-yourself version, discussed more in detail in the DO-IT-YOURSELF ENERGY AUDIT section on p. 39. To encourage implementation and follow-through, we reorganized the planning phase to facilitate the creation of an action plan using our cost-benefit tool, the action pick list, and educational resources (discussed in further detail in the EDUCATION ACTION ITEM LIST AND RESOURCES section on p. 29 and the COST BENEFIT ANALYSIS TOOL section on p. 45, and Example of Action Pick List). The creation of an Action Pick List facilitates goal-setting as well as follow-through. To enhance teamwork, we incorporated best practices for the creation of a Green Team and assignment of a buddy congregation to serve as a resource throughout participation. We also included a requirement that several priority items and progress reports be completed within the first three months to create momentum and help with progress from planning to implementation. For the full text of the refined ECOFaith process, please see ECOFaith Process: Path of Sustainability (file name: 01_ECOFaith_Process.docx).

Within the Path of Sustainability program and process, we included several items that facilitate the ease of use of the program by Green Teams. Here, we explain briefly why we included each of these items.

1) **Table of Contents** (file name: 00_Table_of_Contents): This table of contents is an overview for the user for which documents to use in each part of the process, designed for maximum ease of use in order not to overwhelm the user with all of the documents.

2) **Letter of Agreement**(file name: 02_Letter_of_Agreement.docx): The letter of agreement was part of the text of ECOFaith's original process; however, no actual letter existed. The practice of a Letter Agreement was confirmed as a best practice from GreenFaith, who told us that it was important to gain a formal, public agreement. We therefore formalized the letter and also added within the process a requirement that the Green Team/faith leader announce its commitment to ECOFaith in front of the entire congregation.

3) **Overview Brochure** (file name: 03_Overview_Brochure.docx): As part of the revised process, all Green Team members meet with an ECOFaith representative to explain why the Path of Sustainability is important and how their congregation can be involved. The Overview Brochure serves to show Green Team members why energy efficiency is an important facet of sustainability, gives a broad overview of the steps in the Path of Sustainability, and gives a brief history of ECOFaith to put the organization into context.

4) **Pilot Project Information Brochure** (file name: 04_Pilot_Project_Info.docx): This brochure gives background information about what the four pilot projects were able to achieve. The purpose of adding this document was to show potential participants that other congregations succeeded in implementing many measures, so as to make the Path of Sustainability less intimidating and more inclusive.

5) **Vision Statement Examples** (file name: 06_Vision_Statement_Examples.pdf): The Vision Statements were part of ECOFaith's original process, and we kept in this requirement given the feedback from the faith leaders where they mentioned that this was an excellent tool by which to frame their support for environmentalism. In order to help future congregations develop their own Vision Statements, we included example statements from three of the four pilot projects.

6) **Action Pick List** (file name 09_Action_Pick_List.xls): The Action Pick List is an Excel-based tool to help members create a Path of Sustainability yearly action plan that satisfies the Bren-developed program requirements. The Action Pick List contains the Cost-Benefit Analysis tool as well as lists of action items to fulfill the worship-related GHG reduction and education activity categories. Within these lists, members can select which practices they intend on implementing that year as well as actions for long-term planning, and the tool provides real-time feedback on the requirements that have been fulfilled and which requirements are still remaining. In addition, at the click of a button, the Action Pick List takes the user's selected items and automatically generates the action plan onto a print-ready worksheet. It also contains step-by-step instructions so that users can easily refer to directions as they

are using the tool. For a full description of the Action Pick List, please see APPENDIX V.

7) **Progress Reports** (file names 17_Progress_Report_Instructions.docs, 18_3_Month_Progress_Report.docx, 19_1_Year_Progress_Report.docx): In order for ECOFaith to better gauge progress though the Path of Sustainability program and for congregations to keep momentum on the Path of Sustainability, we have provided both three-month and one-year Progress Reports as well as instructions. Through information gathered in the progress reports, ECOFaith can better track potential resource gaps and roadblocks and identify solutions to ensure that ECOFaith members can stay on track with their projects and maintain forward momentum. Additionally, these reports act as a major data source for ECOFaith activity, which will be of vital importance when ECOFaith applies for grants and other funding by pooling together facts about all ECOFaith congregations' accomplishments.

8) **Evaluation by ECOFaith** (file names: Internal_3_Month_Evaluation.docx and Internal_1_Year_Evaluation.docx): ECOFaith personnel will receive the Progress Reports discussed above, and then can use the evaluations we have created in order to assess the level of success of the congregation in the implementation of their chosen program and to identify strengths and weaknesses for each congregation. This step will aid ECOFaith in identifying whether the congregation has transitioned from planning to implementation and areas in which the organization can help the congregation to achieve its goals.

9) **Green Purchasing Information** (file name: 11_Green_Purchasing_Info.docx): Implementing a Green Purchasing Program was one of the original steps in the ECOFaith process. ECOFaith expressed an interest in maintaining this step. While it did not fit into either energy efficiency action items or educational items, we updated the original Green Purchasing plans provided to pilot projects with working links and sources. We provide it within the Path of Sustainability as supplemental material so that congregations can incorporate a green purchasing program as part of the larger effort to practice more environmentally-friendly practices.

10) **Information on Energy-Efficiency Rebates and Financial Incentives** (file name: 12_Rebate_Information.docx): ECOFaith pilot project leaders requested this information in order to help facilitate purchases such as new furnaces, refrigerators, and other appliances. We identified federal, state, and local opportunities that could aid ECOFaith congregations in finding rebates or other financial incentives for energy efficiency action items. This will help to make ECOFaith member congregations more able to engage in high-profile, high-impact action items by giving resources to make these projects more economically feasible.

11) **Path of Sustainability Poster**: (file names: 20_Path_Poster.pct, 21_Path_Poster_Labels.docx, 22_Path_Poster_Instructions.docx) Our literature review on non-profit organizational practices showed that programmatic success must be tied to a visual display of the success. Additionally, our educational

literature review on behavior change suggested that pleasing, simple visuals could help to convey information most effectively. We therefore worked with a graphic design artist to create a 2' x 3' poster that would represent the Path of Sustainability and display progress throughout the year timeframe. The poster has the visual representation of a path, and users display the four energy efficiency items and six education items that they have agreed to conduct within the year. The stickers for the poster contain expected dates of completion and show how much GHGs can be saved by that action (for the energy efficiency items). The idea for this poster is to allow congregations to simply and effectively demonstrate their commitment to the ECOFaith Path of Sustainability as well as show its successes by filling it in as activities are completed.

Table 2: **The Refined Process vs. the Original Process (new elements highlighted in grey)**

Refined Process

Step One: Meeting with ECOFaith and Defining the Vision and Commitment
Introductory Meeting
Letter of Agreement
Buddy Congregation

Step Two: Creation of a Green Team
Recruiting a Green Team (best practices for Green Team makeup)
Introduction to the Path of Sustainability, encouraging environmental behavior
Vision statement

Step Three: Creating the Action Plan
Do-it-Yourself Energy Audit by Green Team & facilities manager
Creation of Action Plan for Path of Sustainability using Action Pick List
Feasibility of Action Plan and finalization of Action Plan
Communication of Action Plan to congregation

Step Four: Implementing the Action Plan
Priority Action Items within first two months
CEC pledge
3-month Progress Report

Step Five: Path of Sustainability and Beyond
Year-end Path of Sustainability Celebration
1-Year progress report
Continuing Action Plan
Re-administer CEC pledge
Buddy congregation reach-out

Original Process[40]

Step One
Introductory meeting between ECOFaith and pilot congregations

Step Two
Congregation assigns break-out groups to address vision statement, educational actions & activities for the entire congregation, energy audit for the worship building conducted by an energy professional, timelines & budget, and a green purchasing program

Step Three
Break-out meetings with sub-groups to "work through their respective tasks"

Step Four
Compilation of a project binder that contains:

a) Vision statement
b) Educational materials for each congregation
c) Buildings and Grounds program compiled by energy auditor
d) A green purchasing program compiled by the energy auditor
e) A schedule of meetings to complete the Project Binder
f) Cost estimates for the suggested goals provided by the energy auditor

Step Five
Presentation of binder to the entire congregation

Step Six
Commitment of congregation to an education timeline
Congregation sets priorities of building and grounds renovations and green purchasing changes.

Conclusion

Our creation of a revised process for the Path of Sustainability program helps congregation actions align with the goals of ECOFaith in a self-sustainable and easy-to-use manner, while also following organizational best practices for programmatic success. By emphasizing elements that encourage implementation and self-sufficiency, diverse congregations can begin, implement, and continue a comprehensive environmental program with little outside help or resources.

EDUCATION ACTION ITEM LIST AND RESOURCES

Pilot Project Education Programs

One of ECOFaith's primary goals is to teach its members about the value of environmentalism in the context of spiritual life. To accomplish this goal, each of the ECOFaith pilot projects outlined an education plan as part of the initial proposal with the expectation that it would be implemented during the pilot project period. The goal of each plan was to inform participants on two main issues:

- How their spiritual texts and teachings ask followers to care for creation
- Environmental issues and problems in the modern world

In order to evaluate the effectiveness of the education programs and determine what could be improved, we interviewed the faith leaders from each of the pilot projects (see Project Definition for description of scoping interview topics). Our main focus for the education section of the interviews was to determine the lessons and actions that had occurred and how community members reacted both to these lessons and to the ECOFaith mission as a whole. The main points we took away from the interviews include:

- All congregations conducted lessons demonstrating that the environment should be a priority in daily life by reviewing sections of their spiritual texts that describe the value of creation and the importance of being a good caretaker
- Most included some type of hands-on training involving specific items such as CFL distribution, reusable bags, or garden composting
- Lessons were sometimes tied to improvements taking place in the building (such as switching to more efficient light bulbs), but not consistently; not all building improvements were well advertised to members
- Congregation members seemed generally receptive to the message, but several leaders were not sure how much of an impact had occurred since participants had so many other issues to be concerned with in their daily lives. One leader said that interest was lukewarm until the possibility of saving money on utility bills was incorporated.

<u>Education and Behavior Change Literature Review</u>

After speaking to the faith leaders about their experiences with the pilot education plans and examining the initial participation in the CEC Pledge, we conducted a literature review to determine the best practices for presenting information and for changing environmental behavior. We researched a number of studies examining environmental initiatives that sought to improve individual behavior and resulted in varying degrees of success. Bringing about environmental change in individuals is a multi-step process, requiring that they be informed and inspired, feel a personal responsibility to act, and have a supportive social network to help the change become a natural routine. When a step in this process is missing or inadequate, the likelihood of behavior change decreases. There are several documented techniques to help inspire, call for, and maintain positive behavior changes; we have reviewed several of these below.

Inspiring Change

The first step in inspiring an individual to change his or her lifestyle to be more environmentally friendly is to educate that person about how and why the problem exists, and **what that person can do about it**.[41] Certain ways of presenting information have been shown to be more effective than others. In general, a positive change in environmental behavior is more likely when:

- **Information is gained through a hands-on, concrete or vivid experience rather than by gaining information indirectly through written material.** Studies in which individuals were given demonstrations or shown engaging videos reported more behavior change than those where individuals were provided with written material.[42] Brochures or flyers distributed by advocacy groups lead to a short term increase in awareness, but are not correlated with behavior change.[43]
- **Information is very specifically related to the desired behavior.** An examination of recycling programs and practices in the United Kingdom found that individuals were more likely to participate when they were informed on the specific materials that can or cannot be recycled in their cities than when they were taught about the need for recycling in general.[44] Broad information does not tend to lead to behavior changes.[45]
- **Information is presented immediately before or at the same time as the possible change in behavior would occur.** Individuals who were presented with energy use information while purchasing appliances were more likely to choose more efficient products.[46] The effect is temporary, however; information gained in the more distant past is less likely to be incorporated into the decision making process.[47]
- **Information is provided on how to reduce the personal costs of action rather than simply on the greater social need.** Cost is a significant barrier for individual behavior change,[48] even when the individual has very positive environmental attitudes.[49] The need for extra time, effort or financial commitments is often borne by an individual, while benefits are widespread and less tangible. If low-cost or cost-reducing options (such as rebates or utility reductions) are publicized, individuals are much more likely to make environmentally friendly decisions.[50]
- **Information is clear, simple and prioritized.** Individuals who are given long lists of possible energy saving actions tend to be overwhelmed or assume all actions have a similar level of impact and reduce consumption less than those given shorter lists focused on high-priority options.[51]

Individuals must be educated on environmental issues before they can fully recognize the problem and their own ability to have a positive impact. They are best able to make the jump from education to action when information is clear, concrete and closely tied to the desired behavior both in content and timing. Education is not the only motivator for change, however; not every informed individual successfully changes his or her behavior

once educated. The next section describes some of the ways to improve motivation when education is not enough.

Calling for Change

In the early years of the environmental movement, behavior theorists often assumed that if people were educated about environmental issues, they would naturally make more beneficial choices. Research quickly proved that to be **untrue**; many other factors affect the likelihood of an individual making and maintaining a lifestyle change.[52] Due to various motivation barriers (see Overcoming Roadblocks below), even informed and well-intentioned people often require additional pressure to change their behavior.

De Young (1993) reviews several common practices to encourage people to enact an environmental change.[53] Their success can be defined in several ways: how reliably the practice results in a behavior change, how universally effective it is across a variety of groups and individuals, if it leads to spillover effects other than the initial behavior change, if the practice causes a behavior change that will be sustained without further intervention, and how fast the change will occur. The best option for enlisting change will vary depending on circumstances, but some of the most common methods are listed below:

Prompting generally implies placing a reminder in the immediate vicinity of where the desired action would be performed, such as a sign near a light switch reminding users to turn it off when they leave the room. Prompting is generally immediately effective on a wide variety of people, but it loses its effectiveness over time or as soon as the prompt is removed. It also does not encourage participants to make additional changes in other areas of their lives.

Material Incentives such as monetary payments for desired actions have a quick and strong effect on behavior, but behavior tends to revert once the incentive is removed. Research suggests that people are much more likely to implement environmental behavior like energy efficiency because they can save money on utility bills. Other research suggests that material incentives have a negative effect on other non-target environmental behaviors because people learn to wait for a reward before changing their behavior rather than acting selflessly.

Social Pressure has a very strong effect on behavior change. In general people seek approval from friends and peer groups, and are very likely to change their behavior to fit in with what they see as socially acceptable. However, when pressure comes from sources that the individual does not feel a personal connection with, such as schools or the government, there is a chance for rebellion against a perceived overzealous intrusion. Because clubs and religious organizations tend to be closely linked with personal values, they are in a better position to shape what is considered the acceptable standard of behavior.

Commitment/Pledging, where participants promise to enact lifestyle changes, appears to be just as effective as incentive systems in terms of speed and reliability of change. It is

best when paired with social pressure, so commitments are made to or in front of peer groups.[54] Pledging has also been shown to be effective after the pledge period ends; researchers theorize that when no specific incentive is provided people find internal motivation that can last and spread beyond the original promise.

Organizers hoping to bring about change should consider what they are trying to accomplish and how much energy they can dedicate before deciding how to proceed. If the desired action is routine and easy to do, a small visual prompt may be the most cost- and time-effective method. If the change must be implemented quickly, social support is not yet established and resources are available, a token reward for participants may help jump start efforts. If there is wider social acceptance of the desired behavior, peer groups should be mobilized to inspire improvements in their members. Finally, direct requests for pledges, particularly between individuals or organizations that are already socially connected, have a strong effect on bringing about positive change.

Overcoming Roadblocks and Maintaining Change

In some cases, individuals who make an initial effort to change their behavior quickly give up, concluding that they don't have the time, ability, or interest. Research has found that initial changes in behavior only become permanent if the changed individual can overcome several potential roadblocks. First, an individual must feel that they have a personal responsibility to act.[55] For example, many consumers believe that reducing fossil fuel energy use can only be accomplished through technologies such as hybrid cars and solar and wind energy; these individuals are more likely to see environmental issues as the responsibility of corporations and the government. Only when people see a role for themselves will they take active steps towards changing their lifestyles by driving less or using less electricity.[56]

Other potential roadblocks are more logistical. Changes that require a heavy time or effort commitment, such as walking instead of driving, or a high upfront cost, such as purchasing more efficient or more durable products, are less likely to occur.[57] Convenience is a major deciding factor even when the less convenient option is still achievable. One study found that recycling rates were significantly higher in areas with curbside pickup compared to areas where residents had to drop off their material at a central collection area.[58] Organizers can help combat such logistical barriers by passing out information on rebates and low-cost options, making the desired behavior as convenient as possible and by providing easy to follow instructions. They should also be sensitive to the limitations of the group they are working with, and avoid turning off potential allies.

By far the most important factor in either preventing or maintaining positive environmental behavior is how the behavior is perceived by the local culture. Individuals tend to be strongly motivated by the approval of friends, family, and social groups to which they belong. An environmental behavior that is viewed as routine or desirable is much more likely to be maintained. At the same time, activities that are harmful to the environment are much less likely to be given up if they are socially acceptable.[59] In the US, using a personal automobile as the dominant method of transportation is considered

normal and acceptable, therefore very few people are willing to give up their vehicle even when they are aware of the negative effects on the environment and on human health.[60] The same is true for eating meat regularly. Recycling, on the other hand, is a positive environmental behavior that is generally seen as socially desirable so people are more willing to participate—particularly when collection bins may be viewable by neighbors.[61]

Support from peers is very important for maintaining environmentally friendly behavior. Staats et al. (2004) found that people who knew each other through school, church, or some other community activity and met as a group to discuss their environmental choices and what additional actions they could take were much more likely to implement and maintain changes than people who did not have such support networks.[62]

Finally, some attempts at change may simply take several attempts before they stick. Repetition shows that the organizer is committed to making the behavior change permanent, and participants are more likely to agree to join.[63]

Pilot Education Program Conclusions

After completing our initial analysis of the pilot project pledge results education programs and our background research on communication and behavior change best practices, we developed several conclusions:

- Because of their importance in shaping personal morals and potential to serve as a valuable social group, faith communities have a huge amount of potential to shape environmental attitudes and behavior.
- While the pilot projects main intention was to teach their congregations about the importance of environmental awareness in their spiritual lives, this is not enough to develop lasting behavior changes. Education plans need to include specific guidance on actions that can be taken and ongoing support networks for those seeking to make changes.
- In many cases, changes made in the building were not adequately publicized to congregation members. Leaders are missing out on excellent opportunities to provide concrete examples of how to incorporate environmentalism into their everyday lives.
- The initial CEC Pledge results show that the potential impact from members making changes in their own homes is much greater than what can feasibly occur in the buildings. Following up with and providing support to pledge participants can improve the effect.
- It would be advantageous for Green Team members to be aware of and apply these best practices to promote lasting behavior change within their congregations. To this end, we created a short simplified outline of our research on motivation and behavior change for inclusion with our program materials.

Education Program Revision Objectives

Once we formulated our conclusions about how the educational aspect of the program needed to be improved, we defined our criteria for a revised program that would better meet the needs of the institutions and would help them fulfill their potential as agents of change. We sought to design a program that would:

- Ensure that building improvements serve an educational purpose through promotional signage and information on how congregation members can implement similar changes
- Ensure that environmentalism was regularly incorporated into all aspects of the institution's life and would be accepted as a social norm, increasing the chance for successful behavior change
- Be flexible enough that all congregations, regardless of demographics or financial ability, will be able to implement a comprehensive and well-designed plan that incorporated the best practices we researched
- Would provide Santa Barbara-specific information on resources and contacts so that education leaders with no knowledge of energy efficiency or environmentalism would know where to start
- Have a built-in method to record plans and progress so that congregations would be better able to set goals and maintain momentum

Education Action Items and Plan

Methodology

Drawing upon our research and defined criteria for a revised set of educational resources, we created a framework for our education plan. First, we decided upon the format and number of educational action items we would require of participants:

- Keeping in mind that repetition of an environmental message is an effective way to enact behavior change, we determined that implementation of six education items during each year of participation would be an effective yet reasonable request.[64]
- Our research indicated that in order to increase the chances of desired behavior change, it is important to relay these lessons in a variety of formats.[65] To this end, we decided that participants would choose from several types of educational action items: hands-on, presentation, and display.
- With the knowledge that, for environmental issues in particular, it is effective to inform participants about why a problem exists and specifically what they can do about it, we decided that each educational action item option would include a concise summary of the "Big Picture Problem" as well as sections on the "Solution" and "Details", complete with localized information and resources.[66]

With this framework established, we compiled a list of potential educational items for inclusion. Our aim was to include education action items that dealt primarily with energy efficiency and conservation, however based on feedback from pilot projects other environmental subjects their congregations were interested and involved in, we allowed several action items that did not have a direct correlation to energy use. Additionally, we

wanted to include enough items to choose from that congregations had sufficient flexibility without being overwhelmed by their options.

Based on our objectives defined above, we also decided to make two actions required by all ECOFaith participants:

- **The inclusion of environmental topics into at least six weekly sermons**

These sermons are a way to retain and promote the spiritual motivation of environmental stewardship in an open format that religious leaders could utilize how they best saw fit.

- **Posting informative signs about implemented building actions**

These signs are an easy way to tie together the two main aims of the ECOFaith program by using the improvements made in the worship building as both motivation and education for congregation members about what actions they could incorporate into their own lives.

Results & Discussion

List of Education Action Items

The following table summarizes the educational action items ECOFaith participants can choose from with a brief description of why they have been incorporated into the program. Please see the Education Action Item Detail for the detailed descriptions and resources for these education action items.

Table 3: Complete List of Educational Action Items and Reasoning for Inclusion

#	Category	Educational Action Item	Reasoning for Inclusion/ Additional Information
1	Required	Include environmental content in at least six weekly services	Increase environmental awareness and promote environmental stewardship as a facet of spiritual life.
2	Required	Display signs for energy efficiency action items accomplished*	Tie together efficiency improvements in the worship building with congregational education.
3	Hands-on	Organize a worship building workday	Increase energy efficiency while educating and fostering a sense of community.
4	Hands-on	Organize a field trip for congregation	Connect congregants back to the earth to reveal to them the cumulative impact of their own and others' actions.
5	Hands-on	Rent a Kill-a-Watt meter or other energy audit tool to demonstrate usage	Make the abstract concept of energy more tangible by showing how a specific action reduces electricity use.
6	Hands-on	Check congregation members' tire pressure	A third of motor vehicle tires are not kept properly inflated, decreasing gas mileage efficiency.

7	Hands-on	Encourage congregation members to conduct a personal energy audit-related activity	Performing a home energy audit or calculating a personal carbon footprint increases awareness of the impact our everyday actions have on the environment.
8	Hands-on	Conduct an environmentally-themed fundraiser	Environmentally-focused fundraising can be a useful way of raising extra money for building upgrades while being educationally valuable on their own.
9	Hands-on	Host a community yard sale, or book or clothing swap	Keep useful items out of the landfill and prevent the unnecessary manufacturing of new products.
10	Hands-on	Encourage lending or giving between congregation members	Reduce emissions and waste from purchased items that we don't use everyday by sharing within the community.
11	Hands-on	Host a Bike-to-Worship day	Transportation accounts for 30% of US CO2 emissions (EPA, 2009). Bike riding can have a significant effect on reducing climate change.
12	Hands-on	Conduct an informal waste audit	Landfilled waste contributes to climate change, groundwater contamination and air pollution. Understanding waste disposal habits is the first step towards changing our behavior (EPA, 2008).
13	Hands-on	Organize a trip to a local environmental event	Strengthen the connection between congregants and their community and environment.
14	Hands-on	Start a composting program at place of worship	Food waste that is landfilled cannot decompose properly; if this waste is composted it reduces the burden on landfills while providing nutrient-rich material to improve garden health.
15	Presentation	Integrate environmental materials into faith education classes	Promote environmental literacy to congregation members of all ages to make individuals more capable of making informed and responsible decisions.
16	Presentation	Invite a guest speaker to a service, class, or study group	Learning about environmental issues from an engaging expert can provide motivation and knowledge on how to begin making a difference.
17	Presentation	Host a movie showing	Offering vivid information with a variety of media to help people retain environmental

			messages.
18	Presentation	Invite congregation members to present a demonstration or talk	People are more likely to trust and act upon information that comes from a reliable source they are socially connected to.
19	Presentation	Conduct a discussion section amongst congregation members	Social support and group interaction is an integral part of changing behavior.
20	Presentation	Present a skit demonstrating an environmental action	Impart a message in a vivid and personalized format from a trusted source.
21	Presentation	Ask congregation to conduct an environmental action relevant to their worship activities	Create a carpooling system for congregants or encourage recycling or sharing of weekly bulletins as simple positive environmental actions.
22	Display	Include environmental facts in bulletins	Provide congregation members with information of specific actions they can take to increase efficiency and awareness.
23	Display	Exhibit a poster, sign, or display regarding an environmental issue or action	Provide a long-term visual display about an environmental issue that is relevant to the community.

* See below for detailed methodology for sign templates and calculations

Worship Building Signs

In devising the template for our educational signage, we aimed to create signs that: are visually appealing and demonstrative, provide specific information about what upgrades had been accomplished in the participating worship building, present information on potential financial savings for congregants that choose to take the same actions, present information on potential CO_2 emissions reduction in accessible terms, and offer additional information or resources for related rebates. To see an example of the sign, please see the Example of an Action Item Sign as well as the Example of an Action Sign in Spanish.

To assess the potential financial savings and CO_2 emissions reductions for each implemented action, we utilized the corresponding line item calculations from our revised CEC pledge. However, because the numbers used in the pledge are on an individual basis, we multiplied the annual individual CO_2 savings by 2.87, which is the average number of

people per household. In order to provide CO_2 emissions reductions in terms that are more direct and understandable for congregation members, we used EPA's Greenhouse Gas Equivalencies Calculator to convert pounds of CO2 emissions avoided to units such as gallons of gasoline, barrels of oil, or trees planted.

The following is an example of the wording used on each of our 23 customizable sign templates:
"In the winter, (Name of institution) turns the thermostat down to 68° when it is occupied and to 55° when unoccupied… and you can too!

Why? Because keeping your thermostat at too high a temperature in the winter can over-heat the building and use a lot of energy in the process. Turning your thermostat down just a few degrees can save $20 a year as well as reduce your carbon footprint by 209 lbs of carbon dioxide (CO_2) per year. That is equivalent to saving 11 gallons of gasoline!

Want to learn more about central heating systems and thermostats, and rebate programs that can help you maintain your system for less? Go to http://www.fypower.org/res/tools/rgl.html"

Conclusion

The revised education plan we have created best meets the needs of ECOFaith through a simplified and targeted framework. The plan still achieves the original goals of informing participants on how their spiritual teachings promote care for creation, and about environmental issues and problems in the modern world. However, our revisions incorporate a more holistic view and flexible options for providing congregations with knowledge and resources for environmental action. Additionally, the required education action items now tie together the building efficiency and educational aspects of the program while incorporating environmental awareness and action into spiritual life an expected social norm. This new set of educational resources will help ECOFaith fulfill their potential as agents of change throughout their participation in the program and beyond.

DO-IT-YOURSELF ENERGY AUDIT

Motivation & Objectives

Energy auditing is an effective first step towards understanding how a congregation can reduce its worship building's energy consumption, saving the institution money and lowering its environmental impact. The original ECOFaith process began with a complete energy audit and a building and grounds assessment by a trained professional. The creators of ECOFaith considered this green building and retrofitting element of the process the singular factor that made ECOFaith unique compared with other existing energy-efficiency programs. However, hiring professional energy auditors for the three eligible pilot projects resulted in the disbursement of over 60% of the organization's initial grant funding as payment for their services.[67] The resulting deficit in grant funding led to shortcomings in implementation and follow-through and created an early loss in momentum for the pilot program.

While we acknowledged the importance of an energy audit exercise, we recognized that using such a large portion of grant funding on these professional energy audits was unsustainable for the persistence of the ECOFaith organization. We determined that using a *do-it-yourself* energy audit would be the most useful option for religious institutions that often only have enough funding to deal with the low-hanging fruit – the high impact, reasonably priced action items. Our first step was to establish our criteria for a suitable energy audit for faith community use:

5. **User-friendly** – Green Team members lacking prior knowledge of energy auditing procedures or energy efficiency principles must be able to follow our instructions without the help of a professional.
6. **Relevant** – Religious institutions have different energy-use profiles than that of the residential or commercial sector. Additionally, energy use profiles within the state of California tend to be different than that of nationwide profiles. The instructions and recommendations we incorporated needed to address both of these issues in order to be applicable to program participants.
7. **High-Impact** – The recommendations made in the energy audit needed to reduce the energy consumption of the participating institution in a proven and preferably quantifiable manner.
8. **Time- and cost-efficient** – In order to keep the process a reasonable task for volunteer Green Team members, the building walk-through needed to be concise enough to complete within a couple hours, instead of being a multi-day undertaking as it can often be for a professional energy audit.
9. **Consistent with program resources** – To maintain a common thread between all elements included on the Path of Sustainability, elements of the energy audit procedure needed to be consistent with all the tools provided to participants by ECOFaith.

Methodology

First, we evaluated existing energy audit tools and resources to determine if there was an existing do-it-yourself energy audit tool or resource that would fulfill our criteria.

Our group members attended a workshop put on by Southern California Edison entitled "Just Do It! How to Get Started with an Energy Efficiency Survey." The course instructed participants how to complete a do-it-yourself energy audit focused on building systems and the most effective areas to target. It provided an overview of common energy systems in most buildings, outlined how these areas contribute to the overall cost of operating a building, and instructed how to estimate the savings potential of energy-saving options.

From this workshop, we learned that in both the commercial and residential sector, the largest areas of energy-consumption – and thus the greatest opportunities for improvement – are generally the lighting and HVAC systems in a building.[68] This indicates that these are the systems on which a broad-scale do-it-yourself energy audit should primarily focus. General principles for efficiency improvements highlighted in the workshop included:

1) The most effective ways to save on lighting costs are:
    a) Reduce illumination levels
    b) Increase light source efficiency
    c) Increase fixture efficiency
    d) Reduce operating time

2) The most effective ways to save on HVAC systems are:
    a) Inspect and improve operations & maintenance procedures
        1) Repair air and water leaks
        2) Clean all filters and coils
        3) Utilize automated building systems
    b) Replace old, inefficient HVAC equipment with high-efficiency equipment

The workshop then recommended the most effective method for conducting a building survey. Relevant tips included:

- Use a data collection form that fits your needs
- Identify types of HVAC equipment, lighting, refrigeration, etc.
- Make on-site measurements if possible
- Look for obvious operations and maintenance opportunities
- Ask the question: What capital improvements might work?
- Get nameplate data: model number, voltage/amperage, accessories
- Don't waste time collecting data you won't use
- Talk to property owner and facilities managers to find hidden problems

After completion of the workshop, we reviewed several other in-depth energy audit resources in order to assess their viability and identify additional efficiency actions that could provide a substantial reduction in energy use. These included:

1. *U.S. Department of Energy, Energy Efficiency and Renewable Energy "Do-It-Yourself Home Energy Assessments"*[69]
   Includes instructions for identifying problems during a simple building walk-through and prioritizing energy efficiency upgrades. Highlighted areas included locating air leaks, inspecting insulation, HVAC and lighting.
2. *ASHRAE Level 1 Walk-through Analysis*[70]
   These are broad energy audits that look primarily at low-cost and no-cost measures. They typically include an audit of the entire building's energy consuming equipment and a study of past utility bills and are not focused on a specific type of building or energy-use sector.
3. *Southern California Edison "Online Business Energy Survey"*[71]
   Includes a free energy use assessment tool aimed to help business customers gain a better understanding of their company energy usage and costs.
4. *DOE & Lawrence Berkeley Lab's "Home Energy Saver Energy Calculator"*[72]
   Detailed online audit format that requires extensive household information including: age of occupants, house shape, exterior shading, landscaped tree height, insulation ratings, and other values that can be extremely difficult or time-consuming to gather or measure.
5. *Federal Citizen Information Center's "Weatherize Your Home"*[73]
   Provides instructions on how to identify problem areas and properly caulk and weather-strip your building.

These energy auditing resources were either too vague, too narrowly-scoped, specifically oriented towards the residential or commercial sector and therefore not targeted to worship buildings, or excessively detailed without providing any resources or education on how to implement their recommendations. We then decided to devise our own energy audit procedure that drew from these resources, but satisfied our criteria by addressing the shortcomings we discovered in existing tools.

Results & Discussion

Determining which building retrofitting and behavior-change actions items to address

After thoroughly researching existing energy audit procedures and the most effective energy-saving actions, we developed a comprehensive list of actions for potential inclusion in our own do-it-yourself energy audit. Actions included operations and maintenance actions as well as capital improvement options. We then evaluated each option for satisfaction of the objectives we outlined for the energy audit. The actions that were user-friendly, relevant, impactful, consistent, and time- and cost-efficient were then incorporated into the final energy audit procedure. The final list consists of the following table:

Table 4: Items included in the Do-It-Yourself Energy Audit

#	Building Area	Action	Reasoning for Inclusion
1	Lighting	Identify, count and characterize use of lighting fixtures and light bulbs	Lighting is a significant energy-user for all energy-use sectors; identifying and replacing inefficient light bulbs is a simple yet high-impact action.[74]
2	Lighting	Determine if light fixture covers or windows are dirty or yellowing	Dirty fixtures result in wasted electricity usage when light cannot penetrate particle matter.[75]
3	Lighting	Identify lighting usage patterns	Replacing manual light switches with motion sensors or dimmers is an effective way to limit the possibility of lighting rooms that are not in use.[76]
4	Lighting	Test lighting levels and determine if rooms are being properly lit based on usage	Over-lighting wastes energy. Removing fixtures or excess light bulbs or better-utilizing day-lighting is an easy and effective solution.[77]
5	Lighting	Identify and replace old and inefficient fluorescent lighting	Old fluorescent bulbs can be running at 60% efficiency and unnecessarily wasting energy. Replacement of bulbs before they burn out is the most cost-efficient option.[78]
6	Lighting	Identify and replace incandescent exit signs	Although there may only be a small number of exit signs, those that remain lit throughout the day can become significant energy-consumers.[79]
6	Lighting	Avoid using dark-colored wall covering or flooring	Darkly colored rooms do not effectively reflect light. Repainting walls a lighter color can be an effective option.[80]
7	HVAC	Locate and identify furnaces and characterize use patterns	Classifying set temperature, age and efficiency rating of furnaces will help determine if the furnace is inefficient and should be repaired or replaced.[81]
8	HVAC	Locate and identify air conditioning units and characterize use patterns	Classifying set temperatures, age and efficiency rating of air conditioners will help determine if the unit is functioning efficiently.[82]
9	HVAC	Analyze patterns of use for thermostat	Determining if you are over-heating or over-cooling and making the appropriate adjustments on a programmable thermostat is a simple and effective action.[83]
10	HVAC	Determine frequency of scheduled HVAC maintenance	HVAC units can lose approximately 2% in efficiency for every year they go without servicing.[84]
11	HVAC	Determine frequency of air filter replacement	Dirty filters cause HVAC systems to work harder and use more energy than necessary. Changing filters regularly is easy yet crucial.[85]

12	HVAC	Determine frequency of fans, blowers, condenser and evaporator coil cleaning	Dirty coils and fans cause HVAC systems to work harder and use more energy than necessary. Cleaning these components regularly is easy yet crucial.[86]
13	HVAC	Assess furnace, water heater, ducts and pipes for leaks and faulty insulation	Improperly sealed/insulated ducts and pipes can allow heat to escape which causes excessive energy usage.[87]
14	Weatherization	Check doors, windows, outlets, etc for air leaks	Heat escapes from a leaky building causing unnecessary energy use. Installing weather stripping and sealing holes is extremely important.[88]
15	Weatherization	Determine whether building is properly insulated	Improperly installed insulation causes unnecessary heating or cooling.[89]
16	Miscellaneous	Determine whether office equipment is properly powered off when not in use	Electronics can use power even when in power save mode, and this can add up. Using smart power strips and identifying the worst energy-users is the first step to fixing this problem.[90]
17	Miscellaneous	Determine whether refrigerator is functioning efficiently	Verifying if refrigerator door is sealing properly and condenser and evaporator coils are clean will help assess if unit is using energy efficiently.[91]
18	Miscellaneous	Determine whether restroom and kitchen water fixtures and pipes are functioning properly	Particularly in California, water usage is closely linked to energy usage. It is important to verify that there are no leaks and that fixtures are not old and inefficient.[92]

Developing a user-friendly energy audit process

Drawing from the principles learned through the SCE workshop and our research of both audit tools and the most impactful energy efficiency actions, we assembled a step-by-step energy audit procedure that addressed major areas of energy consumptions in a worship building. The audit is split into sections designated by building systems: lighting, HVAC, building envelope/weatherization, and miscellaneous. It consists of a two-part process: the building walk-through, and the post-walk-through energy analysis tool that includes education about each element of the audit as well as resources for how to take any recommended retrofit/repair/replacement actions.

Providing a tool for tracking utility information

In addition to providing ECOFaith participants the tools to complete their own energy audits, we also wanted to offer them with an easy, visual way to track energy savings achieved through their participation in the program. To this end, we created a simple utilities tracking form where members can enter up to five years worth of natural gas or electricity usage from their utility bills. This record-keeping tool is an Excel spreadsheet that automatically generates graphs so faith-communities can quickly get a sense of how their energy use is trending in the long-term. It is important to note, however, that

fluctuating occupancy rates, varying regional temperatures, and several other factors can cause energy use to remain level or even increase even after successful implementation of energy efficiency measures in places of worship. For this reason, this utility form is an optional tool for congregations to use, and while useful, it should not be relied upon as a measure of achievement or shortcoming.

Conclusion

Using our do-it-yourself energy audit, ECOFaith congregations now have a tool that helps them gain the knowledge about what building upgrades are most relevant and useful to their individual buildings while still maintaining self-sufficiency. Once participating institutions perform this audit, they are well-equipped to then utilize our cost-benefit analysis tool to choose and prioritize the building action items that are most in-line with any budgetary or time-constraints. Additionally, now that ECOFaith has access to a no-cost energy audit resource, any future grant funding can be better allocated towards helping participating congregations implement the actions they have chosen instead of paying for under-utilized services.

COST BENEFIT ANALYSIS TOOL

Motivation & Objectives

One requirement from the ECOFaith Path of Sustainability is that members complete four actions a year to reduce worship-related GHG emissions. During our pilot project interviews, we found that some of our client's major barriers to implementing suggested actions were lack of funding, time, and expertise. Given the pilot project congregations' resource constraints and limited experience with the potential benefits of energy efficiency investments, faith communities often did not undertake GHG-reducing actions that required a significant investment, viewing them as financially impractical. In addition, some pilot projects reported that they felt overwhelmed with information about the possible environmental actions they could take, making it challenging to identify and prioritize the feasible, measurable, and high-impact recommendations.

The pilot projects identified that one major opportunity for ECOFaith to help them was by making it easier to choose the least-cost, highest-impact actions. In addition, they requested that the cost data and any supporting resources be locally-focused to the Santa Barbara area. Finally, several faith communities wished that at least some of the recommended actions could be low or no-cost because their budgets would not allow for any significant retrofitting investments.

In answer to the challenges and opportunities we found through the pilot project qualitative assessment, we developed a cost-benefit analysis tool that compares practices to reduce worship-related emissions from religious buildings and events. In implementing the tool, we sought locally-relevant cost data and expertise and aimed to include a number of inexpensive actions. Our objective was to help faith communities channel their funds and enthusiasm more effectively and to help them maintain momentum by identifying feasible actions.

Another challenge ECOFaith pilot projects reported was that gathering metrics for evaluation of their implemented actions was difficult and frustrating. They struggled to set an appropriate baseline, and their utility bill data did not clearly reflect improvements since energy usage fluctuates based on factors such as weather and building occupancy. Consequently, another advantage of the cost-benefit tool would be to provide reasonable estimates of the GHG reductions achieved through implemented actions. By quantifying these GHG reductions, the tool could help ECOFaith report to its funders the environmental benefits their investments produced.

Methodology

<u>Developing an exhaustive list of potential actions to reduce worship-related emissions</u>

The cost-benefit tool provides a suite of energy efficiency and other GHG-reducing actions that the faith community can implement in its worship building and for its events. In

developing this list, we drew from the energy audit we created and also conducted a wide review of existing action lists, focusing on ones designed specifically for faith communities, such as those provided by ENERGY STAR for Congregations and Interfaith Power & Light. Because we only found a handful of faith community-oriented resources, in order to establish an initial exhaustive pool of actions we also examined lists aimed at commercial and residential audiences. Since several academic papers had already collated lists of energy efficiency actions from a number of advocacy organizations, we were able to leverage these studies' results.

Screening analysis to understand major sources of worship-related GHG emissions

One major omission we noted in our research was that few of the resources considered actions to reduce Scope 3, or embedded, emissions arising from the manufacture or provision of goods and services for the faith community. In an effort to understand the importance of these indirect emissions in the overall worship-related carbon footprint, we conducted a screening analysis with three of the ECOFaith pilot projects. The results of the screening analysis would inform our decision on whether or not actions to reduce indirect emissions should be included in our cost-benefit analysis tool.

The screening analysis provided a high-level estimate and breakdown of a particular faith community's GHG emissions. This analysis included direct energy consumption from natural gas combustion, staff business driving, and using electricity, as well as indirect emissions from purchasing goods and services such as food, office products, or landscaping or telephone service. In order to get the necessary information, we contacted each ECOFaith pilot project to canvass for volunteers who could gather the data needed for our assessment. Through face-to-face interviews or by email, depending on the preference of the faith community representative, we administered our questionnaire, which elicited rough estimates of staff-related travel, expenditures on goods and services, and congregation travel to worship services and activities. Note that we had already collected the pilot projects' natural gas and electricity usage during our earlier quantitative assessment (see Quantitative Assessment of Pilot Projects on p. 15).Our questionnaire was modeled off the Cool Congregations carbon calculator,[93] which was designed by the non-profit organization Interfaith Power and Light (IPL) to help congregations measure their carbon footprint. We chose the Cool Congregations calculator over other resources because the IPL tool is designed specifically for faith communities and includes the emissions sources most relevant to our clients. See APPENDIX VI: Questionnaire for Faith Community Carbon Footprint Screening Analysis for a copy of our questionnaire.

To analyze the results, we chose emission source categories that would help us design relevant GHG-reducing actions:

- Utilities: Electricity and natural gas consumption. Relevant actions include building retrofits to improve energy efficiency, installing renewable energy sources, or undertaking behavior changes or curtailments to directly reduce consumption.

- Congregation transportation: Gasoline combusted while transporting congregation members to and from worship services or activities. Note that emissions from the individual lifestyles of congregation members are addressed with the Pledge (see GET ENERGIZED PLEDGE AND TALLY FORM on p. 67) and through congregation education (see EDUCATION ACTION ITEM LIST AND RESOURCES on p. 29). Relevant actions include encouraging carpooling, walking, bike-riding, or taking public transportation to worship events.

- Staff & other transportation: Gasoline combusted while transporting staff on business-related travel or indirect emissions from staff airplane travel. Relevant actions include teleconferencing or communicating remotely (e.g. through telephone and email) when possible. If this category proved to have been a larger component of the community's carbon footprint, we would have conducted a more detailed analysis of ways to reduce associated emissions.

- Food: Indirect emissions from food production. Relevant actions include purchasing a smaller proportion of meat and dairy products.

- Other goods and services: Indirect emissions from manufacturing goods and providing services. Relevant actions would depend on the type of good or service purchased. If this category proved to have been a larger component of the community's carbon footprint, we would have conducted a more detailed analysis of ways to reduce emissions from the relevant goods and services. Note that spending cutbacks in certain areas may be unrealistic depending on the priorities of the faith community and the services it wishes to provide.

We then calculated the emissions associated with each source:

- Natural gas: Faith community representatives provided us with natural gas consumption data from their worship buildings for the most recent 12 months for which they had utility information.* We summed each month's consumption to calculate the building's annual consumption. We then multiplied the annual natural gas consumption by an emission factor (EF) of 5.306 kg CO_2e/therm[94] (assuming a medium High Heating Value of 1025) to compute the annual GHG emissions from the building's natural gas combustion. *Calculation: annual natural gas consumption (therms/year) * EF (kg CO_2e/therm) = annual natural gas GHG emissions (kg CO_2e/year)*.

  * One faith community, the Islamic Society, does not own its own worship building and so shares its utilities with a number of other building tenants. The Islamic Society representative reported that the community has an agreement with the property owner to cap its utilities at $150 a month. For the purposes of this analysis, we assumed that $50 would be used for water/sewer/trash, and the remaining $100 would go toward electricity and natural gas. Since we could not know the breakdown between natural gas and electricity, we conducted our analysis assuming a best-case scenario ($100 toward electricity) and a worst-case scenario ($100 toward natural gas).[95]

- Electricity: Similarly, we summed monthly electricity usage data to calculate the building's annual consumption, which we then multiplied by an EF of 0.330 kg CO_2e/kWh[96] to compute the annual GHG emissions from the building's electricity usage. *Calculation: annual electricity usage (kWh/year) * EF (kg CO_2e/kWh) = annual electricity GHG emissions (kg CO_2e/year)*.

- Congregation driving: Because the scope of our project did not allow for a survey or other direct measurement of the congregation's transportation modes, vehicle occupancy, vehicle fuel efficiency, distance traveled, or other pertinent worship commute data, we made a number of assumptions about the congregation's driving habits. Note that we tested these assumptions in a sensitivity analysis (described below).

Average vehicle occupancy	2 people
Average round-trip distance	10 miles
Average fuel efficiency of congregants' vehicles	22.6 MPG[97]

  To provide a full picture of the emissions associated from driving, we wanted our motor gasoline EF to incorporate both the direct (tailpipe) emissions (8.86 kg CO_2e/gallon[98]) as well as indirect emissions from mining, processing, and refining the fuel (2.28 kg CO_2e/gallon[99]). Therefore, the gasoline EF we used was 11.14 kg CO_2e/gallon. Faith community representatives provided the final pieces of information we needed: the percentage of congregation members who commuted to worship activities by car, the number of people who attended each type of worship activity (e.g. services, study groups, choir practice, etc.), and the frequency of the event (e.g. once a week, twice a year, etc.). We then calculated the congregation driving emissions as follows:
  - Number of cars at each activity: *(% of congregants who travel by car * # congregation members who attend each activity) / vehicle occupancy*
  - Vehicle miles traveled each year: *# cars at each activity * round-trip distance * # times activity held per year*
  - Gallons of gas used each year: *vehicle miles traveled each year / average vehicle fuel efficiency*
  - Annual GHG emissions from driving: *gallons of gas used each year * EF of motor gasoline*

- Purchased goods and services: To calculate the GHG emissions associated with goods and services, we used the Comprehensive Environmental Data Archive for Economic and Environmental Systems Analysis (CEDA) 4.0.[100] CEDA 4.0 is a suite of environmentally-extended input-output databases that support various environmental systems analyses, including carbon footprinting.[101] Among other environmental data, the databases provide GHG emissions factors for products in terms of kg CO_2e/U.S. dollar of economic value. Because responses to our questionnaires gave the faith communities' annual expenditures on a variety of

goods and services, we could calculate the indirect GHG emissions associated with those purchases using CEDA's emission factors. Economic value in CEDA is expressed in producers' prices, so we first had to convert the questionnaire responses from consumers' price[102] to producers' price using a price conversion factor that CEDA 4.0 provided. Also, prices were expressed in 2002 dollars, so we had to convert from 2009 dollars (2010 data is not yet available) to 2002, using a price deflator specific to each category.[103] One concern with our method is that donated supplies and services do not count toward a faith community's carbon footprint because the expenditures for those items are not captured centrally. Nevertheless, this scenario, through relevant to certain goods used by the Islamic Society, is not the norm. APPENDIX VII: CEDA4 Product Emission Factors Used in Screening Analysis provides a list of the CEDA categories we used, and the emission factor, price conversion factor, and price deflator for each category.

Calculating the emissions for the food portion of the goods and services was more complicated. The CEDA categories for food are narrower than what was appropriate for a questionnaire. For instance, "poultry processing," "milk," and "bakery products" are a few examples of CEDA food categories. As it is unrealistic to expect faith community representatives to know how much money was spent on each particular food item over a year, we decided to run our analysis assuming a best-case food scenario (i.e. low emissions) and a worst-case food scenario (i.e. high emissions). The questionnaire only asked that respondents separate meat purchases from the rest of the food expenses as meat production results in significantly higher emissions than other food products. For details on the categories chosen for the best-case and worst-case scenarios, please see APPENDIX VII: CEDA4 Product Emission Factors Used in Screening Analysis.

As Figure 1, Figure 2, and Figure 3 show, Utilities (natural gas and electricity usage) and Congregation Driving comprise the bulk of faith communities' GHG emissions, even using a worst-case food scenario (and, in the case of the Islamic Society, a best-case utilities scenario). To test the assumptions we made in calculating the congregation driving emissions, we re-ran the analysis with a much more optimistic set of parameters:

Average vehicle occupancy	3 people
Average round-trip distance	5 miles
Average fuel efficiency of congregants' vehicles	27.5 MPG[104]

Under the optimistic set of assumptions, the share of emissions coming from congregation driving dropped from 79% to 50% at the Islamic Society, from 30% to 18% at Second Baptist, and from 85% to 61% at Holy Cross. While the reductions are dramatic, congregation driving still represents a large proportion of emissions even in the optimistic scenario.

Given the relatively small proportion of emissions that result from purchasing goods and services, we decided not to pursue developing actions that would reduce this type of indirect emissions. Furthermore, designing actions to reduce goods and services consumption can be challenging as each type of good or service requires a different solution, and no single category captured a large enough emissions share to make the task worthwhile. Nevertheless, we recognize that indirect emissions comprise a larger part of individual carbon footprints, and we address this issue through our education action items and pledge.

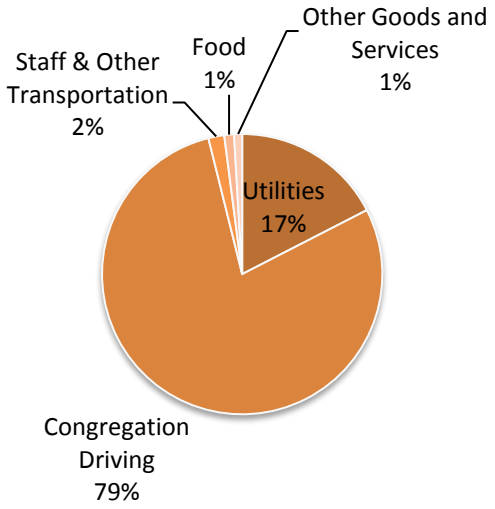


Figure 1: Islamic Society GHG Emissions Breakdown with Worst-Case Food Scenario, Best-Case Utility Energy Scenario, and the Original Congregation Driving Assumptions

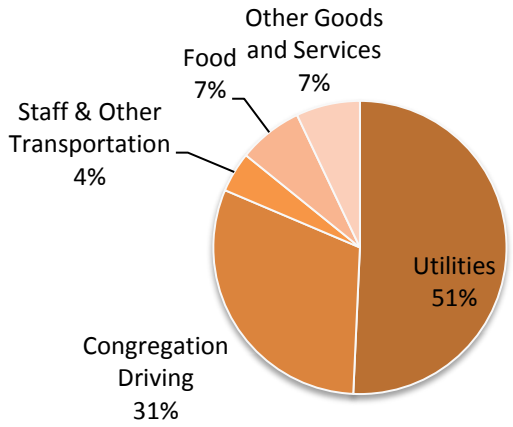


Figure 2: Second Baptist GHG Emissions Breakdown with Worst-Case Food Scenario and Original Congregation Driving Assumptions

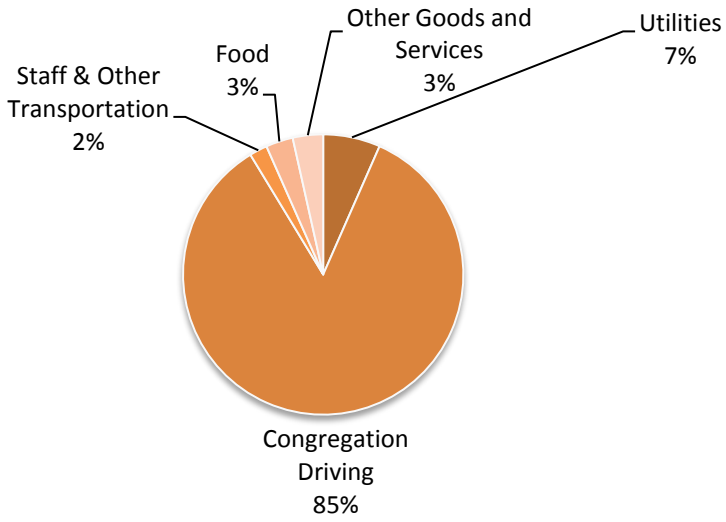


Figure 3: Holy Cross GHG Emissions Breakdown with Worst-Case Food Scenario

Targeting important actions

Researchers studying the potential of dramatically reducing U.S. carbon emissions through individual household actions suggest that long laundry lists of actions can be overwhelming, confusing, and ineffective.[105] Though these studies focus on household actions, the same reasoning can be applied to faith communities as well. Because many of these lists are not prioritized by impact, they can even be counterproductive by making people feel they have satisfied their responsibilities when, in fact, they may have done little to reduce their actual GHG emissions.[106] Therefore, in designing the list of actions for our cost-benefit tool, we focused primarily on high-impact activities, defined as actions that have the potential to reduce the most GHG emissions.

Nevertheless, our interviews with ECOFaith members as well as our project goals for the cost-benefit tool informed our decision to include some other important considerations, which we list below.

Criteria that had to be met:

- Limit list to actions with available GHG reduction data: For actions to be included on our list, their associated GHG reductions had to be quantifiable. Only with this data could we estimate an action's potential impact and weigh its financial costs and benefits.

- Limit list to actions relevant to most faith communities: In the interest of keeping our list short and effective, we omitted actions that would not be applicable to most faith communities. For example, many groups do not own clothes washers or dryers. Therefore, we did not include actions pertaining to those appliances.

Action traits that the list should prioritize:

- Prioritize high-impact actions: One of ECOFaith's main objectives is to reduce GHG emissions from worship buildings. High-impact actions can achieve this aim most effectively.

- Prioritize high-visibility actions: As we discovered in our quantitative assessment of the pilot projects, one of the largest positive impacts that faith communities could effect is through influencing their congregations. Therefore, a primary goal of these GHG-reducing actions should be educating congregation members on energy efficiency and conservation. Consequently, we made sure to include high-visibility actions that building users are likely to notice without the help of signs or other informational campaigns, even though these actions' actual GHG-reducing impact may be relatively lower.

- Prioritize actions that require behavior change: Behavior-changing or curtailment actions often require a high level of congregation involvement and can therefore stimulate environmental awareness. Also, by changing their habits at the worship building, congregation members may be more likely to adopt those habits at home. Finally, curtailment actions involve a sacrifice by building occupants, either of convenience or comfort, and so at least passive participation in the action.

Action traits that the list should include:

- Include no- or low-cost actions: Many of the faith communities we spoke to had limited budgets for building retrofits and maintenance. Even though many energy efficiency retrofits would eventually earn back their cost in utility savings, some communities lack the access to capital needed for these upgrades. In order to allow the largest number of communities to participate in the Path of Sustainability, we felt it was important to include a suite of no- or low-cost actions. Furthermore, no- and low-cost actions tend to be more immediately implementable. Because we require one action to be completed within the first three months of embarking on the program and another three actions in the first year, quick implementation is an important benefit of these no- or low-cost actions.

- Include actions with existing momentum: Though most of the items on our list are energy efficiency or conservation actions, we included installing solar panels in our list because of the existing interest and excitement around this action. In our materials, we emphasize the principle of reducing energy load before installing renewable energy systems because this approach is more cost-effective and reduces more environmental impact. Nevertheless, we recognize that congregation enthusiasm and visual symbols can be important tools to motivate environmental concern.

- Include actions that do not require building ownership: Some faith communities, such as the Islamic Society, may not own their worship buildings. In order for these

members to participate, we needed to include actions that could be implemented even without building ownership.

By the end of this process, we had winnowed the list from 59 original items to 23 (see APPENDIX VIII: Initial Exhaustive Pool of Potential Actions to Reduce Worship-Related GHG Emissions for the original list of the items we considered, and our reasoning for including or excluding each action from our final list). The shorter list enabled us to emphasize the most impactful, visible, behavior-changing, and relevant items with quantifiable GHG emissions reductions. Many of the actions that we culled from the list, however, are covered in our energy audit (see DO-IT-YOURSELF ENERGY AUDIT on p. 39). These actions can still receive credit toward the Path of Sustainability, though they may not satisfy any of our category requirements (High-Impact, High-Visibility, and Behavior-Changing).

The cost-benefit tool divides these 23 proposed actions into three categories: actions with a one-time, upfront cost; actions that require paid equipment maintenance; and no-cost actions. The different categories vary in the types of relevant cost-benefit information:

- Actions with a one-time cost:
    - Estimated annual GHG reduction
    - Upfront cost (both a low-end and an average cost)
    - Estimated annual utility bill savings
    - Payback period
    - Annual GHG reduction per dollar of upfront cost

- Maintenance actions:
    - Estimated annual GHG reduction
    - Annual cost (both a low-end and an average cost)
    - Estimated annual utility bill savings
    - Estimated net annual savings
    - Annual GHG reduction per dollar of maintenance cost

- No-cost actions:
    - Estimated annual GHG reduction
    - Estimated annual utility bill savings

<u>Estimating the GHG reduction for each action</u>

The first step in estimating GHG reductions is to calculate the energy savings for each action, which we could then multiply by an emissions factor, either for natural gas or electricity, depending on the type of energy used. We estimated the energy savings for each action in one of two ways:

- General end-use reduction: Many actions reduce energy consumption from a certain end-use function such as heating, cooling, or lighting, whose efficiencies depend on

more than one appliance. For example, heating efficiency depends not only on the furnace but also the building envelope, which in turn encompasses insulation, windows, ducts, and more. Therefore, the GHG reduction is most easily calculated from a reduction in a particular end-use rather than for any particular appliance. For example, installing efficient windows can reduce heating and cooling energy consumption by 15 percent.[107]

- Device-based reduction: Some actions are specific to a particular appliance, such as a refrigerator or a certain type of light fixture. In those cases, the GHG reduction is most easily calculated from comparing the power required for the inefficient appliance or device to the power required for an efficient one. For example, switching from a T12 to a T8 fluorescent light can save 8 W per bulb.[108]

Developing a worship building energy profile

In order to calculate energy savings based on energy end-use consumption, we needed to know how much energy is consumed for each end-use at the worship building. Because we wanted our tool to be general to any worship building in Santa Barbara, we did not try to model or measure actual energy consumption by end-use in particular ECOFaith member buildings. Instead, we looked for more general data that could describe the energy profile of a typical religious building in Santa Barbara. Most published data sources focus on residential or commercial buildings, but these building types have a different occupancy and usage pattern than a worship building has. Our literature search turned up only one source that contained information specific to religious buildings: electricity and natural gas consumption by end use from the U.S. Energy Information Administration (EIA)'s Commercial Buildings Energy Consumption Survey (CBECS).[109] The California Energy Commission (CEC) also has a Commercial End-Use Survey, but it does not separately examine religious worship buildings.[110] One potential problem with using the EIA tables is that data for religious buildings is highly variable, so the provided end-use estimates are less reliable.[111] Moreover, data for religious buildings is not available by census or climate zone, so we cannot account for the particular consumption patterns of the Santa Barbara area. Nevertheless, as the only relevant dataset, the EIA tables represent the best information available.

The two dominant energy fuels used in worship buildings are electricity and natural gas,[112] though some buildings may use fuel oil instead of natural gas, primarily for heating.[113] Our tool examines only natural gas and electricity, as these energy sources comprise 89 percent of total energy consumption in religious buildings.[114] In addition, the CEC's Commercial End-Use Survey also only examines natural gas and electricity consumption, implying that other fuels do not contribute much to California's commercial energy consumption.

First we calculated the share of electricity consumed by each end-use. The EIA provides separate electricity and natural gas tables that display the aggregate consumption for each end-use over the entire sample set of religious buildings surveyed. Certain end-uses—particularly space heating, water heating, and cooking—can consume either natural gas or electricity. Therefore, simply taking the percentage of consumption for each end-use from

the aggregated consumption numbers does not provide a realistic electricity profile for a real building. For example, only a fraction of religious buildings use electricity for space heating, but the aggregate numbers reflect the consumption of all worship buildings, regardless of whether they use electricity for space heating or not. Therefore, the average percentage of *electricity* spent on space heating will be understated for buildings that use electric space heating and overstated for buildings that use natural gas. In other words, religious buildings are unlikely to use both natural gas and electricity for space heating, so we must understand how much electricity they would use if they only used electric space heating or only used natural gas.

To adjust for this anomaly, we needed to account for the percentage of worship buildings that do not use electricity for space heating, water heating, and cooking. Fortunately, EIA also provides this data.[115] We also had to adjust for the fact that not all end-uses are relevant to every religious building. For example, some surveyed religious buildings did not have cooling systems, refrigeration, cooking equipment, or space heating. By dividing the aggregate electricity consumption for each end-use by the percentage of buildings that have that end-use *and* use electricity to power it, we created an energy profile baseline of a religious building that: 1) uses all surveyed end-uses and 2) uses electricity to power everything (see Table 5: U.S. Religious Building Electricity Consumption by End-Use, 2003 and Figure 4, below) Note that this adjustment only changes the share of electricity consumption that goes to each end-use, not the total amount of electricity used by a single religious building. Later we explain how we adjusted these values when a building does not use electricity for one of the end-uses.

Table 5: U.S. Religious Building Electricity Consumption by End-Use, 2003

End-Use	*Aggregate Electricity Consumption (Trillions of Btu)*	*% Buildings Using Electricity for End-Use*	*Adjusted Aggregate Electricity Consumption (Trillions of Btu)***
Space heating	3	25%	11.9
Cooling	11	83%	13.3
Ventilation	5	100%	5
Water heating	0.5*	46%	1.1
Lighting	17	100%	17
Cooking	0.5*	14%	3.6
Refrigeration	6	73%	8.2
Office equipment	0.5*	100%	0.5
Computers	1	100%	1
Other	18	100%	18
Total	62.5	-	79.6

Source: EIA

* According to the EIA, these end-uses consume 0.5 trillion Btu or less, so we just assume 0.5 trillion Btu.

** Assumes 100 percent of buildings use electricity for all end-uses.

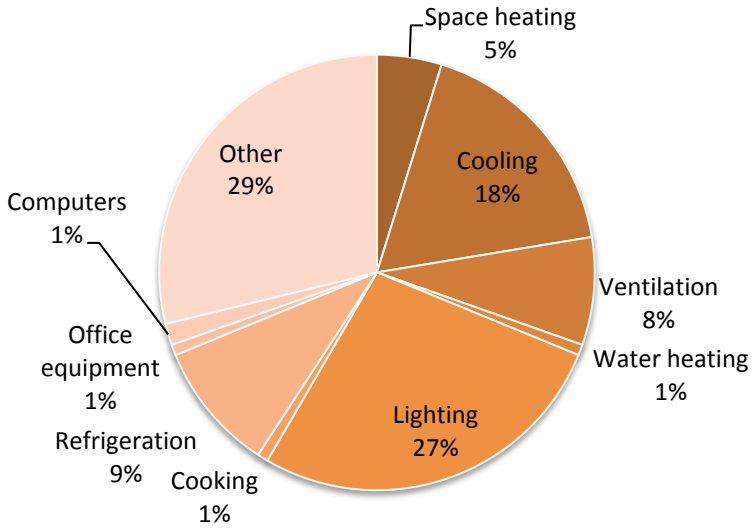


Figure 4: Unadjusted Electricity End-Use Profile for U.S. Religious Buildings, 2003

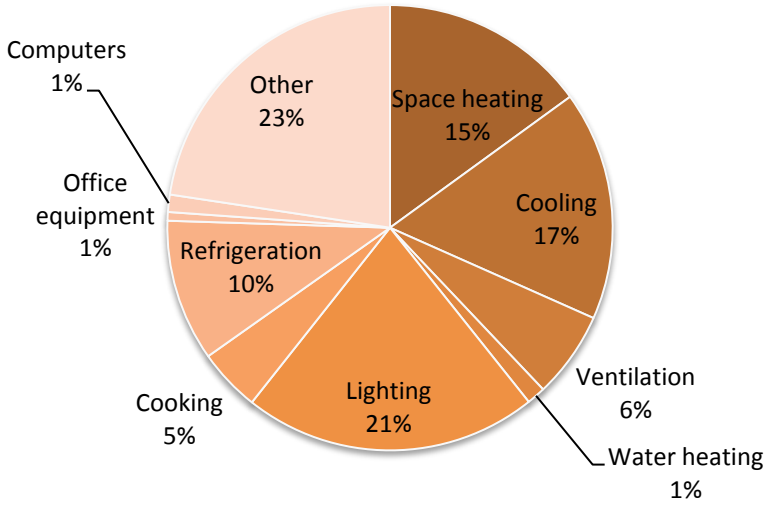


Figure 5: Adjusted Electricity End-Use Profile for U.S. Religious Buildings, 2003

We undertook a similar adjustment for the natural gas end-use consumption profile, with one minor adjustment. While all the buildings EIA surveyed had electricity, not all of them used natural gas. The natural gas data reflect *only those buildings that use natural gas*. Therefore, we calculated the percentage of buildings that used natural gas for each end-use out of the total number of *buildings that used natural gas*, not the total number of buildings surveyed.

Table 6: U.S. Religious Building Natural Gas Consumption by End-Use, 2003

End-Use	*Aggregate Natural Gas Consumption (billions cubic feet)*	*% Buildings Using Natural Gas for End-Use*	*Adjusted Aggregate Natural Gas Consumption*

			*(billions of Btu)**
Space heating	74	90%	82.2
Water heating	2	63%	3.2
Cooking	3	27%	11
Total	79	-	96.4

* Assumes 100 percent of buildings *that use natural gas* use it for all three end-uses (space heating, water heating, and cooking).

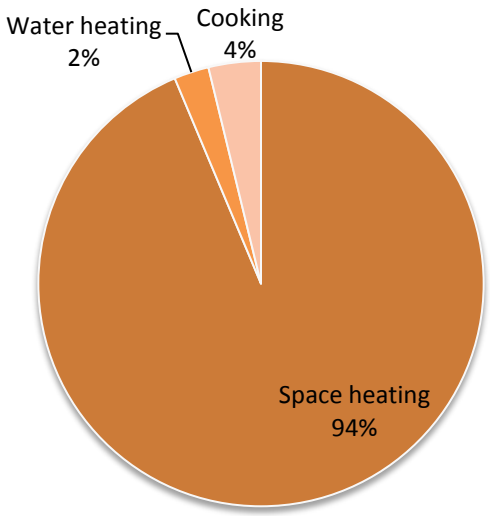


Figure 6: Unadjusted Natural Gas End-Use Profile for U.S. Religious Buildings, 2003

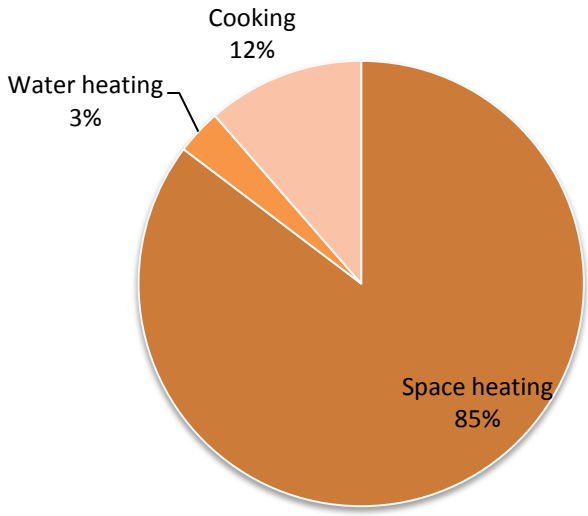


Figure 7: Adjusted Natural Gas End-Use Profile for U.S. Religious Buildings, 2003

By this step we had produced two energy profiles: one that assumed the building used electricity for all end-uses, and one that assumed the building used natural gas for space heating, water heating, and cooking. Naturally, both profiles could not be true for a single

building. Therefore, the tool must dynamically adjust the profiles depending on the building's characteristics. Based on user input, the tool has information about whether the building uses electricity or natural gas for space heating, water heating, and cooking, and if the building has A/C, refrigeration, and cooking. We can use this information to redistribute the shares of energy consumption among the applicable end-uses for the building in question. For example, assume an all-electric building has 100 units of electricity distributed among the end-uses according to Figure 5: Adjusted Electricity End-Use Profile for U.S. Religious Buildings, 2003, above. If the user denotes that the building uses natural gas space heating and cooking and has no A/C, then the tool subtracts 36 electricity units from the total, and re-calculates the percentages of the remaining end-uses accordingly (e.g. lighting, with 21 units, now uses 21/(100 – 36) = 34 percent of the building's electricity). Similar dynamic calculations are conducted for the natural gas profile.

Finally, from user input information, the tool knows the total amount of electricity and natural gas the building uses in one year. Multiplying these energy totals by the percentage of consumption for each end-use derives the estimated electricity consumption (in kWh) and natural gas consumption (in therms) for those end-uses (space heating, cooling, ventilation, water heating, cooking, refrigeration, lighting, office equipment, computers, and other uses).

Estimating worship building energy usage

Though we strongly recommend that users input data from their own building, especially real natural gas and electricity usage from their utility bills, we do not require this data. Consequently, another important step in developing the cost-benefit tool was deriving realistic default responses for the 14 questions we ask users.

Table 7: User Inputs and Default Values for Cost-Benefit Tool

Input	Default Value	Explanation for Default Choice
Annual electricity usage (kWh)	Determined based on electricity intensity and building area	Methodology and reasoning described below
Annual natural gas usage (therms)	Determined based on natural gas intensity and building area	Methodology and reasoning described below
Natural gas or electric space heating	Natural gas	55 percent of religious buildings use natural gas for space heating[116]
Natural gas or electric water heating	Electric	54 percent of religious buildings use electric water heating[117]
Air conditioning present	Yes	308 of 370 surveyed religious buildings have a cooling system;[118] the presence of cooling equipment may be especially climate-dependent, so we also confirmed that a majority

		(59 percent, assuming no overlap between residences with room A/C and central A/C) of California residences in Santa Barbara's CEC climate zone also have air-conditioning[119] (data for commercial buildings was not available)
Refrigerator present	Yes	73 percent of EIA-surveyed religious buildings have a refrigerator,[120] as do all of the ECOFaith members we visited
Cooking present	No	Only 108 of 370 (29 percent) surveyed religious buildings have cooking facilities[121]
Natural gas or electric cooking	Natural gas	56 percent of religious buildings use natural gas for cooking[122]
Area of worship building (sq. ft.)	6,000	6,000 sq. ft. is the median area of a U.S. religious building[123]
Number of windows	10	Estimated
Number of incandescent light bulbs	60	Estimated
Number of T12 light fixtures	4 fixtures with 4 bulbs each	Estimated
Number of cars driven to worship events each week	30	Estimated
Display low-end or average costs	Low-end	Low-end estimates provide the best-case cost scenarios

To estimate the electricity and natural gas usage for a typical religious building, we multiplied the building area (either a default value or user-provided) by an electricity (kWh/sq. ft.) or natural gas intensity (therms/sq. ft.). As base intensity values, we used the EIA-provided natural gas and electricity intensities for worship buildings in Climate Zone 4 (Santa Barbara's climate zone). The intensity numbers, however, have to be dynamically adjusted to match the electric and natural gas end-uses for the building.

To adjust the electricity intensity, we:

1) Started with the EIA-provided base value of 4.8 kWh/sq. ft.[124]
2) Scaled up the electricity intensity by the percentage increase in electricity consumption from assuming an all-electric building with every end-use.
    a) Originally, the aggregate electricity consumption of surveyed religious buildings was 62.5 trillion Btu (see Table 5: U.S. Religious Building Electricity Consumption by End-Use, 2003)

    b) After we adjusted for natural gas users by recalculating the aggregate electricity usage assuming that all end-uses would be powered by electricity, consumption rose to 79.6 trillion Btu (see Table 5: U.S. Religious Building Electricity Consumption by End-Use, 2003), a 27 percent increase
    c) We then multiplied the starting electricity intensity by 127 percent to get 6.1 kWh/sq. ft.
3) The electricity intensity derived from step 2 would be for an all-electric building with all end-uses, so the tool must then dynamically scale down the intensity based on the actual fuel sources for space heating, water heating, and cooking in the worship building, and which end-uses are actually present in the building.
    a) Originally, the shares of each end-use in an all-electric building sum to 100 percent.
    b) The tool removes the A/C and refrigeration end-uses if the building does not have a cooling system, as well as any end-uses powered by natural gas (we assumed that all buildings have some form of space and water heating). Unless the building is indeed all-electric with all end-uses, the shares from the remaining end-uses should sum to less than 100 percent. For example, if the user denotes that the building uses natural gas space heating and cooking and has no A/C, then the remaining electric end-uses would represent 64 percent of the original share.
    c) The tool scales down the all-electric/all end-use building's electricity intensity by the percentage share of the applicable electric end-uses. Following the example in b), we would multiply 6.1 kWh/sq. ft. by 64 percent to get an adjusted electricity intensity of 3.9 kWh/sq. ft.

To adjust the natural gas intensity, we followed the same steps, beginning with a base natural gas intensity of 16.5 cubic feet/sq. ft.,[125] converted to 0.165 therms/sq. ft. In step 2, we increased 0.165 therms/sq. ft. by 22 percent to 0.201 therms/sq. ft. The result from step 3 would depend on user inputs, but following the same example as used for calculating the electricity intensity (natural gas space heating and cooking and electric water heating), the tool would multiply 0.201 therms/sq. ft. by 97 percent to get an adjusted natural gas intensity of 0.195 therms/sq. ft.

Calculating energy savings from general end-use reduction actions

After we estimated the worship building energy consumption, we could calculate the energy savings from each recommended action. The end-use reduction actions are listed in APPENDIX IX: Worship-Related Actions with Energy Savings Expressed as a Percentage Reduction of End-Use Consumption, along with the percentage energy savings they achieve.

To calculate the estimated energy savings (in kWh for electricity and therms for natural gas), we simply multiplied the energy reduction percentage by the amount of energy used for the relevant end-use. For example, if the building uses 1,700 kWh a year on ventilation, 0 kWh on cooling, and 2,000 therms on heating, then the tool estimates that replacing air

filters monthly (15 percent reduction) would save 1,700 kWh * 15% = 255 kWh and 2,000 therms * 15% = 300 therms.

The one area not covered by building energy consumption is congregation transportation, which we determined through our screening analysis comprises a large portion of worship building and event emissions. We estimated the energy savings from a carpool board in the following way: *10% fewer car trips from using a carpool board * user input number of cars driven to worship events a week (tool default value is 30) * assumed average car trip distance of 10 miles * the gas mileage of a typical car (20.3 MPG[126]) = number of gasoline gallons saved by a carpool board*.

Calculating energy savings from device-based reduction actions

For the action items that achieve savings related to a specific appliance or device, we calculated the energy savings based on the number of devices that would be replaced and typical usage patterns for that device. The device-based reduction actions are listed in APPENDIX X: Worship-Related Actions with Energy Savings from Specific Appliances or Devices, along with the energy savings they achieve.

We then calculated the GHG emissions reduced from each action by multiplying the electricity savings by an electricity emission factor and the natural gas savings by a natural gas emission factor. We used the same factors as described in the Screening Analysis section (see p. 46): 5.306 kg CO_2e/therm for natural gas, 0.330 kg CO_2e/kWh of electricity, and 11.14 kg CO_2e/gallon of gasoline.

Weighing the benefits and costs of each action

The GHG reductions described the environmental benefits resulting from each action, but we also had to examine the financial costs and benefits as well.

Financial costs

For upfront action costs, we determined both a low-end and an average cost for each item. For appliances, weatherization materials, and small items such as light bulbs, we researched item costs on nationwide hardware and home improvement websites that also have store locations in Santa Barbara and the Central Coast, such as Home Depot and Lowes. In addition to their locality, another aspect of the retailers we considered was product selection. Because these sources had large product selections, they could provide reasonably accurate and wide-ranging cost data for the products we examined. Additionally, both of these sites use prominent identifiers for rated energy-efficient items and appliances, which will aid program participants in choosing new efficient appliances. To determine the cost of maintenance and installation actions and programs, we also referenced Home Depot and Lowes where possible. This was supplemented by data from well-established, relevant sources such as the Department of Energy, the Community Environmental Council, Flex Your Power (a California energy efficiency partnership of private, non-profit, and government organizations and individuals), Southern California

Edison, and professional associations such as the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). Due to the extensive number of resources, we could collect a significant amount of cost data, which enabled us to include the low and average costs for each.

Money saved on utility bills

To calculate the money saved on utility bills, we multiplied the energy savings from each action by the cost per kWh of electricity or therm of natural gas. For electricity, we used EIA data for the average California commercial price in 2010 ($0.1489 per kWh).[127] For natural gas, we used EIA data for the average California commercial price in 2009, the latest year with data ($0.775/therm).[128]

Other measures

Other measures combine GHG reduction, financial costs, and money saved on utility bills to provide further cost-benefit information:

- Payback period: For actions with an upfront cost, we calculated the payback period by dividing upfront cost by utility money saved. While this analysis does not incorporate a discount rate, we judged that for the purposes of giving ECOFaith members a rough estimate, a simple payback period would be sufficient. Moreover, given that the other measures are also just estimates, incorporating a discount rate, which would have added significant complexity to our tool, seemed needlessly precise.

- Net annual savings: For maintenance actions, we calculated the net savings members could achieve by subtracting the annual cost of the maintenance action from the annual utility bill savings.

- Annual GHG reduction per dollar spent: For maintenance actions, we calculated this measure by dividing the GHG reduction by the annual cost of the maintenance action. For actions with an upfront cost, we divided the GHG reduction by the upfront cost. This metric allows users to get a rough sense of the "bang for their buck" of each action.

<u>Reporting GHG emissions reductions</u>

One of ECOFaith's needs was the ability to provide metrics or quantitative results to funders seeking to understand the effect of their investment. One common way to measure the GHG reductions achieved by one or several actions is to establish a baseline of GHG emissions from before the action(s) and then assess how emissions changed after project implementation. Following this method for faith communities is difficult, however, given that building usage can fluctuate dramatically over time as many communities allow other organizations to borrow or rent their space. One possible way to account for these changes

is to measure GHG emissions per person-hour of building usage. For example, if 40 people attend service for 2 hours a week, and another 10 people use the building for a 1-hour community event once a week, then the building usage for that week would be 40 * 2 + 10 * 1 = 90 person-hours. During our interviews and site visits, however, we realized that the detailed record-keeping that this level of reporting would involve was beyond the ability of most faith communities. Other factors such as weather may also confound results.

Instead of trying to measure overall GHG emissions before and after a project, our cost-benefit tool approaches estimating GHG reductions from a project-based accounting perspective. That is, we calculate the GHG reduction from a given action based on information about the building's energy usage and the expected drop in energy consumption. While not exact, this method is much more appropriate for faith communities, which do not have the expertise or time to conduct detailed analyses.

Results and Discussion

One of the most complex aspects of our cost-benefit tool was the estimation of worship building energy consumption. In order to see if our calculations were reasonable, we checked them against data from two of the ECOFaith pilot projects: Second Baptist and Grace Lutheran.

Table 8: Comparison of Estimated and Actual Electricity and Natural Gas Consumption in Two ECOFaith Worship Buildings

	Second Baptist	Grace Lutheran
Inputs		
Natural gas or electric space heating	Natural gas	Natural gas
Natural gas or electric water heating	Natural gas	Natural gas
Natural gas or electric stove/oven	Natural gas	Natural gas
A/C present	No	No
Refrigerator present	Yes	Yes
Stove/oven present	Yes	Yes
Building area	6,000 sq. ft.*	11,640 sq. ft.
Energy Consumption		
Actual electricity usage	8,188 kWh	17,160 kWh
Tool-estimated electricity usage	22,898 kWh	44,442 kWh
% difference in electricity estimate	**180%**	**159%**
Actual natural gas usage	1,002 therms	2,270 therms
Tool-estimated natural gas usage	1,208 therms	2,343 therms
% difference in natural gas estimate	**21%**	**3%**

* We did not know the area of Second Baptist's building, so we kept the default value.

While the tool was reasonably accurate in predicting natural gas consumption, it grossly overestimated electricity consumption. Only two factors comprise our electricity

consumption estimate: building area and electricity intensity. Therefore, the error must be in one of those two inputs. Because we have the actual building area for Grace Lutheran, and the electricity estimate for that building is still 159 percent over the actual consumption, the electricity intensity is likely the culprit. The EIA electricity intensity estimate for religious buildings in Climate Zone 4 is 4.8 kWh/sq. ft. After our adjustments (described above), the tool reduced Grace Lutheran's electricity intensity to 3.8 kWh/sq. ft. Because our calculated electricity intensity is actually lower than the one provided by EIA, it is unlikely that our adjustments are to blame for the inaccuracy. Therefore, we must assume either that Second Baptist and Grace Lutheran have abnormally efficient buildings or that the EIA-given electricity intensity is far too high for Santa Barbara. We suspected that the latter is true, but we had no other electricity intensity sources. Therefore, in the cost-benefit tool itself, we strongly urged users to input their own electricity and natural gas usage information. In fact, gathering this information and inputting it into our provided Excel spreadsheet 08_Utilities_Form.xls (see Example of Utilities Form) is the first step of the energy audit, so ECOFaith members should already have collected the necessary information.

Another strange artifact of the EIA data is that the energy intensity for religious building space heating with natural gas (37.9 thousand Btu/sq. ft.) is significantly higher than the intensity for electricity (5.7 thousand Btu/sq. ft.).[129] This result is unexpected given the well-known efficiency of natural gas over electric space-heating. The data, however, do not reflect true differences in efficiency but rather differences in building consumption patterns. Because electricity is higher-priced than natural gas, electric space heating is typically only used in places that do not require much heating, whereas buildings requiring significant heating use natural gas. Though the data reflect a sampling bias, the information is nonetheless relevant since the same pattern likely applies to energy source decisions in Santa Barbara.

Because the cost-benefit tool updates dynamically depending on user inputs, we use an example faith community to illustrate its results. Our data for the ECOFaith pilot project Grace Lutheran is the most complete, so we chose its worship building as our model. (Note that, for new ECOFaith members using the cost-benefit tool for the first time, answering the input questions will mainly be an exercise in transferring information as members should already have collected most of the data during the energy audit, which precedes this tool in the Path of Sustainability process.) APPENDIX XI: ECOFaith Pilot Project Grace Lutheran's Inputs into the Cost-Benefit Tool gives the Grace Lutheran inputs into the tool while APPENDIX XII: Cost-Benefit Tool Output Based on Inputs from ECOFaith Pilot Project Grace Lutheran show the tool's output.

The tool lists the actions in rough order of GHG-reducing impact. The order is rough because it was established with default input values and does not change dynamically with user customization. While dynamic ordering is ideal, this feature would have been difficult to implement in Excel and was beyond the scope of our project. Moreover, the static ordering will still be relevant for most scenarios.

Not surprisingly, the largest-impact reductions involve some type of upfront investment to improve heating or lighting efficiency, though the financial cost for many of these items is minor compared to the utility savings. Installing a programmable thermostat (coupled with thermostat setbacks during periods when the building is unoccupied), replacing incandescent bulbs, installing efficient windows (when it is time to replace them), and sealing drafts each provide a GHG reduction of over 2,000 lb CO_2e a year and have less than a two-year payback period. While upgrading insulation can have a large impact, the relative expensiveness of this retrofitting measure makes it less cost-effective. Given Grace Lutheran's energy use and building area, we estimated a payback period of 20 years. Replacing an inefficient gas furnace has a much shorter payback period of eight years, but the expense may still be too high for more cost-conscious faith communities.

More telling are the GHG reductions that can be achieved with no cost at all. Dominant among these are decreasing winter thermostat temperatures and organizing a carpool system for the congregation. To put these numbers into perspective, these two no-cost behavior changes *each* have a potentially larger impact than the *cumulative* effects of the worship building installing motion-sensing lights, replacing an inefficient refrigerator with an Energy Star model, replacing T12 fluorescent lights with T8 or T5, replacing conventional holiday lights with LEDs, and replacing an inefficient water heater with an efficient unit.

Note that the GHG reduction estimate for the carpooling system is highly sensitive to our assumptions about the number of car trips taken by congregation members per week (default estimate is 30) and the effectiveness of the board (we estimated the system could reduce at least 10 percent of car trips). We purposely chose numbers that are conservative and yet realistic, and the tool allows users to input their own weekly congregation car trips to override the default. Because we did not have car trip estimates for Grace Lutheran, the estimate given in APPENDIX XI uses the default values and therefore reflects the annual impact of reducing just three 10-mile car trips each week.

Conclusion

While the metrics provided by the tool are just rough estimates, they can still give ECOFaith members a high-level understanding of each action's costs and benefits relative to the other options available. As an illustration, the analysis described in the preceding paragraphs is precisely the type of investigation faith communities can now pursue when trading off the merits of one action over the other. By incorporating the necessary energy efficiency expertise into its behind-the-scenes calculations, the tool reduces decision-making complexity while enabling ECOFaith members to make informed choices.

Also, by including many no- and low-cost practices, the tool expands the pool of feasible actions for faith communities with restrictive budgets. In fact, for the example pilot project Grace Lutheran, 12 of the 20 relevant actions were no- or low-cost (6 no-cost actions and 6 actions with less than a two-year payback period). Many of the low-cost actions may have originally seemed out-of-reach to faith communities that did not realize the investment

could be paid back in such a short period of time. Now ECOFaith members can pursue those practices with more confidence.

Finally, by quantifying the GHG reductions for each action, the cost-benefit tool simplifies the metrics-gathering process. Rather than trying to establish a baseline and adjust for changes in weather and building occupancy in the utility data, ECOFaith can simply capture and report the GHG reduction estimates provided by the tool. While these estimates are high-level, they are accurate enough to give existing and potential funders a concrete understanding of the impact from ECOFaith's sustainability programs.

GET ENERGIZED PLEDGE AND TALLY FORM

Motivation & Objectives

The individual pledge is an important component of the Path of Sustainability. The pledge provides a comprehensive collection of actions an individual can take to reduce personal GHG emissions and, as such, reinforces and connects the separate educational activities that will have taken place throughout the year. Furthermore, our research into motivating behavior change showed that a pledge is one of the most effective tools to bring about sustained environmental action.[130] All four original ECOFaith pilot projects, as well as a few non-pilot ECOFaith members, have administered a pledge to their congregations and view it as an integral part of their education program.

Despite widespread adoption of the pledge as a motivational tool, analysis of the challenges faced by ECOFaith pilot projects reveals ways to improve the pledge and enhance its overall usefulness. Pilot project interviewees stressed the importance of providing low- or no-cost actions due to the financial constraints faced by many congregants. More generally, faith community representatives, pointing to the high socioeconomic and cultural diversity within ECOFaith communities, suggested that the pledge should contain a wide variety of recommendations to accommodate as many people as possible.

Another major frustration for pilot projects was the difficulty of collecting metrics that could be used to evaluate ongoing progress and report back to funders. Considering the magnitude of GHG reductions that can be achieved by congregants in their personal lives compared to the amount of worship-related emissions that ECOFaith members can reduce, quantifying and reporting the effect of congregation behavior change is extremely important. The pledge is one way to begin measuring this effect. It is the only congregation-wide data regularly collected from individuals about their personal intentions to address climate change and other environmental problems. Furthermore, more recent versions of the pledge can track what congregation members are currently doing in addition to what they plan to do.

Several ECOFaith pilot projects also expressed the desire to set goals for congregation action. Because the pledge can provide a comprehensive snapshot of congregation actions and intentions, information from the pledges can easily be used for goal-setting purposes. By collecting and analyzing the pledges, ECOFaith members can record their current progress and set targets for future achievements.

Finally, we wanted to ensure that all the high-impact and otherwise important actions were represented and prioritized on our pledge. In particular, considering the large proportion of household emissions from purchased goods and services,[131] we felt it was essential that the pledge address these indirect emission sources. In the United States, indirect emissions from households are three times as great as direct emissions.[132]

To address ECOFaith's needs and goals, we decided to update the original pledge they used to:

- Include actions to reduce emissions from purchased goods and services
- Add more high-impact actions
- Prioritize high-impact actions within each category
- Improve the pledge experience for renters and for low-income congregants
- Provide more accurate GHG reduction estimates

In addition, we developed a set of tools to help ECOFaith members gather metrics on and set goals for congregation action.

Methodology

Updating the pledge

All four ECOFaith pilot projects administered the Community Environment Council's Get Energized Pledge to their congregations. In addition, our interviews with other members revealed widespread adoption of and trust in CEC's pledge across ECOFaith communities. Therefore, we decided to work with the Community Environment Council to adjust their pledge for ECOFaith's needs rather than create our own.

Below we describe how we addressed our objectives for the pledge:

Include actions to reduce emissions from purchased goods and services

The original Get Energized Pledge focuses primarily on actions to reduce direct energy consumption, only including flying and food as indirect emission sources while not even quantifying the GHG reductions from its food recommendations. Consequently, we added a Consumer Goods category that contains three quantifiable actions to reduce goods consumption: 1) reduce purchases of clothing and shoes by 25%; 2) quit smoking; and 3) reduce purchases of cleaning supplies by 25%. We also quantified the GHG reduction from eating less meat, and added another action to the Food category for eating fewer sweets. While the associated emissions reductions are modest compared to total per capita emissions, their inclusion will at least sow awareness that purchased goods and services also produce GHG emissions.

Add more high-impact items

To ensure the completeness of the pledge, we also conducted a literature search of the most high-impact actions that households could take to reduce direct energy consumption. Our research identified four high-impact actions that could be added to the list:

- Install higher-performing insulation in attic and around ducts
- Purchase low-rolling resistance tires for car

- Regularly remove excess weight from car
- Reduce car idling

Upgrading insulation reduces more GHGs than any of the other actions in the Heating and Cooling section (see below for how we calculated GHG reductions for each action), so we decided to add it to the pledge list. Though one of the additional car-related actions (removing excess weight) had the lowest impact in the Transportation category, we added it also, reasoning that, because transportation emits such a large proportion of an individual's GHGs, even minor improvements in transportation efficiency can reap large GHG reductions. Though "Reduce idling" could have warranted an action of its own, we felt, for the sake of brevity, it could be placed within the "Alter driving habits" action. Nevertheless, we kept "Keep tires properly inflated" separate from the "Keep car maintained" action item because its impact was large enough to deserve its own action, and tire inflation should occur on a more frequent basis than other maintenance.

Prioritize high-impact actions within each category

As mentioned in the "Targeting important actions" section of the Cost-Benefit Analysis Tool above, un-prioritized and un-categorized laundry lists of actions can overwhelm and confuse pledge participants.[133] In addition to visually separating the actions aimed at homeowners (see below), another organizational feature we added to our pledge was ordering the action list from highest to least impact within each category. A quick visual scan of the GHG reduction estimates will clue pledge participants into the prioritization, so the estimates become more than meaningless numbers but indications of each action's relative importance.

Improve the pledge experience for renters and for low-income congregants

The homeownership rate in Santa Barbara County is only 56.1 percent,[134] which means that a significant portion of congregation members will be renters. Therefore, we wanted to increase the pledge's relevance to renters. With 15 of 45 total actions on the original Get Energized Pledge aimed primarily at homeowners,[135] we sought to increase the number of actions that renters could take. Besides adding the Consumer Goods section described above, we also included a category for Waste, which contains actions for composting and recycling, and added three more actions in the Transportation section. None of these actions require home ownership. The new pledge reduced the percentage of homeowner actions from 33 percent to 27 percent. Moreover, we updated the pledge to clearly mark the items for property owners so that renters could more easily skip them if they desired.

Many of the actions added for renters do not have any associated financial cost and so can be achieved by low-income congregants as well. In total, we added seven new no-cost actions to the pledge.

Provide more accurate GHG reduction estimates

In examining many carbon calculators for our project, we identified that one of the major problems with existing calculators is the lack of transparency and customization in their GHG reduction estimates. While the original Get Energized Pledge does provide sources for its calculations, many estimates are based on older data. Moreover, whereas much of the original pledge's data is generalized to all Californians, we wanted to provide reduction numbers that would be specifically applicable to Santa Barbarans. Therefore, we created our own estimates based on clearly-referenced government and academic sources. Our calculations are explained in Estimating GHG and water reductions for pledge actions below.

Another source of uncertainty with many carbon calculator estimates is whether the reduction estimates quoted are for a household or an individual. We decided our estimate would reflect an individual's share in the household reduction, even if the individual were responsible for the action that reduced the household's overall GHG emissions. Our reasoning is explained in Estimating GHG and water reductions for pledge actions, below.

Finally, we omitted any actions or estimates where we could not determine a reasonably reliable reduction number. For example, we could not find a figure for the amount of energy saved from ensuring doors and windows are closed when the heater or A/C is on. The original Get Energized Pledge references the Minnesota Energy Challenge as its source (www.mnenergychallenge.org), but we could not find the information on that website, nor could we necessarily depend on its accuracy. We considered leaving the action on the pledge but removing the estimate, but we feared leaving the estimated reduction blank would confuse pledge participants. Therefore, we decided to remove the action completely.

Make other general improvements

In updating the pledge, we also made a number of other improvements:

- Added water savings estimates for the Water Conservation section: The original Get Energized Pledge includes a water conservation section that lists ways to reduce (cold) water. These actions are not directly tied to GHG reductions, but we could quantify their associated water usage reductions. Having water savings estimates will help pledge participants prioritize between the different water conservation actions.

- Combined redundant items: The original Get Energized Pledge contains some items that overlap. To make sure we do not double-count reductions, we combined all redundant actions:

    - "I will unplug my TV when it's not in use" and "I will have my computer and other home office electronics on a Smart Strip or completely unplug them when not in use" became "I will plug electronics/TV into a Smart Strip or unplug when not in use."

    - Between "I will purchase at least 25% of my food a week from a farmers market or other local source" and "I will eat one completely local meal a week," we kept the former because it is more specific.
    - "I will remove areas from my lawn that are not used for recreational purposes (replacing 1000 sq. ft. of lawn)" and "I will use water-wise plants in my garden (replacing 1000 sq. ft. of lawn)" combined to become "I will implement xeri-scaping (using water-wise plants instead of lawns)."

- Made actions more explicit: Certain actions were too vague to quantify, so we made them more specific.
    - "I will set my furnace thermostat down 2 degrees" became "I will turn furnace thermostat down to 68 degrees in the winter when at home and 55 degrees when not at home."
    - "I will set my AC thermostat up 2 degrees" became "I will turn A/C thermostat up to 78 degrees in the summer when at home and 85 degrees when not at home."
    - "I will eat meat one less meal a week" became "I will reduce consumption of beef and pork to once per week and fish, poultry and eggs to twice or fewer per day."

<u>Estimating GHG and water reductions for pledge actions</u>

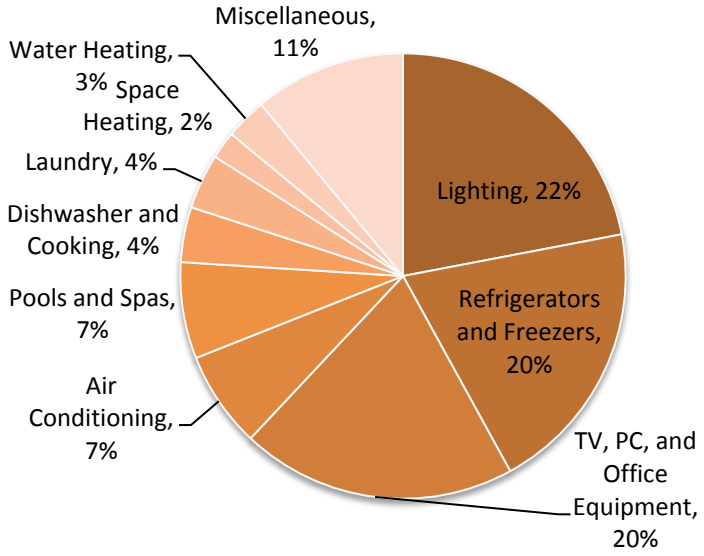
Calculating GHG reduction estimates for the pledge was similar to calculating reductions for the worship building actions used in the cost-benefit tool. Once again, for direct household energy consumption, we could categorize actions into general end-use reduction actions and device-based reduction actions. (Note that reductions of indirect emissions require a different type of calculation, which we describe later in the report). For general end-use reduction actions, we had to develop a household energy profile in order to estimate electricity and natural gas consumption for each end-use. However, because the pledge gives average household estimates rather than the customized estimates that the cost-benefit tool provides, we did not have to accommodate dynamic user inputs, adjust energy intensities, or update profiles based on relevant end-uses. Moreover, the California Energy Commission provides a wealth of data on household energy consumption in California, most of it particularized to Santa Barbara's forecast zone,[136] so we could use that information directly rather than trying to calculate it on our own.

We did recognize, however, that basing our calculations off of averaged data would likely understate energy savings. The average contains energy usage data from households that have made energy efficiency improvements as well as households who have not. Individuals who pledge an action will come from the set who have not yet made the efficiency improvements, so their energy reduction potential will be greater than implied by using average numbers. Nevertheless, calculating base energy usage (energy usage that would have arisen if a household had not implemented any of the energy efficiency actions on our pledge) was beyond the scope of our project. We therefore assume that the average provides a reasonable, if understated, estimate of energy consumption in households who have not yet implemented the energy efficiency action. Moreover, because we also sum the

reduction estimates for current and pledged actions to compare the congregation against a baseline of "average Americans," using average data dampens the over-counting effect (see the Results and Discussion section for a more in-depth treatment of over-counting).

Specifically, the California Energy Commission's Residential Appliance Saturation Survey[137] reports average residential electricity and natural gas consumption as well as the percentage share of each energy source that goes to different end-uses. We relied heavily on the CEC study for our energy usage assumptions.

Figure 8: California Household End-Use Electricity Consumption Profile, 2009



The CEC survey provided an electricity profile for the average Californian household (see Figure 8). In addition, it reported that average household electricity consumption in Santa Barbara's forecast zone was 6,046 kWh in 2009. From these two pieces of information, we derived the electricity usage for each end-use in an average Santa Barbara household (see Table 9). Unfortunately, the document did not provide the electricity profile for each forecast zone, so we had to assume that Santa Barbara's forecast zone (forecast zone 8) was similar to the rest of the state's. In support of this assumption, we found that the average household electricity consumption in forecast zone 8 was only 4 percent lower than the state average. With total electricity consumption basically equivalent, we were more assured that the electricity profiles would be similar as well.

Table 9: Household End-Use Electricity Consumption in Forecast Zone 8, 2009

End-Use	*Electricity Usage (kWh)*
Lighting	1330.12
Refrigerators and Freezers	1209.2
TV, PC, and Office Equipment	1209.2
Air Conditioning	423.22
Pools and Spas	423.22

Dishwasher and Cooking	241.84
Laundry	241.84
Space Heating	120.92
Water Heating	181.38
Miscellaneous	665.06

The household natural gas profile, however, required a bit of adjustment. Unlike electricity, natural gas consumption in forecast zone 8 was 17.8 percent lower than the state-wide average.[138] Luckily, the report provided the unit energy consumption (UEC) for most natural gas-consuming appliances, as well as the saturation rate in forecast zone 8 (see Table 10), so we used this information to create our own natural gas profile for Santa Barbara. To create the profile, we multiplied the UEC per appliance by the saturation, which represents the fraction of households in forecast zone 8 that use that particular appliance. Note that UEC data by forecast zone was not provided for most electrical appliances (only weather-relevant ones), so we could not use this method to create a forecast zone 8 electricity profile.

Table 10: UECs and Saturation for Various Natural Gas Appliances in Forecast Zone 8, 2009

Appliance	*UEC (therms)*	*Saturation*	*Forecast Zone 8 Household Consumption (therms)*
Primary Heat	71	0.9	63.9
Auxiliary Heat	33	0	0
Conventional Gas Water Heat	197	0.86	169.42
Solar Water Heat w/Gas Backup	154	0	0
Dryer	26	0.56	14.56
Range/Oven	32	0.81	25.92
Pool Heat	230	0.05	11.5
Spa Heat	48	0.07	3.36
Miscellaneous	22	0.17	3.74

As a check on our calculations, the sum of the household consumption by end-use (292.4 therms) closely matches the average natural gas consumption for forecast zone 8 (291 therms), allowing for rounding errors. The appliances in Table 10 above were too granular for our purposes, so we aggregated them into general end-use categories (see Table 11).

Table 11: Household Natural Gas Consumption by End-Use in Forecast Zone 8, 2009

Appliance	*End-Use*	*Forecast Zone 8 Household Consumption (therms)*
Primary Heat	Space Heating	63.9
Auxiliary Heat		

Conventional Gas Water Heat	Water Heating	169.42
Solar Water Heat w/Gas Backup		
Dryer		14.56
Range/Oven		25.92
Pool Heat	Pool & Spa Heating	14.86
Spa Heat		
Miscellaneous		3.74

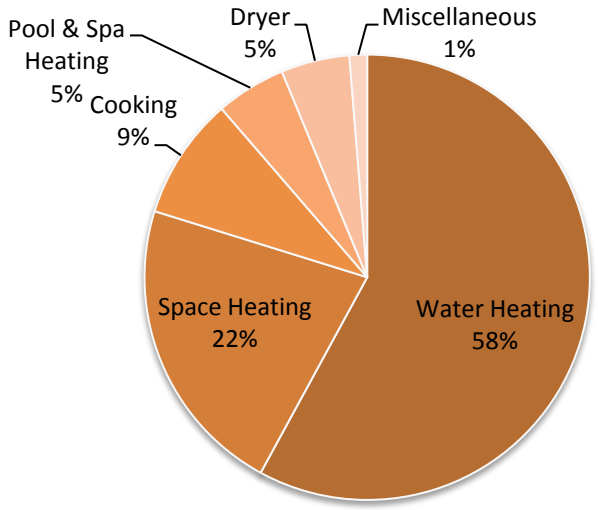


Figure 9: Household End-Use Natural Gas Consumption Profile in Forecast Zone 8, 2009

After estimating household energy consumption, we then calculated the energy savings from each building- or appliance-related pledge action. The percentage-reduction actions are listed in APPENDIX XIII: Household Building and Appliance Energy Savings Expressed as a Percentage Reduction of End-Use Consumption.

To calculate the estimated household energy savings (in kWh for electricity and therms for natural gas), we simply multiplied the energy reduction percentage by the amount of energy used for the relevant end-use. For example, an average household uses 181 kWh and 169 therms a year on water heating. (Note: a real household would most likely either use electricity or natural gas for water heating but not both, but our numbers reflect usage for an "average" household and so must contain elements of both energy sources.) Turning down the water heater temperature saves 8 percent of water heating energy, or 8% * 181 kWh + 8% * 169 therms = 14.5 kWh and 13.5 therms.

We also had to divide the household energy savings by the number of individuals per household (2.87 on average[139]) to get the individual energy savings. We chose to display individual rather than household GHG and water reduction numbers in the pledge, reasoning that the pledge would be taken on an individual basis. Though some household

actions may be decided by one individual, we cannot always assume that to be the case. The problem becomes more pronounced when counting the action items that pledge participants are *currently* doing. Here members of the household are even more likely to check off relevant actions they are already doing, even if one person had decided to implement that action for the entire household. Moreover, the pledge contains some actions, such as the meat content of a diet, which may be more appropriately decided on an individual basis. Hence, we chose to report individual reductions for the sake of clarity and consistency.

For the device-based reductions, we calculated the energy savings based on the electricity or natural gas consumption of that particular device and again divided by the individuals per household. The device-based energy reductions are listed in APPENDIX XIV: Household Energy Savings from Device- or Appliance-Based Actions.

Another set of actions were related to transportation, with all but one about driving. For the driving-related items, we assumed the following characteristics of Californian drivers:

- Annual vehicle-miles traveled per household: 22,100 (in the Pacific West)[140]
- Gallons of gas consumed per household annually: 1,090 (in the Pacific West)[141]
- Average fuel efficiency of vehicles: 20.3 MPG (calculated: *VMT / gallons of fuel consumed*)

To calculate the individual emissions, we divided reductions by the number of drivers per household (1.87[142]), assuming that non-drivers would not pledge any driving-related actions. Reductions from driving actions are listed in APPENDIX XV: Household Energy Savings from Actions Related to Driving.

The pledge also contains actions that reduce water consumption, and actions that reduce both water and energy consumption. Because heating water requires energy, reducing consumption of hot water also reduces energy usage. We calculated the environmental benefits of the following actions primarily by calculating water usage reduction and then, if the action saved hot water, converting the water savings to energy savings. We used the following conversion factors:

- Electricity used to heat one gallon of water: 0.1766 kWh[143]
- Natural gas used to heat one gallon of water: 0.008768 therms[144]

Not all water saved is hot water, however, so we also had to multiply by the percentage of water that is hot, which varies by use. Also, because the pledge considers an average person, we must provide a weighted average of the electricity and natural gas consumption: (*% of people using electric water heating * electricity used to heat water) + (% of people using natural gas water heating * natural gas used to heat water)*. Of surveyed Californians, 75 percent reported natural gas water heating, while 6 percent reported electric. Normalizing the electricity and natural gas water heating surveyed households, we got 75%/(75% + 6%) = 92.6% using natural gas water heating and 100% – 92.6% = 7.4%

using electric water heating. Actions that reduce water usage and the energy used to heat water are listed in APPENDIX XVI: Household Energy and Water Savings from Actions to Reduce Water Consumption.

For GHG emissions reductions from direct household energy savings, the final step was to translate those energy savings into GHG reductions. As with the screening analysis (see Screening analysis to understand major sources of worship-related GHG emissions on p. 46), we used the following emission factors: 5.306 kg CO_2e/therm for natural gas, 0.330 kg CO_2e/kWh of electricity, and 11.14 kg CO_2e/gallon of gasoline.

Another set of GHG-reducing actions accounted for indirect emissions from purchased goods and services, including food. For these actions we calculated product emission factors from the CEDA4 database, using the same methodology as described in . The difference for the pledge calculations, however, was that we could not question each potential pledge participant on her annual expenditures. Instead, we turned to the Bureau of Labor Statistic's Consumer Expenditure Survey (CES) for average household expenditure information. Santa Barbara is too small a city for which the CES to collect separate data, so we chose to use survey results from Los Angeles,[145] which, out of all the surveyed cities in California, had the annual consumer unit income closest to Santa Barbara's annual family income.[146]

However, the metropolitan data, while more appropriate for Santa Barbara, was not as disaggregated as the CES's regional data. For example, the Los Angeles dataset had one category for "Meats, poultry, fish, and eggs," whereas regional data for the West contained subcategories for "Beef," "Pork," "Other meats," "Poultry," "Fish and seafood," and "Eggs."[147] Therefore, we decided to estimate the more detailed categories for Los Angeles by using the same percentage distribution within a category as data from the more general West region:

$$LASpecificCategoryExpenditure = \frac{WestSpecificCategoryExpenditure}{WestAggregatedCategoryExpenditure} \times LAAggregatedCategoryExpenditure$$

See **Error! Reference source not found.**Table 12 below for an example of the calculation results.

Table 12: Example of Disaggregating Expenditure Categories from Los Angeles Consumer Expenditure Survey Data

LA Category	LA Expenditure	West Categories	West Expenditures	% of Total Expenditure for Category	Disaggregated LA Expenditure
Meats, poultry, fish, and eggs	$996	Beef	$236	27%	$269
		Pork	$163	19%	$186
		Other meats	$108	12%	$123
		Poultry	$169	19%	$192
		Fish and seafood	$150	17%	$171
		Eggs	$50	6%	$57

Even with disaggregation, however, some of the categories are too broad for CEDA4. For example, the CES category "Other dairy products" could correspond to any or all of the following CEDA4 categories: "Cheese manufacturing," "Dry, condensed, and evaporated dairy product manufacturing," "Fluid milk and butter manufacturing," or "Ice cream and frozen dessert manufacturing." Since we could not estimate the share of "Other dairy products" that were spent on each CEDA4 category, we averaged the emission factors for the CEDA categories and assigned it to the CES category. Remember from the Screening analysis to understand major sources of worship-related GHG emissions in the Cost Benefit Anyalsis Tool section that we arrive at the emission factor (CO2e/dollar) by multiplying by a price conversion factor that converts producer prices to consumer prices, and then by a price deflator that converts 2009 prices to 2002 prices (CEDA data uses 2002 prices). APPENDIX XVIII: Calculations of GHG Emissions from Purchases of Selected Products provides a list of the CEDA categories we used, the emission factor, price conversion factor, and price deflator for each category, and the averaged overall emission factor for the CES category.

Once we had calculated the product emission factor and the annual household expenditures on that product, we could then estimate an action's averted GHG emissions by calculating the overall emissions for that product category and multiplying by the percentage reduction the action produces:

$$\sum_{All\ \mathrm{Pr}oductTypesInCategory} \left(ExpenditureOn\,\mathrm{Pr}oductType \times \mathrm{Pr}oductTypeEmissionFactor\right) \times \%\,\mathrm{Re}ductionFromAction$$

For example, for the food product category, we calculated overall food emissions by summing the emissions from each product type (e.g. poultry, fresh fruits, etc.). Eating less meat reduces overall food emissions by 10 percent, so we multiplied the overall food emissions by 10 percent to get the GHG reductions from eating less meat. Then, to calculate individual emissions, we divided reductions by the number of individuals per household in the Los Angeles dataset (2.8^{148}). Actions to reduce indirect emissions from purchased goods and services (except for air travel) are listed in APPENDIX XVII: Household Actions to Reduce Indirect Emissions from Food and Consumer Goods.

We calculated the GHG reductions from the remaining items through extensive research. For the only non-driving action in the Transportation category (reducing air travel by 5,000 miles a year), we used the GHG Protocol's Transport Tool.[149] Assuming long-haul flights totaling 5,000 miles traveling within the U.S., the tool calculated emissions of 0.97 metric tons of CO_2e, or 2,138 lb CO_2e.

Emissions reductions from recycling we found on a calculator provided by the U.S. Environmental Protection Agency. Recycling all recyclable waste can reduce 447 lb of CO_2e per household,[150] a figure we then divided by the individuals per household.

The pledge also contained a handful of actions for which we could find no reliable GHG or water reduction estimates. These actions and accompanying explanations are listed in Table 13 below.

Table 13: Actions without Reliable GHG or Water Reduction Estimates

Action	Explanation
Purchase > 25% of food a week from farmer's market or local source	We could find no reliable sources that provided a straightforward way to calculate emissions reductions from purchasing farmer's market or local food. In fact, there seems to be no scientific consensus that eating locally actually reduces GHG emissions.[151]
Compost kitchen and lawn scraps	By increasing soil carbon storage, composting can act as a carbon sink.[152] Nevertheless, composting lifecycle GHG reductions or emissions vary widely depending on the material being composted and how the compost is transported, treated, and used.[153] Its impact on greenhouse gases is still poorly understood.[154]
Use mulch throughout garden	While we found several sources touting the water conservation benefits of mulching, none provided any estimates about the amount of water that could be saved.[155] Moreover, while mulching reduces the watering needs of lawn plants, homeowners will not necessarily change their watering behavior to match plant needs, so it is probable that little water conservation would result without accompanying education.

Estimating money saved by pledge actions

We translated energy and water savings directly into money saved on utility bills and gasoline purchases using the following prices:

- Average California residential price of natural gas in 2009: $0.943/therm[156]
- Average California residential price of electricity in 2010: $0.1531/kWh[157]
- Average Santa Barbara water rate as of January 19, 2011: $0.006/gallon
    - Assumed single-family rate for simplicity (multi-family is more expensive from the thirteenth HCF onward)
    - $2.93 for the first 4 HCF[158]

- $4.90 for the next 16 HCF[159]
- A household on average uses 20 HCF a month: *(171.8 gallons per person per day[160] * 365 days per year * 2.87 individuals per household[161]) / 12 months per year / 748 gallons per HCF*
- *($2.93 * 4 HCF + $4.90 * 16 HCF) / 20 HCF / 748 gallons per HCF = $0.006/gallon*

Helping congregations set goals

In the pilot project interviews, ECOFaith members expressed a strong desire to set goals for congregation education and behavior change. One of the primary ways the Path of Sustainability will help to motivate congregation behavior change is through the pledge. In addition, the pledge is the only ECOFaith tool that regularly tracks congregation members' actions and intentions. Consequently, we developed an Excel-based tool to help Green Team and congregation leaders set effective goals through the pledge.

The Pledge Tally Form takes as input the number of pledges ("I will") and current participants ("I already") for each action. It then sums the estimated GHG reductions and reports the total for each category and overall. (See APPENDIX XIX: Hypothetical Input into Pledge Tally Form after Several Years' Participation in Path of Sustainability for an example.) In addition, the workbook contains a sheet called "Graphs & Analysis" that can be used as a visual tool to help congregations put their emission reductions into context. The graphs compare the congregation to a hypothetical baseline, calculated by multiplying the number of congregation members by the U.S. average per capita GHG emissions. Each pledged or current action will then reduce the congregation's footprint below this baseline.

On a third tab, named "Goal-setting," the user can view and set goals on three aspects of the congregation pledges:

- Congregation participation: We calculate this metric by dividing the number of pledge participants by the total number of people in the congregation. The user can then set a goal for participation rate, and the tool will calculate the number of additional pledge participants needed to meet that goal: *goal percentage * number of congregation members – actual percentage * number of congregation members*.

- Percentage of emissions reduced through current and pledged actions: We calculate this metric by summing the GHG reductions from the pledged and current actions and dividing by the baseline "U.S. average" footprint. The user can then set a goal, and the tool will calculate the GHG reductions still needed to meet that goal: *goal percentage * congregation baseline footprint – actual percentage * congregation baseline footprint*.

- Percentage of emissions reduced through current actions alone: To encourage follow-through, we wanted to emphasize the importance of actually *fulfilling* pledges. Because the pledge will be administered every year, congregations can see

how their current ("I already") actions increase in impact over time. We calculate this metric by dividing the current action GHG reductions by the baseline congregation footprint. The user can then set a goal, and the tool will calculate the GHG reductions still needed to meet that goal: *goal percentage * congregation baseline footprint – actual percentage * congregation baseline footprint*.

To make the Pledge Tally Form as easy to use as possible, we included step-by-step instructions within the Excel spreadsheet itself so that ECOFaith members could easily refer to the directions as they were using the tool. Also, to prevent accidental deletion of important cells, we made all the non-input cells un-editable. Finally, we hid the assumptions and calculation tabs so as to not confuse users with unnecessary complexity. These tabs can be un-hidden for sophisticated users who want to change parameters, assumptions, or calculations in the future.

Results & Discussion

The Pledge Form

A copy of the pledge with its estimates of GHG reductions, water savings, and money savings is available here.

Our results showed that the largest emissions reductions can be achieved in the Transportation category. Just switching from an average car getting 20.3 MPG to a fuel-efficient car getting 30 MPG would reduce emissions by more than the cumulative impact of all the non-transportation actions, excluding installing a 3 kW solar PV system. Nevertheless, purchasing a new car may be unrealistic for many families in the short-term, so it is worth noting that simply altering driving habits by accelerating more slowly, reducing braking, and reducing idling can abate emissions by 2,420 lb CO_2e, which is more than any other single action on the list except purchasing a more efficient vehicle. Reducing air travel by 5,000 miles a year, saving 2,138 lb CO_2e, is the third most impactful item on the list.

Transportation and Solar categories aside, the most GHG-reducing actions (ordered by decreasing impact) are:

1. Reducing meat consumption
2. Unplugging an unused fridge/freezer
3. Replacing incandescent bulbs with CFLs
4. Reducing clothing and shoe purchases by 25 percent
5. Installing a more efficient water heater

Two of the high-impact actions listed above reduce emissions from indirect sources (items 1 and 4) rather than direct household energy use, further indicating that indirect emissions are indeed important to target. While the GHG reductions from the actions we added or quantified are minor compared to the total per capita indirect emissions, our pledge at

least brings awareness to the embedded emissions in consumer products. Future research may be able to identify more actions to reduce consumerism.

Surprisingly, no actions from the Heating and Cooling category reduced more than 100 lb CO_2e. This result could be explained by the mild Mediterranean climate enjoyed in the Santa Barbara area. Santa Barbara's forecast zone uses 18 percent less natural gas than the California average, and its natural gas UEC of 71 therms/year for primary heat was the lowest in the state.[162] In fact, besides forecast zone 9 with a primary heat UEC of 88 therms/year, all other forecast zones had UECs in the range of 161 to 302 therms/year—more than double the UEC of Santa Barbara's forecast zone.[163]

Goal-Setting

For a demonstration of the goal-setting functionality, see a hypothetical example of the Pledge Tally Form output in APPENDIX XX: Pledge Tally Form's Visual Representation of the Congregation Compared to Baseline "Average American" and APPENDIX XXI: Pledge Tally Form Goal-Setting Sheet. (See the same Appendix for the inputs to the Pledge Tally Form that led to these results.)

We recognize that in totaling the GHG reductions and providing a comparison with a "business as usual" scenario, our estimates do not correct for double-counting. To understand the problem of double-counting, consider an example where a homeowner both insulates his home and replaces its furnace. The cumulative GHG reduction of these two actions will not be as great as if one homeowner insulated one home and a different homeowner replaced a furnace. Correcting for double-counting, however, would have been extremely complicated. We would have had to consider which actions would interact with each other (having multiplicative effects) and which would be independent (and therefore additive), as well as what correlations exist between the likelihood of adopting any two actions. Such rigorous calculations were beyond the scope of this project. The primary goal of our tool is to motivate behavior change, so exactness is not as important as simplicity. Therefore, we felt justified in sacrificing accuracy in order to give a powerful, meaningful, and easily understandable representation of the GHG reductions from congregation member actions. Moreover, we wanted to make the pledge simple to update in the future, and we feared that complex calculations would add more confusion than value.

By providing a framework within which to evaluate pledge actions, the Pledge Tally Form's goal-setting functionality provides an incentive to choose the high-impact actions rather than just actions that are easy to implement. For example, if the congregation sets a goal to reduce its emissions to 10 percent below the baseline, the tool outputs the amount of additional GHG reductions that need to be pledged to achieve that goal. The Green Team or the congregation itself can then strategize about what actions can be taken, and by how many people, to reach that goal. Because low-impact actions will do little to help congregations reach their target, congregants will quickly understand the importance of implementing the high-impact actions. If ECOFaith so desires, the goal-setting functionality can even be used to create competition between ECOFaith communities to further incentivize congregation action. Because achievements are expressed as a percentage

reduction below a baseline, large congregations would not have an advantage over small ones.

Another primary purpose of the goal-setting functionality is to address a major concern with pledges: that they do not reflect actual behavior change—only intended behavior change. To encourage implementation, the Pledge Tally Form has a goal to increase GHG reductions from current ("I already") actions. Because this goal does not include pledged actions, the only way for congregations to meet it is if they actually carry out the changes they promised in previous pledges. Therefore, the goal encourages actual implementation of environmental actions.

Conclusion

The updated CEC pledge is more complete and accurate than the original version. It includes more high-impact actions while also providing more choices for renters and more no-cost options. These new actions address pilot project feedback that congregations are heterogeneous and therefore need a variety of recommendations, especially inexpensive ones appropriate for low-income congregants. Furthermore, our pledge begins tackling the large problem of indirect emissions, paving the path for future recommendations that reduce consumerism.

Besides the improvements we made to the pledge, we also provided a suite of tools to help ECOFaith members collect metrics on congregation actions and set goals for future progress. With visual aids and concrete numbers, these tools provide motivation for congregation members to make meaningful reductions in their personal environmental impact. In addition, having a simple way to report the congregation's achievements to potential grant sources will be extremely helpful in ECOFaith's efforts to draw more funding.

RECOMMENDATIONS AND NEXT STEPS FOR ECOFAITH

Given the scope of our project, we were able to accomplish a large portion of our objectives within the timeframe. With more time, we would have been able to fully analyze more aspects of the ECOFaith program. Additionally, some issues were beyond the scope of our project and fall instead under the purview of the organization's leadership. We recommend that ECOFaith leaders focus on the following topics as they continue to refine their program:

- **Implementation of new pilot projects:** While the Bren revisions have received positive reviews from both the original pilot and non-pilot congregations, no group has yet implemented the full program. ECOFaith leaders should ensure that the tools and ideas the Bren group developed are thoroughly tested by new congregations that are willing to and capable of providing ongoing feedback, so that ECOFaith as an organization can continue to improve and grow.

- **Increased focus on maintaining communication and momentum:** ECOFaith portrays itself as a coalition of over 20 faith institutions; however, the coalition is weak in practice. While the four pilot project congregations met regularly during their planning phase, there was insufficient interaction with non-pilot groups and several that we spoke to were actually unsure as to the current status of the organization. When the pilot phase ended, ECOFaith did not successfully implement its program across the coalition. While some of this is due to a lack of resources, communication could be strengthened within the organization. Going forward, ECOFaith must ensure that all interested congregations, particularly those that are not yet actively participating in the program, are included in meetings, planning, and funding discussions. Doing so will help the organization maintain momentum and life even after one group of institutions finished its feasible improvements; new groups will constantly be coming on board and will be ready to hit the ground running.

- **Additional measurement of behavior change:** One of ECOFaith's greatest strengths is its ability to instigate behavior change in individual members of congregations, and not just energy efficiency improvements in the worship buildings themselves. While this aspect of the organization may be highly appealing to funders, ECOFaith will be unable to secure support if it cannot provide these organizations with some idea of how much of an impact these behavior changes have. The pledge is an excellent first step, and we have already outlined the need for ongoing, regular checkups to be sure that pledged actions are being implemented. These pledges do not show, however, if ECOFaith's actions are what caused the individual to undertake the change, or if they would have done so anyway. Tracking ECOFaith's influence will require additional robust baseline assessments as well as regular and thorough tracking via surveys, discussion groups, or other methods to be developed.

- **Additional emphasis on indirect emissions:** Many of ECOFaith's efforts have dealt with easy energy efficiency improvements such as changing light bulbs and maintaining equipment. While these are important actions, the majority of emissions in the typical person's daily life actually come from purchased goods: raw materials, manufacturing, and shipping. ECOFaith may want to consider widening its focus from reducing on-site energy use to educating members about the environmental effects of the things they buy and how to live with less.

- **Increased web presence with electronic versions of materials:** Many of the new Bren-developed tools require use of spreadsheets and calculations, so they are only effective when they can be used on a computer. The Process mentions several of these files specifically in the order at which they would be used. Making these materials available online via a website will allow materials to be used as they are intended and will allow for easy linking between documents. This will help keep the ECOFaith Path of Sustainability easy to use for all participants.

- **Revisit the organizational mission with new experience and tools in mind:** The Bren revisions to the ECOFaith program are extensive. Even if ECOFaith leadership does not adopt all of the items we developed for our toolkit, it may wish to use our research and findings to define its goals going forward. For example, one of ECOFaith's original distinct features is its professional energy audit; in practice, however, the expense of the audit was too much for the organization to maintain while still providing other valuable services. ECOFaith may wish to consider itself as an advisor that provides congregations with the tools and information they need to be self sufficient, thus lowering the financial restrictions that have prevented the organization from growing.

- **Reach out to other interfaith organizations:** ECOFaith leadership approached organizations such as Green Faith and Interfaith Power and Light during the formation stages, but the relationships seem to have dried up. ECOFaith should continue to work with such groups to help develop ongoing support as it grows and new issues develop. ECOFaith should also maintain a presence in other local faith-based groups such as the Justice Fund and Clergy and Laity United for Economic Justice (CLUE), which will help both increase networking potential and cement the connection between environmental and other social issues.

APPENDIX I

The Path of Sustainability

Please note: some formatting and usability may have changed in the translation from the actual documents to this formatting. To see the original formatting, please see the original documents at: http://fiesta.bren.ucsb.edu/~ecofaith to download a zip file of the Path of Sustainability Program.

00_Table of Contents
01_ECOFaith_Process
02_Letter_of_Agreement
03_Overview_Brochure
04_Pilot_Project_Info
05_Encouraging_Environmental_Behavior
06_Vision_Statement_Examples
07_Energy_Audit
08_Utilities_Form
09_Action_Pick_List
10_Education_Action_Items_Detail
10a_Sustainability_Tips
11_Green_Purchasing_Info
12_Rebate_Information
13_Action_Item_Sign_Example
14_Action_Item_Sign_Espanol_Example
15_CEC_Pledge
16_Pledge_Tally_Form
17_Progress_Report_Instructions
18_3_Month_Progress_Report
19_1_Year_Progress_Report
22_Path_Poster_Instructions (contains examples of both the Path poster and Path poster labels, from file names: 20_Path_Poster and 21_Path_Poster_Labels)

Table of Contents

Welcome to ECOFaith! The ECOFaith toolkit is provided to you in order for your faith community to embark on the ECOFaith Path of Sustainability. Use this Table of Contents roadmap to show you which documents belong with the steps outlined in the ECOFaith Process. We wish you well as you embark on the journey of environmental stewardship.

First, use the **ECOFaith Process** to walk through how the Path of Sustainability works in action.
Relevant document
File name: 01_ECOFaith_Process.docx

Step One: Meeting with ECOFaith and Defining the Vision and Commitment
Relevant documents
File name: 02_Letter_of_Agreement.docx

Step Two: Creation of a Green Team
Relevant documents
File name: 01_ECOFaith_Process.docx
File name: 03_Overview_Brochure.docx
File name: 04_Pilot_Project_Info.docx
File name: 05_Encouraging_Environmental_Behavior.docx
File name: 06_Vision_Statement_Examples.pdf

Step Three: Creating the Action Plan
Relevant documents
File name: 07_Energy_Audit.docx
File name: 08_Utilities_Form.xls
File name: 09_Action_Pick_List.xls; instructions for this tool are included in the file
File name: 10_Education_Action_Items_Detail.docx
File name: 11_Green_Purchasing_Info.docx
File name: 12_Rebate_Information.docx

Step Four: Implementing the Action Plan
Relevant documents
File name: 13_Action_Item_Signs.pptx
File name: 14_Action_Item_Signs_Espanol.pptx
File name: 15_CEC_Pledge.docx, legal-sized paper, 8 ½" x 14"
File name: 16_Pledge_Tally_Form.xls; instructions and graphs are included in the file
File name: 17_Progress_Report_Instructions.docx
File name: 18_3_Month_Progress_Report.docx

Step Five: Path of Sustainability and Beyond
Relevant documents
File name: 17_Progress_Report_Instructions.docx
File name: 19_1_Year_Progress_Report.docx

Internal ECOFaith documents only

3 Month Evaluation	(file name: Internal_3_Month_Evaluation.docx)
1 Year Evaluation	(file name: Internal_1_Year_Evaluation.docx)

Example of the Path of Sustainability Poster

ECOFaith Process: Path of Sustainability

The ECOFaith Process is designed as a yearly program to promote sustainability actions and education within faith-based communities. The process is comprised of the following five steps. Some congregations may have already completed some of the early organization stages (such as creating a Green Team or equivalent group), and should feel free to modify the process as necessary. The process can also be adapted and modified based on individual congregation needs and abilities, but these changes should be communicated to ECOFaith.

Step One: Meeting with ECOFaith and Defining the Vision and Commitment

Participants: ECOFaith staff, congregation leaders

a) ECOFaith Leadership meets with the leaders of the congregation to discuss the history and objectives of the organization and the ways the ECOFaith staff and the specific faith community will work together. ECOFaith provides the faith community with the detailed process from beginning to end and demonstrates how the portfolio of resources and tools can help the congregation meet its goals. The group then sets a date for a full meeting between ECOFaith Staff and the congregation "Green Team" (see "What is a Green Team?" section below).

b) ECOFaith follows up with a letter of agreement to the congregation leaders (file name: 02_Letter_of_Agreement.docx), and coordinates the scheduling of subsequent meetings. The leaders of the congregation work with the governing body to approve the written agreement and pursue the ECOFaith "Path of Sustainability." Leaders should publically announce the agreement; this public announcement is an ideal opportunity to solicit participation for the Green Team.

c) ECOFaith will assign a buddy congregation and provide appropriate contact information so that new participants can have an experienced member to turn to for support and ideas. The buddy congregation should be invited to the first meeting of the Green Team in order to share ideas and inspiration.

Step Two: Creation of a Green Team

Participants: ECOFaith staff, congregation leaders, Green Team

a) The congregation leaders/initial contacts with ECOFaith are responsible for recruiting and establishing a Green Team, as well as communicating to the entire congregation the commitment to achieving the ECOFaith "Path of Sustainability." The Path of Sustainability is a commitment for a congregation to achieve ten action items per year from a list of potential actions, including greening of the worship building, greening of worship events and activities, education (green lifestyle and actions as well as spiritual motivation), and reporting activities to ECOFaith. The Path of Sustainability comprises four energy efficiency actions for the worship building, built upon an energy audit that the Green Team conducts, and six education actions, one of which includes six sermons/homilies/reflections by the congregation leaders throughout the year.

What is a Green Team?

- The Green Team is a group of volunteers who are dedicated to learning about and implementing strategies for greenhouse gas (GHG) reductions in the worship building as well as in their personal lives. The Green Team shall also be an instrument of motivation in helping to encourage environmental awareness throughout the congregation and communicating how congregation members can positively contribute to GHG reductions in their day-to-day lives.
- The Green Team can vary in size depending on the congregation; we strongly recommend at least three people to allow for easier task division or transition in case of Green Team member changes.
- The Green Team should be aware that GHG-reducing strategies pertain to all levels of congregation activities, from both a day-to-day operational standpoint (i.e., electricity use, transportation, purchasing of goods for the congregation), to special events (food, transportation), to congregation education (i.e., Bible study, Sunday School, outreach to help individuals improve their personal environmental performance at home) to long-term goals and strategies (larger renovation projects). The Green Team will communicate with the leaders who are in charge of each of the major activity categories to help promote these strategies throughout the congregation.
- To improve its ability to make changes in the congregation, the strongest Green Team will include or be in contact with: faith leaders, educational leaders, congregation volunteers, buildings and maintenance staff, finance leaders/decision-makers. Even if these individuals are not direct participants, their support is essential for the Team to successfully implement changes. The Green Team cannot stand alone in its efforts to make a difference within the congregation.

b) Appropriate ECOFaith staff meets with members of the congregation's Green Team for introductions and to discuss the program overview, design, and implementation. The ECOFaith representative will bring along the ECOFaith binder, which includes all of the materials necessary for the Green Team to complete the Path of Sustainability. Each Green Team member will receive an overview brochure (file name: 03_Overview_Brochure.docx), a copy of this process (file name: 01_ECOFaith_Process.docx), information about the pilot projects (file name: 04_Pilot_Project_Info.docx), and information about how to encourage environmentally-friendly behavior change (file name: 05_Encouraging_Environmental_Behavior.docx). A representative of the assigned buddy congregation should be invited to the meeting to provide perspective on the process. The Green Team should assign a person to head the work on the vision [see bullet (c) below], and should schedule the next meeting with the facilities manager to conduct an energy audit, which will take approximately 1-2 hours.

c) The leader(s) of the congregation and/or the Green Team will prepare a description of the faith community and the foundations for their specific ECOFaith vision that shall be included in the binder. Examples of other faith communities' vision statements can be found in the binder or on the CD (file name: 06_Vision_Statement_Examples.pdf). This vision document serves as the spiritual foundation for environmental action within the community.

Step Three: Creating the Action Plan

Participants: the Green Team, the facilities manager for the energy audit

a) The first official meeting of the Green Team as a unit will be to conduct an energy audit of the worship building(s) (file name: 07_Energy_Audit.docx). The Green Team should complete both the walkthrough and the post-walkthrough parts of the energy audit during this meeting in order to best be able to determine potential action items. The Green Team should collect the prior 12 months of electricity and gas bills of the worship building for the energy audit and enter this information into the Utilities Form (file name: 08_Utilities_Form.xls).

b) The next meeting is dedicated to coming up with a complete Action Plan for the Path of Sustainability. Use the post-walkthrough possibilities determined by the energy audit last time, coupled with the Action Pick List tool (file name: 09_Action_Pick_List.xls; instructions for this tool are included in the file), in order to determine which energy efficiency action items are feasible within the constraints of the building itself, budgetary needs, and crew needed to complete the action.

   The Green Team must determine four action items for energy efficiency to complete within the next year, while also noting longer-term goals (such as upgrading to an energy-efficient furnace within 5 years, etc.). The Green Team will also choose six education action items from the Action Pick List, one of which is required to include six messages (i.e., sermons) that the faith leader must give within the year that deals with sustainability themes (the Green Team can choose the other five items). Detailed information for how to conduct the education action items can be found at file name: 10_Education_Action_Items_Detail.docx. For both education and energy efficiency, the Green Team should decide expected completion dates for each item; two of the action items should be completed in the first three months (Priority Actions), in order to jumpstart plan implementation (one action item from energy efficiency and one from education). A congregation may get credit for two actions taken before starting the ECOFaith Path of Sustainability; however, these credits cannot be applied to the Priority Actions. We suggest starting with the "low-hanging fruit," such as changing to CFL light bulbs and turning down thermostats.

c) Once the draft Action Plan is complete, the Green Team will be responsible for talking with the appropriate people (for example, those in charge of facilities, event planning, or spiritual education) to refine the Action Plan based on feasibility.

d) In the next meeting, the Green Team will finalize the Action List based on feedback, and for each action item, will determine the responsible member and a reasonable timeline for execution. The team shall print out the Action Plan; choose a quote for the poster; and create the Path of Sustainability poster (materials provided by ECOFaith). The Green Team will communicate the Action Plan to the congregation and prominently display the Path of Sustainability poster within the congregation. The binder should now include the vision statement, results of the energy audit, and a finalized action plan with dates of expected completion and responsible parties.
   If the Green Team is interested, additional information on green purchasing for facilities and rebates for energy-efficiency purchases can be found in the binder or as file names: 11_Green_Purchasing_Info.docx and 12_Rebate_Information.docx. This information can be incorporated and used as optional action items if you so wish.

Step Four: Implementing the Action Plan

Participants: the Green Team

a) In order to build momentum, ECOFaith requires that at least two of the tasks on the Action Plan be implemented in the first three months following submission--these shall be the Priority Actions. In addition to displaying the Path of Sustainability poster, actions should be publicized to the congregation to promote awareness and involvement. Communication ideas include announcements, mention in the bulletin or newsletter, or signage in the worship building. All energy efficiency action items must be publicized in the worship building using the example signs, which are available in both English and Spanish (file names: 13_Action_Item_Signs.pptx and 14_Action_Item_Signs_Espanol.pptx).

b) Use the provided CEC pledge form (file name: 15_CEC_Pledge.docx, legal-sized paper, 8 ½" x 14") as part of the initiation process for the congregation. Have all members complete and sign this pledge. To increase the participation rate, we highly recommend passing out the pledge during services and asking congregation members to fill them out and return them before leaving. Once the pledges are collected, tally the results using the pledge tally form (file name: 16_Pledge_Tally_Form.xls; instructions and graphs are included in the file), and, if possible, return the pledges to the members. We recognize that larger congregations may have difficulty in returning pledges to their members, but reminding people of their pledge is an important strategy in ensuring they stick to the pledge.

c) After three months, submit the three-month Progress Report to ECOFaith (file names: 17_Progress_Report_Instructions.docx and 18_3_Month_Progress_Report.docx) and to your buddy congregation, and adjust your plan according to their feedback. At the same time, submit the action plan that you already created to ECOFaith, as well as the 12 prior months of energy bills of the worship building that you collected for the Energy Audit.

d) We suggest that the Green Team continue to meet at least once every month to check in, maintain project progress, see how the congregation is doing as compared with timeline, and brainstorm any new ideas or boosts in morale that can be applied. Reach out to the various leaders in the church (finance, education) to check on their progress. Update the poster as action items are achieved.

Step Five: Path of Sustainability and Beyond

a) A year has passed—you achieved your sustainability goals! Organize an eco-friendly celebration of your actions—this event could be timed with other relevant celebrations, such as Justice Week or Earth Day, that may already be celebrated in your congregation.

b) The Green Team will meet at the end of the first year of progress and set up the Continuing Action Plan for the next year. Create a new Action Plan using the Action Pick List. Two energy efficiency items can continue over to the new year (such as green purchasing), and two should be new. Education should have six more items for the new year.

c) Submit the yearly progress report (file names: 17_Progress_Report_Instructions.docx and 19_1_Year_Progress_Report.docx) to ECOFaith and your buddy congregation for discussion and evaluation. ECOFaith will review your progress report to determine your achievements based on your Path of Sustainability goals and will give you a new poster for the upcoming year.

> If you would like and are able, re-administer the CEC pledge before turning in the one-year progress report so that you can show the increase in participation/increase in GHG reductions from the congregation.

d) Now that you've accomplished so much, you are ready to be a buddy congregation. Reach out to other congregations you may have relationships with, either inside or outside of the Santa Barbara region. Encourage them to join the ECOFaith process and provide them with ECOFaith contacts as well as examples of what you've achieved.

e) Sometime within the year, a Green Team representative should attend the ECOFaith yearly meeting to report on progress and exchange ideas and experiences with other congregations.

f) Green Team members may wish to share responsibilities with other new volunteers--get them on board and educate them before you leave the team in order to ensure a smooth transition.

ECOFaith Participant Letter of Agreement

As representatives of _____(Name of participating institution)_____, we acknowledge that our planet is in environmental peril and that collaborative leadership is needed to protect and preserve creation. We believe that while slowing climate change and reducing our dependence on fossil fuels requires scientific and technological advances, such innovations alone will not be sufficient to stop the underlying causes of climate change. There will need to be a profound shift in human behavior whereby people are deeply motivated to reduce their energy use, consumption and waste. To achieve these goals, religious institutions such as our own must play a major role, both by retrofitting our buildings for energy efficiency and by calling on our congregations to be better stewards of the environment within the life choices they make.

_____(Name of participating institution)_____ is making a commitment to embark upon and follow the ECOFaith Path of Sustainability for the initial period of one year. This process shall include the following steps:

1. Creating a Green Team and setting goals for energy efficiency retrofitting and education;
2. Creating and implementing an action plan for improved energy efficiency and resource conservation in our worship buildings;
3. Creating and implementing an action plan for the education of our congregation members about the importance of reducing their own ecological footprints and how best to do so, and;
4. Partnering with the broader community and other ECOFaith member institutions to work towards a healthy and energy-efficient environment.

_____(Name of participating institution)_____ is dedicated towards doing our part as stewards of our planet and the environment!

_____

Name of participating institution

_____

Name and signature of participant institution representative #1

_____

Name and signature of participant institution representative #2 (optional)

_____

Name and signature of participant institution representative #3 (optional)

_____

Name and signature of ECOFaith representative

_____

Date of agreement

ECOFaith and the Path of Sustainability

Welcome and thank you for your interest in ECOFaith! The goal of our organization is to help diverse faith communities in the Santa Barbara area communicate and work together towards improving their environmental sustainability. We provide participating groups with information, ideas, contacts, and planning tools to help them customize an environmental plan that works for their unique needs.

Below you will find a summary of ECOFaith's history and goals and our Path of Sustainability process. For more in-depth information or to get involved, please contact Ed Bastian at *ed@spiritualpaths.net*.

Why energy efficiency?

For many homeowners, businesses, and groups, the idea of improving energy use in a building immediately leads to thoughts of solar panels. While generating renewable energy is an important part of reducing environmental damage, a better first step is energy efficiency—that is, reducing actual energy demand while maintaining the same level of function. According to the EPA commercial and residential buildings account for 40% of fossil fuel combustion in the US, so focusing on upgrades in homes and businesses is a great way to reduce total environmental footprint.

In many cases, small efficiency improvements pay for themselves much faster than large projects like solar panels. For example, a CFL bulb costs approximately $2.80 more than a comparable incandescent bulb, but because it uses 75% less energy it will save that same amount in electricity cost in less than 4 months—and then continue to use less electricity and cost less every month for the next ten years. The EPA estimates that a single $3.40 CFL bulb will save the user $69 over its ten-year lifespan.

Even if large-scale projects like solar panels are the ultimate goal, it is generally better to start with smaller projects with a faster payback period. Upgrading lights, adding insulation and adjusting behavior all save both money and energy immediately, and the savings can then be set aside to help with the high upfront cost of solar panels. Doing efficiency upgrades first will also give building managers a better idea of their real energy needs so they don't end up buying a larger unit than needed.

Because ECOFaith is a coalition of faith communities that in many cases have little funding and many causes to support, we focus on low-cost energy efficiency improvements as the first step in reducing energy use. Once the low-hanging fruit has been picked, congregations will be in a better position to tackle more difficult problems.

The Path of Sustainability

The ECOFaith Path of Sustainability was developed by a team of graduate students at the Bren School for Environmental Science and Management. It is the process by which congregations can begin to improve their environmental impact. The major steps in the process include:

- Organization of congregation leadership into a united, committed group
- Formation of a Green Team tasked with oversight of environmental activities
- Development of an action plan for the congregation to pursue over the next year. The action plan will include:
    - 6 weekly sermons/messages throughout the year that incorporate the environment

    - 4 energy efficiency actions, including at least 1 behavior-changing action, 1 high-impact action, and 1 high-visibility action
    - 6 educational activities, including at least 1 hands-on action, 1 visual/display action, and 1 presentation/discussion action
- Implementation timeline, follow-up, and visual display to help inform congregation of progress
- Interactions between ECOFaith congregations through regular meetings and "buddy" pairings

The ECOFaith process helps congregations develop a framework to get them started on environmental issues while still allowing a great deal of individual customization.

History of ECOFaith

The momentum toward the creation of an environmental coalition of diverse faith communities in Santa Barbara was seeded during the planning and implementation of a Faith and Politics Summit on June 3, 2007, organized by Karin Quimby, District Representative for Congressperson Lois Capps. One of the major topics of the summit was the environment.

The momentum built further when Rep. Capps invited faith leaders from her Congressional district to meet with the Democratic Congressional leadership as part of a special Faith Day in Washington DC. At that meeting, several prominent members of Congress eloquently articulated the relationship between religion, politics, and the environment. Following these talks, Ed Bastian suggested that participants form an interfaith environmental coalition when they returned to Santa Barbara.

On February 13, 2008, Karin Quimby and Ed Bastian convened a meeting hosted by Steve Jacobsen at Goleta Presbyterian Church. The meeting was attended by about 16 people who represented a cross section of Santa Barbara Faith Communities. They supported the formation of a coalition and about six participants agreed to meet again to draft a mission statement and action plan for the coalition. In this initial phase close to 20 faith communities joined the coalition, including three historically black churches, Jewish and Muslim congregations, and Catholic and Protestant denominations.

Once the group was formed, ECOFaith selected four of its founding member congregations to act as pilot projects. With generous support from the Bower Foundation, the pilot congregations conducted energy audits of their facilities, implemented efficiency upgrades, and educated their members about the role of the environment in spirituality. After gaining experience from these pilot projects, ECOFaith and students from the Bren School of Environmental Science and Management revised and expanded the process to include all congregations in the coalition.

Current ECOFaith Members

- Islamic Society of Santa Barbara (*pilot*)
- I.V. Minyan & Community Shul of Montecito and Santa Barbara
- St. Andrews Presbyterian Church
- Congregation B'nai B'rith
- Free Methodist Church
- Saint Barbara Greek Orthodox Church
- Second Baptist Church (*pilot*)
- First Presbyterian Church
- New Friendship Baptist Church
- Grace Lutheran Church (*pilot*)
- Holy Cross Catholic Church (*pilot*)
- Unitarian Society of Santa Barbara
- Greater Santa Barbara Clergy Association
- Interfaith Initiative of Santa Barbara
- La Casa de Maria
- Montecito Covenant Church
- Lewis Chapel CME Church
- Santa Barbara Friends Meeting
- Westmont College
- Church of Scientology
- Trinity Episcopal Church

For more information: contact ECOFaith Director Ed Bastian at *ed@spiritualpaths.net*

What have other ECOFaith members achieved?

What motivates you to "go green"? Cost-savings? Your children? Moral responsibility? Love for nature? The pilot projects of ECOFaith have achieved many sustainable measures in their communities and places of worship, and from them have saved money on utility bills, contributed to a healthier built environment, and conserved resources.

What are some of the energy efficiency items members have accomplished so far?

- The Islamic Society of Santa Barbara sold aluminum water bottles and reusable bags to their congregation to reduce plastic in landfills from water bottles and grocery bags and to raise money for future environmental actions.
- Grace Lutheran and Holy Cross Catholic created large community gardens to encourage people to nurture the earth and eat local foods.
- Second Baptist Church changed exit signs to LED exit signs, insulated their hot water heater, and changed old fluorescent lights and ballasts to more efficient models to save energy.
- All of the pilot projects changed incandescent light bulbs to CFLs throughout their church.
- Holy Cross Catholic installed waterless urinals, low-flow toilets, and Energy Star furnaces on its campus, as well as increased its number of recycling bins and recycling participation.
- Grace Lutheran used low-VOC paint for a repainting project.
- The four pilot project church members collectively pledged to save 139,477 pounds of carbon dioxide annually, the equivalent of 7,117 gallons of gasoline saved.

What are some of the ways the pilot projects have spread the word about their actions?

- All of the pilot project faith leaders delivered sermons and messages about the importance of protecting the Earth's resources and its importance within the central tenets of their beliefs.
- Second Baptist held educational sessions for its members to learn about waste, energy and climate change, food systems, paper usage, and water. For their efforts, Second Baptist has been recognized with an Interfaith Power and Light Energy Oscar.
- Grace Lutheran discussed ways to help the environment in its Adult Forum, and watched a DVD series about the environment within Lutheranism.
- Holy Cross gives a green wedding guide to all couples undergoing marriage preparation sessions, and incorporated environmental issues throughout all of its child education programs from Sunday School to catechism to adult education.
- The Islamic Society added environmental content to its Muslim Student Association meetings, conducted a workshop teaching how to make reusable bags from disposable plastic bags, and held field trips to participate in Coastal Cleanup Day and to visit a community garden.

ECOFaith members have accomplished so much—so can you! What actions can you take for energy efficiency & environmental education in your own faith community?

Encouraging Environmentally-Friendly Behavior Change: Tips and Techniques

Encouraging people to behave in an environmentally friendly way can be challenging. It typically requires educating them about the impact of their current habits, providing a viable alternative, motivating them to make the change, and following up to ensure that the change becomes permanent. Behavior research has found that some techniques for bringing about change are more effective than others. This guide describes several of those techniques and when they are most appropriate. We hope it will be useful to you as you plan your environmental education activities.

Inspire Change

The first step in inspiring an individual to change his or her lifestyle to be more environmentally friendly is to educate that person about how and why the problem exists, and **what that person can do about it**. Certain ways of presenting information have been shown to be more effective than others. In general, a positive change in environmental behavior is more likely when:

- **Information is gained through a hands-on, concrete or vivid experience rather than indirectly or by reading or hearing it.**
  Example: Individuals are more likely to change behavior following a hands-on demonstration or video than when they read a brochure.
- **Information is presented in such a way that the individual can see a role and/or benefit for themselves in the action.**
  Example: Individuals are more likely to change behavior when they are told it will save them money than when benefits are more distant or abstract; they are also more likely to take on an activity when they feel they have a personal responsibility or can make a noticeable difference.
- **Information is presented immediately before or at the same time as the possible change in behavior would occur.**
  Example: Customers purchase more energy-efficient appliances when efficiency information is presented along with other product features.
- **Information is very specifically related to the desired behavior.**
  Example: People have been shown to recycle more when they are educated about exactly what materials can be recycled than when they are taught about waste issues in general.
- **Information is clear, simple and prioritized.**
  Example: Consumers given long lists of overly technical options for energy efficiency can feel overwhelmed and/or make less efficient choices than when lists are concise, written in simple language and clearly prioritized by impact.

Individuals must be educated on environmental issues before they can fully recognize the problem and their own ability to have a positive impact. They are best able to make the jump from education to action when information is clear, concrete and closely tied to the desired behavior both in content and timing. Education is not the only motivator for change, however; not every informed individual successfully changes his or her behavior once educated. The next section describes some of the ways to overcome gaps in motivation when education is not enough.

Call for Change

In the early years of the environmental movement, behavior theorists often assumed that if people were educated about environmental issues, they would naturally make more beneficial choices. Research quickly proved that to be **untrue**; many other factors affect the likelihood of an individual making and maintaining a lifestyle change. In particular, people are more likely to improve their environmental choices when they are **specifically asked to do so.**

There are several common practices to encourage people to enact an environmental change. Their success can be defined in several ways: how reliably the practice results in a behavior change, how universally effective it is across a variety of groups and individuals, if it leads to spillover effects other than the initial behavior change, if the practice causes a behavior change that will be sustained without further intervention, and how fast the change will occur. The best option for enlisting change will vary depending on circumstances, but some of the most common methods are listed below:

Social Pressure has a very strong effect on behavior change. In general people seek approval from friends and peer groups, and are very likely to change their behavior to fit in with what they see as socially acceptable. Clubs and religious organizations are in a powerful position in this way, as they can shape what is considered the acceptable standard of behavior. Too much pressure, however, and people may begin resisting what they feel is an intrusion on their lives.

Prompting generally implies placing a reminder in the immediate vicinity of where the desired action would be performed, such as a sign near a light switch reminding users to turn it off when they leave the room. Prompting is generally immediately effective on a wide variety of people, but it loses its effectiveness over time or as soon as the prompt is removed. It also does not encourage participants to make additional changes in other areas of their lives.

Material Incentives such as monetary payments for desired actions have a quick and strong effect on behavior, but behavior tends to revert once the incentive is removed. Research suggests that people are much more likely to implement environmental behavior like energy efficiency because they can save money on utility bills. Other research suggests that material incentives have a negative effect on other non-target environmental behaviors because people learn to wait for a reward before changing their behavior rather than acting selflessly.

Commitment/Pledging, where participants promise to enact lifestyle changes, appears to be just as effective as incentive systems in terms of speed and reliability of change. It is best when paired with social pressure, so commitments are made to or in front of peer groups. Pledging has also been shown to be effective after the pledge period ends; researchers theorize that when no specific incentive is provided people find internal motivation that can last and spread beyond the original promise.

Organizers hoping to bring about change should consider what they are trying to accomplish and how much energy they can dedicate before deciding how to proceed. If the desired action is routine and easy to do, a small visual prompt may be the most cost- and time-effective method. If the change must be implemented quickly, social support is not yet established and resources are available, a token reward for participants may help jump start efforts. If there is wider social acceptance of the desired behavior, peer groups should be mobilized to inspire improvements in their members. Finally, direct requests for pledges, particularly between individuals or organizations that are already socially connected, have a strong effect on bringing about positive change.

Maintain Change

In some cases, individuals who make an initial effort to change their behavior quickly give up, concluding that they don't have the time, ability, or interest. Organizers can help combat such barriers by passing out information on rebates and low-cost options, providing easy to follow instructions, and continuously emphasizing the need for individual responsibility rather than waiting for someone else to start. This is also where a sense of community can be especially valuable, since people are much more likely to maintain an action they see as socially desirable or when they feel they are part of a team of like-minded individuals.

It is important to never think of environmentally-friendly behavior as being "finished," particularly when it is so easy to revert to old habits before the new ones have been fully established. Ongoing social support is vital in this stage; research shows that groups with regular follow-ups are more likely to make new changes part of their normal routine.

Finally, some attempts at change may simply take several attempts before they stick. Education, enthusiasm, support and dedication are all critical in leading environmental change. Message consistency and repetition is particularly essential. Just as research shows that techniques with the fastest impact are often the ones that are most quickly abandoned, real community-wide environmentalism takes time to cultivate. It is important not to get frustrated by setbacks and slow progress; every step makes a difference.

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Vision Statement Examples

Second Baptist Church: God's Open Door Vision Statement

Rev. Dr. Wallace K. Shepherd, Jr. Pastor
February 13, 2009
It is our mission to look to the Lord through the Word of God to give us direction to green our Churches, our homes and our lives to the best of our ability. In the past we have not contemplated our environment as it relates to the Churches. We have only attended our sanctuaries and sat within the four walls of God's house, learning lessons. In Revelation Chapter 18 verse 3-8, it describes how man has neglected his environment and how God says there will be consequences for his neglect.

This is why it is time for us to make a change in our walk as Christians. God gave us the responsibility to keep our environment simultaneously safe, along with our bodies. We don't have the time to waste. In Revelations 18 and 3 it says "For all nations have drunk of the wine of the wrath of her fornication and the kings of the earth have committed fornication with her, and the merchants of the earth are waxed rich through the abundance of her delicacies." This is telling us that we must examine what we are doing in our world and get to the heart of the problem.

Jesus said in the Gospel of John in chapter 5 verse 28 – 30: "Marvel not at this: for the hour is coming, in the which all that are in the graves shall hear his voice, And shall come forth; they that have done good, unto the resurrection of life; and they that have done evil, unto the resurrection of damnation. I can of mine own self do nothing: as I hear, I judge: because I seek not mine own will, but the will of the Father which hath sent me."

We are to be Christ like as we participate and do our part to keep the earth clean. Jesus was always talking about doing the right thing; it is up to us to follow through. The right thing is to treat each other right and to take care of what God has given us.

In our future we must be willing to pick up where our forefathers left off. Our church can now be healthier by replacing our lights with energy saving lights. We can save water by using our water more prudently. We can conserve energy by insulating our buildings with additional efficiently. We have a great future if we would just apply ourselves.

It is the goal of Second Baptist Church to work toward a cleaner and more environmentally promising future. We now can see the many different items that need our attention. We must work on our building, our grounds, our driveway and parking lot to make the improvements necessary to have a more balanced environment. Some of these items can be accomplished by utilizing our electric, gas and water companies' energy saving programs to accomplish our goals.

We also have plans to build a senior citizens complex on our church grounds. Our plans are to build this complex using all the eco-friendly materials that we can to help improve the environmental condition of our community.
In the future I would like to see our church with solar panels on the roof, double- or triple-pane windows, repaint our buildings with paint that is eco-friendly, and install rain barrels to collect water from our rain gutters.

Finally, it is our goal that we educate our congregation to help them understand the many different facets of an eco-friendly environment. We also expect that our outreach to other faith communities in the community on ecological and sustainable issues, will impact these congregations to make changes in their homes as well as their sons' and daughters' homes.

We will be blessed by our conservation efforts by: 1) saving money, 2) saving energy on the grid, 3) and recycling our waste, 4) educating our community to make changes in their environment to make a difference in our children's future.

Wallace K. Shepherd Jr., Pastor
Second Baptist Church
1032 E. Mason St
Santa Barbara Ca 93103

Grace Lutheran Church VISION

Rev. Lynn Bruer
December 2008

Communities of faith who are formed and informed by the Biblical narratives are not lacking documentation regarding the Creation's value. Woven into the core stories about identity and about God, the multi-faceted creation shows up as a literal and poetic presence as well as partner in God's messages and works.

But when did the creation stories turn into permission to plunder? When did proper care of land and animals--included in the Sabbath laws--become passé? When did "the whole creation waiting with eager longing" for the revealing of the children of God became ignorable? Has it always been true? Have the sacramental earthly elements of water, oil, grain, grape been always at risk? Have the rivers, mountains, lakes, trees, birds, lilies, stones, sheep, fields, fruits, sun, moon, stars, been so inconsequential in telling God's love story that we take implicit permission to be careless? If policy and practice over the centuries, and intensely so in our own times, were any measure, the answer would be, "yes, these are inconsequential."

But people of the Book actually know better. It is just that we have not wanted to stay awake, to hold the standards of faith to daily and complex decisions. We have made peace with "missing the mark." The theological word for "to miss the mark" is sin. Whatever reactions we may have to the word, "sin", it remains the salient word as we watch the "missing of the mark" in our relationships with God, creation and each other.

On August 28, 1993, with a two-thirds majority vote, the Evangelical Lutheran Church in America adopted a Social Statement on Caring for Creation: Vision, Hope, and Justice. This foundational document for all ELCA member congregations helps us think Biblically and theologically about environmental concerns. The Lutheran Church has never lived in isolation from the concerns of the world. It is deeply aware of and active in compassionate and practical responses to the world's suffering and to the world's injustices. With the articulation of this social statement in 1993, the creation and its populations were included in the field of concern regarding suffering and injustice.

As the writers of the social statement noted, "Even as we join the political, economic, and scientific discussion, we know care for the earth to be a profoundly spiritual matter." The document summons us to prayer and to work for justice in the following ways:

1. Through the principle of participation. "We pray…that our church may be a place where differing groups can be brought together, tough issues considered, and a common good pursued."

2. Through the principle of solidarity. "We pray…for the humility and wisdom to stand with and for creation, and the fortitude to support advocates whose efforts are made at personal risk."

3. Through the principle of sufficiency. "We pray…for the strength to change our personal and public lives, to the end that there may be enough." [resources, goods, services for all humanity and creation]

4. Through the principle of sustainability. "We pray…for the creativity and dedication to live more gently with the earth."

To their credit, individuals and congregations have been paying attention to creation theology and have been making necessary changes. Some individuals and congregations have been leading voices in this environmental love and justice issue. We might now feel heartsick at our failure to wholeheartedly embrace what we knew to be true in 1993. In theological language, true repentance, being heartsick by seeing how we have missed the mark, is a matter of changing our thinking and our direction, our behaviors. That being said, the urgent necessity of changed behaviors and policies for the well-being of the whole creation and its populations is now unambiguous.

A small congregation's little part in the big complicated inter-related universe might seem laughable and dismissible. Here's where we must turn to the Scriptural record of God's ability to take a little offering and do a big thing. Here's where Christians might take in Paul's insights, that if anyone is in Christ, "there is a new creation." Here's where we may take courage and energy for new behaviors in seeing ourselves as part of a new creation movement.

The emergence of the Eco-Faith Community and the resources of the Bower Grant have been perfectly timed for Grace Lutheran's own attentions to more pro-active participation in caring for creation and community. We are thankful for the support. As a result of the support, knowledge, encouragement and organization of the Eco-Faith leadership team, our congregation's fledgling Green and Garden Team can see that we are not in this effort alone.

Inclusion in the Eco-Faith pilot project has helped key congregational leaders focus in new ways of thinking and acting on property-related work and educational opportunities. As Grace moves into more intentional behavioral caring for creation, the four E.L.C.A. principles of participation, solidarity, sufficiency and sustainability will be our guidelines, the Scriptures our foundations, and the shared concerns of our wider community the basis of our partnerships.

We are glad to be going green with Grace.

Pastor Lynn Bruer
December 2008

Holy Cross Parish Vision Statement

1740 Cliff Drive – Santa Barbara, CA 93109 - Phone (805) 962-0411 – Fax (805) 564-6921
Fr. Ludo De Clippel
2009

BACKGROUND & VISION

At Holy Cross Catholic Church we are happy and proud that for the last decade we have been listening to, and been actively present in interfaith collaboration within the Greater Santa Barbara Clergy Association, the Interfaith Initiative, and CLUE (Clergy & Laity for Economic Justice). From this ecumenical attitude, encouraged by the Vatican, it seemed obvious that we wanted to be an active member of the Santa Barbara Environmental Coalition of Faith Communities (ECO Faith). We are very grateful for the organizational help we have received so far from the ECO Faith leadership and the trailblazing example of the Unitarian Society and of the first ECO Faith pilot community in our area, the Grace Lutheran Church.

Every so often we are gladly surprised when noticing how fast concerns from grassroots activist groups are echoed in statements of high-level religious leaders. Equally, we are often saddened by the reality that the political, economic and religious structures of the majority in between move and change slowly. That is certainly true for the international environmental movement, as we see it, as for example, in our own worldwide Catholic Church. As far back as 1979, Pope John Paul II proclaimed St. Francis of Assisi the patron saint of ecology for the simplicity of his lifestyle and his vision on creation expressed in his Canticle of Brother Sun. The same Pope's January 1, 1990 World Day of Peace message connects world peace among nations with peace with the Creator and all creation. Numerous papal statements up to Benedict XVI's address to World Youth Congress (July 2008 – Sydney, Australia) have repeated similar concerns.

Here in the USA, the Conference of Catholic Bishops followed suit with their November 1991 Pastoral Statement, "*Renewing the Earth, An Invitation to Reflection and Action on Environment in Light of the Catholic Social Teaching,* and their 2001 pastoral letter, *Global Climate Change: A Plea for Dialogue, Prudence and the Common Good.* However, fairness requires us to mention that in their controversial and courageous pastoral letter 'on Catholic Social Teaching and the U.S. Economy, *Economic Justice for All',* (1986) that a number of concerns are voiced that are echoed in more recent environmental statements. It is, then, not surprising that the American Bishops Conference promotes in this year 2009 "The Saint Francis Pledge to Care for the Creation and the Poor" linking environmental concerns with the traditionally strong Catholic social concerns.

These teachings from our Catholic Church leaders, which are reprinted here in our ECOFaith binder, refer to a theology of creation, faith values, and practices in Biblical times and throughout 20 centuries of Church history and spirituality, that belong also to the heritage of other Christian communities.

VISION STATEMENT

Holy Cross Parish wants to endorse in our own small local community what our Church leadership has formulated as theological and spiritual foundations, and what the new leadership in Washington describes as priorities for political and economic action. We understand that humanity and nature are not separate entities but intimately interconnected as are all living beings.

Therefore, as a parish family we make the Saint Francis Pledge our Mission Statement:
WE PLEDGE TO:

PRAY and reflect on the duty to care for God's creation and protect the poor and vulnerable.
LEARN about and educate others on the causes and moral dimensions of climate change.
ASSESS how we – as individuals and in our families, parishes and other affiliations –contribute to climate change by our own energy use, consumption, waste, etc.
ACT to change our choices and behaviors to reduce the ways we contribute to climate change.
ADVOCATE for Catholic principles and priorities in climate change discussions and decisions, especially as they impact those who are poor and vulnerable.

Vision Statement
Islamic Society of Santa Barbara

In the name of Allah, the Most Compassionate, the Most Merciful.
To enlighten, promote and instill Islamic values on environmentalism for the 21st century American lifestyle.

The Islamic approach to environmentalism is based on Quranic teachings and the concepts of *tawhid* (unity), *khalifa* (stewardship) and *amana* (trust/accountability).

Tawhid is the oneness of God and the cornerstone of Islamic Faith.

"*He to whom the kingdom of the heavens and the earth belongs…..He created everything and determined it most exactly" (Quran 25:2)*

It essentially means that there is one absolute Creator, everything belongs to Him and that each person is responsible solely to Him for their actions. All God's creation is created equal before God and will be called forth on Judgment Day, therefore abusing any of God's creation, whether a living being or natural resources, is a sin.

The principle of *khalifa* and *amana* emerge from the principle of *tawhid*. The Quran explains that human beings have a privileged position among God's creation and are therefore chosen as *khalifa*. Human beings are given the *amana* for caring of God's earthly creation, and have a moral relationship with the rest of God's creation which demands responsibility, self restrain and an awareness of the needs of others.

Islam requires us to adopt a holistic lifestyle and take seriously our role as *khalifa*. Over 750 verses in the Quran exhort us to reflect on nature, to study the relationship between living things and their environment, to make the best use of reason and to maintain the balance and proportion God has built into creation. To include environmental considerations into all our actions is considered a major obligation in Islam.

The Islamic understanding of accountability is that each of us will be questioned on our actions. A simple effort to reduce, reuse and recycle our personal consumption is the first small step that anyone can take. We understand that any effort, however small, will not go to waste. Prophet Muhammad (peace be upon him), said, '*If the Hour (Day of Judgment) comes while one of you holds a palm seedling in his hand and he can cultivate it, he should do so."*

The formation of ECOFaith has provided a platform for ISSB to get involved and be educated in environmental issues in a more formal and structured way. It also provides opportunities for all faith groups and the general community to share knowledge, resources and understanding of environmental issues that have an effect on all of us.
To achieve our vision ISSB will carry out the following programs

• Environmental Education
• Hands on Activities
• Construction and operation of a green community center/masjid

ISSB will actively participate, lead when necessary, to ensure ECOFaith be a success.
April 2009.

Energy Audit of Worship Buildings

Why conduct an energy audit? Energy audits serve to identify areas where buildings can improve on efficiency. If you look at energy bills (electric, gas, and water) over time, you can examine trends and identify areas for improvement. Therefore, it is important to collect your energy bills for the prior 12 months so that ECOFaith can create graphs and see improvement over time. However, energy bills do not provide specific solutions to energy waste. To understand how your building can reduce its energy consumption, save your congregation money, and lower its environmental impact, conduct an energy audit using this guide and see where improvements can be made immediately.

Please take an hour or two to walk through the building and complete this audit thoroughly.

- You may need to consult with the facilities manager for some of these answers. It is a good idea if he/she came along with you on the energy audit walk-through.

When you are finished, use the attached "Energy Measurement Tool: Post-Walk-through" to see how the building scored and which actions you should take to improve the energy efficiency of the worship building.

What You'll Need:

- This tutorial
- Pen
- Tape measure
- Light meter (available from SCE's tool lending library) phone # (800) 772-4822
- The last 12 months of gas and electricity bills, for input into "Utilities Form.xls"

Walk-Through & Information Gathering

Lighting

1) What types of lights are used? How often are they used?

Type of bulb	Example	How many?	Where are they located?	Mark which are used most frequently (estimated hrs/wk)
Incandescent bulbs				
Compact Fluorescent (CFLS)				
Fluorescent Tube Lighting		Fixtures: Bulbs:		
Halogen				
LEDs				

2) Are the lenses and covers of your lights and light fixtures clean and are they cleaned regularly? Are the lenses and covers of fluorescent lights old, yellowed or broken? Are windows and screens cleaned regularly?

3) How do lights turn on in the building? Be specific as to where each type occurs.

- Manual lightswitches

- Motion sensors

- Dimmers

4) Are you over-lighting? Take the light meter into each room. Take several measurements in each room, and average these measurements for the room. This will give you an idea of whether you are using too many fixtures or bulbs with too many watts to provide the ideal amount of lighting. Please also take into account whether shades are usually left open or closed, as daylighting from the sun is preferred to artificial lighting.

Space (e.g. "Office"): _____ Space: _____

Light Level Reading: _____ Light Level Reading:_____

Space: _____ Space: _____

Light Level Reading: _____ Light Level Reading:_____

Space: _____ Space: _____

Light Level Reading: _____ Light Level Reading:_____

Space: _____ Space: _____

Light Level Reading: _____ Light Level Reading:_____

5) If you have fluorescent lights, check the ends of the fluorescent tubes. Are they blackened?

6) Locate your exit signs: what kind of light bulbs do they use? How many exit signs are there and where are they located?

Type of Bulb	Example	How Many?	Where are they located?
Incandescent (clear glass bulbs with a filament inside bulb)			
Fluorescent/CFL (1 or 2 narrow, U-shaped tubular frosted lamps)			
LED (String of small glowing red or green bulbs arranged in a circle)			

7) What colors are the walls and flooring of the spaces inside the worship building?

HVAC (Heating, Ventilation, and Air Conditioning)

8) Does the building have a furnace and/or individual heaters?
   - If so, where are they located?
   - Is the main heater natural gas or electric?
   - What temperatures are the units set to in the wintertime?
   - How old is the unit? (Estimate if possible.) If age is unknown, write down the model # from the unit here, as well as the brand. You can look up the approximate age of the unit from this number as well as the AFUE (annual fuel utilization efficiency) online.
   - Are activities held in rooms that can be separately heated?

9) Does the building have a central air conditioner or individual air conditioners?
    - If so, where?
    - How old is/are the units?
    - What temperatures are the A/Cs set to in the summertime?
    - Are activities held in rooms that can be separately cooled?

10) Is there a programmable thermostat for heating and cooling?
    - If so, is the programmable thermostat set?
    - What temperature is it set to?
    - Who is responsible for the thermostat?

11) How often does an HVAC specialist perform maintenance for the furnace and/or air conditioning?

12) How often are air filters replaced? Is there a maintenance schedule for their replacement?

13) How often are condenser and evaporator coils cleaned? How often are fans/blowers for HVAC cleaned? HVAC fans and blowers can be mounted to an exterior wall in a ventilation unit or above the ceiling (plenum fan), or used as part of a ducted system (duct fan).

    A dirty HVAC blower:

14) Are the ducts and pipes coming off of the furnace/AC properly sealed? (If you can see a gap or feel air flow coming off of any of the pipes, they are not properly sealed.)

15) Are your furnace, water heater, and hot water pipes insulated? (They are insulated if there is some sort of wrapping around them).
    - What temperature is your water heater set to?
    - Is your water heater natural gas or electric?
    - What is the brand and model number of your water heater?

Weatherization/Insulation (Building Envelope)

16) Check each window, door, skylight, baseboard and electric outlets for the following for air leaks:
    - Doors and windows – if they are broken or if you can rattle them, see daylight, see visible warping, or feel air flow, you have a leak!
    - For baseboards and electrical outlets - simply feel for air flow.
    - Note any obvious air leaks such as mail slots, or doors that are often propped open, etc.
    - Note if weather stripping on doors is absent, damaged or insufficient.
    - On outside, inspect all areas where two different building materials meet, including all exterior corners, or areas where foundation and bottom of siding meet.

    Note here where air leaks occur:

    Note here whether the windows are single-paned or double-paned and where they are located, if single-paned. Note the number of windows in the building.

    Note here how curtains and blinds are used (left open during the day/night, always open/always closed, etc.).

17) In attic or crawl spaces check for air leaks to the outside and around any ductwork or piping. Also check for the absence, dampness or health/age of insulation. Are attic vents blocked by insulation?

Other Important Areas

18) Do you turn off your office equipment or other plug-in items when you leave the building?

19) Do you plug your equipment into power strips?

20) Are computers and other office equipment (i.e., copiers) set to auto-off and/or hibernate modes, when not in use? Are computer screens left on when not in use?

21) Does your building have a refrigerator? If not, skip to question 23. If so, check the back.
    - Are the fridge and freezer condenser and evaporator coils clean from dirt or dust?
    - What is the brand, model number, and serial number of your refrigerator (usually found on the inside of the door or on the top shelf)?

22) Check door gaskets of your refrigerator.
    - Is there condensation around doorframes?
    - Take a piece of paper and slide into door crack when open. Close the door and try to slide out the paper. Is it easily removed?

23) In restrooms and kitchens, check for obvious leaks and under the sink to see if you detect any leaks and note where this occurs.

24) In your restroom, are your sinks and toilets visibly old (15+ years)?

Energy Measurement Tool: Post Walk-Through

Please go through your answers to the energy audit with the post walkthrough guide to identify possibilities for action. For each item below, check the box on the left if the action is relevant and feasible and answer the accompanying questions. Be as specific as possible about noting opportunities for energy efficiency projects (where, when possible, feasibility).

Lighting:

Question 1: **What types of lights are used? How often are they used?**

If you have mostly incandescent bulbs, these are the least energy-efficient bulbs on the market.

☐ Bulbs with high usage should be high priority for changing to CFLs or LEDs.

Where will you change them? When?

☐ Old fluorescent lighting fixtures or lamps (T12) should be replaced and/or upgraded to Low-Wattage T8 or T5 if possible. For more information, see Fluorescent Lighting section in: http://www.energystar.gov/index.cfm?c=sb_guidebook.sb_guidebook_lighting.

Where? When?

***Question 2*: Are the lenses and covers of your lights and light fixtures clean and are they cleaned regularly? Are the lenses and covers of fluorescent lights old, yellowed or broken? Are windows and screens cleaned regularly?**

☐ If your answer was that they are not clean, the light fixtures need to be cleaned, and cleaning light fixtures should be added to the building's regular maintenance activities. The dust that collects reflects light away from the area it is supposed to light, resulting in wasted electricity usage. Where do they need to be cleaned?

☐ Light covers may need to be upgraded if they are yellowed and broken. Where?

☐ Windows and screens should also be cleaned to allow more daylighting to enter the building. This task can also be added to the building's regular maintenance activities. Where do they need to be cleaned, and who should clean them?

***Question 3*: How do lights turn on in the building? Be specific as to where each type occurs.**

a. **Manual lightswitches**
b. **Motion sensors**
c. **Dimmers**

☐ If your answer is manual lightswitches, consider installing motion sensor detectors in areas such as kitchens, bathrooms, and hallways, and outside areas. Dimmers can be installed in offices and sanctuary space to reduce electricity needs. This will result in lighting only when people are present, reducing consumption of electricity.

Where? When would it be possible to implement this action?

☐ Install signs to remind people to turn off the lights when they exit the room.

Where? When?

***Question 4*: Are you over-lighting? Take the light meter into each room. Take several measurements in each room, and average these measurements for the room. This will give you an idea of whether you are using too many fixtures or bulbs with too many watts to provide the ideal amount of lighting. Please also take into account whether shades are usually left open or closed, as daylighting from the sun is preferred to artificial lighting.**

Based on recommended illumination levels from the IES (Illuminating Engineering Society), see how this facility compares with the recommended levels.

	Light Level	Light Power Density
• Eating Area	20 FC	0.6 W/SF
• Food Preparation	75 FC	1.5 W/SF
• Conference Rooms (Sanctuary space)	35 FC	0.9 W/SF
• Hallways/Lobbies	20 FC	0.7 W/SF
• Offices		
• Private w/o task lighting	50 FC	1.2 W/SF
• Open w/ task lighting	35 FC	0.8 W/SF
• Computer Work	30 FC	0.7 W/SF
• Rest Rooms	20 FC	0.7 W/SF

Task lighting is individually controlled lighting in office spaces (such as desk lamps), whereas no task lighting would be use of overhead lights that light the entire room.
An FC is a foot-candle and is a unit of illuminance or light density used in the lighting industry.
Light Power Density is measured in watts per square foot.

If you discover that you are over-lighting in certain areas, consider:

☐ Removing certain unnecessary light fixtures/unscrewing every other bulb within a fixture

Where?

☐ Replacing dead light bulbs with lower wattage (CFLs are preferable to incandescent!)

Where?

☐ Increase the amount of daylighting by opening shades when possible

Where? Who is responsible?

Question 5: **If you have fluorescent lights, check the ends of the fluorescent tubes. Are they blackened?**

If your answer was yes, your lights are most likely degraded and are only running at 60% efficiency, resulting in a lot of lost electricity.

□ Replace fluorescent lamps before they fail completely, and consider fixture replacement with T-8 electronic ballasts (check with SCE for rebates).

Where?

***Question 6*: If you have exit signs, what kind of lightbulbs do they use? How many exit signs are there and where are they located?**

a. **Incandescent**
b. **Fluorescent**
c. **LED**

□ If your answer was incandescent, replace existing fixtures with compact fluorescents or LED lighting. These fixtures run for 8,700 hours per year, and on average incandenscent bulbs need to be replaced five times per year. LEDs are more expensive upfront but need to be replaced less than one time per year. There are rebates available from SCE to offset the cost of purchasing LED exit signs.

Where?

Question 7: **What colors are the walls and flooring of the spaces inside the worship building?**

□ If your answer includes dark colors, consider repainting in a lighter color that better reflects light throughout the room, which results in less lighting needed for the room, which reduces electricity costs.

Where?

HVAC:

Question 8: **Does the building have a furnace and/or individual heaters? If so, where is it located? What temperatures are the units set to in the wintertime? How old is the unit? (estimate if possible) If age is unknown, write down the brand and the model # from the unit. You can look up the approximate age of the unit from this number as well as the AFUE (annual fuel utilization efficiency) online.**

You can Google the brand and model unit of your furnace to check out the approximate age and AFUE rating. Current Energy Star AFUE ratings are 85 and 90%. (For more information, see: http://www.energystar.gov/index.cfm?fuseaction=find_a_product.showProductGroup&pgw_code=FU)

☐ Units that are more than 15 to 20 years old and with a low AFUE should be considered for early replacement for a unit with a higher efficiency rating (i.e. Energy Star). Old units are already likely to be running inefficiently, and will most likely fail when you need them the most.

If space heaters are present, running a typical space heater for an hour uses 70% more energy than a furnace.

☐ Educate occupants to use space heaters less often or at lower temperatures if it is necessary to use one at all.

☐ If possible, hold activities in rooms that can be separately heated so that the entire building does not have to be heated for a small event.

***Question 9*: Does the building have a central air conditioner or individual air conditioners? If so, where? How old is/are the units? What temperatures are the A/Cs set to in the summertime?**

☐ AC units that are more than 15 to 20 years old should be considered for early replacement for a unit with a higher efficiency rating (i.e., Energy Star). Old units are already likely to be running inefficiently, and will most likely fail when you need them the most.

☐ Raise the temperature from 73° F in the summer to 78° F to maximize energy savings while still ensuring comfort.

☐ If possible, hold activities in rooms that can be separately cooled so that the entire building does not have to be cooled for a small event.

***Question 10*: Is there a programmable thermostat for heating and cooling? If so, is the programmable thermostat set? What temperature is it set to? Who is responsible for the thermostat?**

☐ If there is a programmable thermostat, make sure that it is programmed correctly. Often, units are not reset when power outages occur, have never been programmed at all, or are not changed during Daylight Savings Time. Time when the program turns on to when occupants arrive in the building, and vice versa for when occupants leave. In the summer, increase the thermostat from 78° F to 85° F when building is unoccupied and in the winter, decrease thermostat temperature from 68° F to 55° F when the building is unoccupied.

☐ If there no programmable thermostat, consider installing one. The cost ranges from $40 to $200, with a short payback period in terms of energy saved. If this is not feasible, consider lowering the heating in the winter to 68° F to save on energy use.

Question 11: **How often does an HVAC specialist perform maintenance for the furnace and/or air conditioning?**

Recommended HVAC maintenance for furnaces is once per year. SCE says that it is not unusual for a heating system to lose 2% in efficiency for each year that it is not serviced. In addition, tuning up an A/C system can save up to 17% of cooling energy. These savings would be realized during the first year after servicing.

☐ To find a licensed contractor to have HVAC maintenance, go to http://www.phccweb.org

Question 12: **How often are air filters replaced? Is there a maintenance schedule for their replacement?**

Air filters for high occupancy buildings should be checked and replaced (if necessary) once per month; at the very least, change air filters every three months. Dirty filters slow down airflow and waste energy, and also may induce problems for the system, requiring expensive maintenance.

☐ Ensure that there is a schedule for maintenance and that someone specific is responsible for making it happen.

Question 13: **How often are condenser and evaporator coils cleaned? How often are fans/blowers for HVAC cleaned? HVAC fans and blowers can be mounted to an exterior wall in a ventilation unit or above the ceiling (plenum fan), or used as part of a ducted system (duct fan).**

If your coils are dirty, this restricts air flow so that your system will work harder and will thus be less efficient.

☐ Coils should be cleaned often so that they do not accumulate dust. Add this activity to the building's maintenance plan.

Question 14: **Are the ducts and pipes coming off of the furnace and/or AC properly sealed? (If you can see a gap or feel air flow coming off of any of the pipes, they are not properly sealed.)**

☐ Hire an HVAC specialist to help to seal the leaky ducts; this should be part of the yearly maintenance for the furnace.

Question 15: **Are your furnace, water heater, and hot water pipes insulated? (They are insulated if there is some sort of wrapping around them). What temperature is your water heater set to? What is the brand and model number of your water heater?**

☐ If any of these are not insulated and they are hot to the touch, purchase relatively inexpensive hot water heater or furnace insulation blankets, as well as pipe wrap for hot water pipes. There are available rebates for insulating through Southern California Gas Company (socalgas.com/rebates). If your water heater is electric, you can install the blanket yourself, but if your unit is gas, please consult a professional.

☐ Set the water temperature: the water heater should be set no higher than 120° F. (Usually, dishwashers require 140°F, but they usually preheat water to this temperature unless the preheat function has been turned off, in which case turn it back on and turn the water heater down!)

☐ If your water heater is due for replacement, consider replacing it with a new tankless or gas-condensing water heater that meets current Energy Star specifications.

Weatherization:

Question 16: **Check each window, door, skylight, baseboard and electric outlet for the following for air leaks:**

a. **Doors and windows – if they are broken or if you can rattle them, see daylight, see visible warping, or feel air flow you have a leak!**
b. **For baseboards and electrical outlets - simply feel for air flow.**
c. **Note any obvious air leaks such as mail slots, or doors that are often propped open, etc.**
d. **Note if weather stripping on doors is absent, damaged or insufficient.**
e. **On outside, inspect all areas where two different building materials meet, including all exterior corners, or areas where foundation and bottom of siding meet.**

Note where air leaks occur.
Note whether the windows are single-paned or double-paned and where they are located, if single-paned.

Note how curtains and blinds are used (left open during the day/night, always open/always closed, etc.).

If you encounter any air leaks there are several ways to plug them. For leaks around window perimeters, ducts, vents, etc. you should seal them on both sides with caulking (preferably silicone, polyurethane expanding foam or water-based foam sealant).

☐ Caulk air leaks; list where: _____

☐ For leaks around doors and window openings, you should install weather stripping most suited to your location – the weather stripping you choose should allow the window or door to open and close freely while sealing effectively when closed. It should fit snuggly against both surfaces.

☐ For leaks on the outside of the building seal them with the appropriate material (Butyl rubber caulking is the most durable, not recommended for indoor application).

☐ For single-paned windows, when replacement becomes necessary, consider double-paned windows. Windows can be expensive to install if new ones are not needed, so most likely you should wait until you are replacing windows. Replacing windows can save a significant amount of energy, however, so it should still be a priority goal even if it is not currently feasible.

☐ One behavior change that can help to save energy is to keep curtains and blinds closed at night during the winter, keeping warmth in the building. In the summer, keep curtains and blinds closed during the day to keep heat from getting into the building. To implement this action, you may need to educate office/maintenance staff and/or post signs.

***Question 17*: In attic or crawl spaces check for air leaks to outside and around any ductwork or piping. Also check for the absence, dampness or health/age of insulation. Are attic vents blocked by insulation?**

☐ If you encounter air leaks around ductwork, you should seal them with silicone caulk.

☐ If you find air leaks to the outside, use polyurethane expanding foam to seal.

☐ If insulation is absent or present but is visibly worn or old, consider replacing with new cellulose or fiberglass insulation.

☐ If insulation is present but inefficient, considering adding in additional blow-in cellulose insulation or upgrade current insulation to a higher rated insulation.

☐ If present insulation is damp, you should remove it in order to find the nearby leaks, seal with caulk, and reinstall new cellulose or fiberglass insulation.

☐ If attic vents are blocked by insulation, remove that portion of insulation to ensure proper airflow.

Other Important Areas:

Question 18: **Do you turn off your office equipment or other plug-in items when you leave the building? Do you plug your equipment into power strips? Are computers and other office equipment (i.e., copiers) set to auto-off and/or hibernate modes, when not in use? Are computer screens left on when not in use?**

☐ If you leave your electronics on (even in power save mode) they are often still drawing power from your outlets. This is called phantom load. To reduce your phantom load, turn off equipment and appliances that do not need to be on, and install signs near office equipment reminding others to turn off equipment when they are finished with them.

☐ Purchase smart power strips that reduce the standard phantom loads used by electronics.

☐ To test the standard or phantom load of any of your appliances or electronics, consider renting/borrowing a Kill-a-Watt from the CEC (email commrel@cecmail.org with subject line: Kill a Watt asking to borrow it) or the Southern California Edison tool-lending library (visit: http://www.sce.com/b-sb/energy-centers/agtac/tour-agtac/tool-lending-library.htm or call (800) 772-4822 to borrow). They are also available for purchase at Amazon.com or Home Depot for approximate $20 each.

☐ Work with office staff to set office equipment to auto-off and/or hibernate modes when not in use (use Google to find information relevant to your specific brand and model number of copier, computer, printer, fax machine, etc.)

☐ Make signs to put on computer monitors reminding office staff to turn monitors off when not in use.

Question 19**: Check the back of your refrigerator. Are the fridge and freezer condenser and evaporator coils clean from dirt or dust? What is the brand, model number, and serial number of your refrigerator (usually found on the inside of the door or on the top shelf)?**

☐ If your refrigerator coils are dirty, it is working harder than needed and thus inefficiently. Clean coils regularly. Assign someone this responsibility.

☐ Use the following tool to determine the age of your refrigerator: http://www.appliance411.com/service/date-code.php. Consider upgrading to a more energy efficient model, if possible, which can save anywhere from 2-4 times the energy costs of the refrigerator depending on the age of the refrigerator. It is recommended that you consider replacing your fridge

before it breaks, especially if it is over ten years old, and to replace it with a new Energy Star fridge (rebates and free removal services available).

***Question 20*: Check door gaskets of your refrigerator. Is there condensation around doorframes? Take a piece of paper and slide into door crack when open. Close the door and try to slide out the paper. Is it easily removed?**

☐ If there is condensation around your refrigerator door gaskets or if the paper slide out easy during your test, your door gaskets are worn and your fridge is functioning inefficiently. Replacing door gaskets is not easy. It is recommended that you consider replacing your fridge with a new Energy Star model (rebates and free removal services available).

Question 21: **In restrooms and kitchens, check for obvious leaks and under the sink to see if you detect any leaks and note where this occurs.**

☐ Leaky faucets waste more water than you think! Go to http://www.awwa.org/awwa/waterwiser/dripcalc.cfm to get an idea of just how much wasted water you are paying for. If your faucet or showerhead is leaking, you may be able to tighten the gasket around the fixture for a quick fix. If this doesn't work, you may have to call a plumbing professional to fix this leak. Note the locations of the leaks you'll fix:

Question 22: **In your restroom, are your sinks and toilets visibly old (15+ years)?**

Older faucets and toilets have much higher flow rates than those sold under today's standards.

☐ To decrease the flow of faucets, you can install a very inexpensive faucet aerator.

☐ For toilets, consider installing low-flow or dual-flush toilets in their place.

☐ If you are financially limited or leasing your space, there are several options for self-installable dual-flush toilet retrofit kits such as the Flush Choice Dual-Flush Toilet Retrofit ($59.95) which is a universal retrofit designed to fit most 2-piece toilets, and installs in 30 minutes; or the Simple Flush from Brondell ($79), which is also very easy to install and can save you up to $100 per year in water bills.

Other potential actions not covered by the energy audit that you may wish to implement:

☐ Install solar panels for high-electricity consuming congregations/campuses, once energy efficiency projects are complete.

☐ Set up a carpool board or a system so that members can carpool to weekly service and other events, in order to reduce gasoline used.

☐ Replace conventional incandescent holiday lights with new LED versions.

☐ Replace a patch of lawn or parking lot with a community garden. Educate gardeners about organic and water-saving gardening methods.

☐ For every trash can, make sure there is a recycling bin, preferably larger than the trash can. Post signs educating congregants on what can be recycled.

Discussion with Other Green Team Members:

Are any of these items applicable to your home (not just the worship building)? Can you think of ways you can increase the energy efficiency of your home?

What are ways that you can share the knowledge of what actions can be taken?
Some suggestions are a quick skit in front of the congregation; conducting an "energy efficiency workshop"; posting signs in the worship building to let people know what the faith community is doing to increase energy efficiency. Please see the Educational Action Item List for more ideas.

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<http://www.energysavers.gov/your_home/energy_audits/index.cfm/mytopic=11170>

Example of Utilities Form

Instructions: Gather your electricity and natural gas bills. In the column heading, enter the year of the bills you are entering (e.g. 2010). Then, for each month, enter the kWh of electricity or therms of natural gas used in that month. Billing periods will often span two months. Enter the data for the month in which the billing period ends. For example, if the billing period spans from December 15, 2009, to January 14, 2010, enter the data into the cell for January 2010. When you are finished, click the other tabs at the bottom of the spreadsheet to see graphs of your data.

Electricity					
Enter Year Here ->					
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Total					

Gas					
Enter Year Here ->					
January					
February					
March					
April					
May					
June					
July					
August					
September					
October					
November					
December					
Total					

Example of Action Pick List

Providing the answers to these questions will help the tool give a more detailed analysis for your building.
We HIGHLY recommend inputting your own electricity and natural gas usage to get accurate results.
Important questions are marked with an asterisk (*).

1) *What was your electricity usage (in kWh) for the most recent one-year period for which you have data?
This data can be found in your 08_Utilities_Form.xls spreadsheet from when you conducted the energy audit.

[ ] <-- Input answer here

2) *What was your natural gas usage (in therms) for the most recent one-year period for which you have data?
This data can be found in your 08_Utilities_Form.xls spreadsheet from when you conducted the energy audit.

[ ] <-- Input answer here
Note: If your building does not use natural gas, please type in 0 rather than leaving the space blank.

3) *Do you use natural gas or electricity for your space heating?
See your answer to question 8 of the energy audit.

[ ] <-- Choose answer here

4) *Do you use natural gas or electricity for your water heating?
See your answer to question 15 of the energy audit.

[ ] <-- Choose answer here

5) *Does your building have air conditioning?
See your answer to question 9 of the energy audit.

[No] <-- Choose answer here

6) *Does your building have a refrigerator?
See your answer to question 21 of the energy audit.

[ ] <-- Choose answer here

7) Does your building have a stove or oven?

[ ] <-- Choose answer here

8) If your building has a stove or oven, do you use natural gas or electricity for cooking?

[ ] <-- Choose answer here

9) What is the area of your worship building (in square feet)?

[ ] <-- Input answer here

10) How many windows are in your worship building?
See your answer to question 16 of the energy audit.

[ ] <-- Input answer here

11) How many incandescent light bulbs are in your worship building?
See your answer to question 1 of the energy audit.

[ ] <-- Input answer here

12) How many T12 light fixtures and bulbs are in your worship building?
See your answer to question 1 of the energy audit.

[ ] <-- Input # light fixtures [ ] <-- Input total # bulbs

13) On average, how many cars are driven to worship events each week?

[ ] <-- Input answer here

14) Would you like this tool to display average or low-end costs for retrofitting and other environmental actions?

[ ] <-- Choose answer here

Actions with Upfront Cost	Annual GHG Reduction (lb CO_2e)	Low-End Upfront Cost ($)	Annual $ Saved on Utility Bill	Payback Period (years)	Annual GHG Reduction/$ of Upfront Cost (lb CO_2e/$)
Install programmable thermostat to: increase thermostat temperature in the summer from 78 to 85°F when building is unoccupied and decrease thermostat temperature in the winter from 68 to 55°F	3569	$25	$297	0.1	142.8
Upgrade insulation in attic, ceiling, and other areas	3432	$4,500	$285	15.8	0.8
Replace incandescent light bulbs (including ones in exit signs) with CFLs or LEDs	4273	$120	$875	0.1	35.6
When it's time to replace the windows, install efficient double-paned, low-emissivity windows *Note: Cost estimates are for increased cost of efficient windows over non-efficient ones and do not reflect overall cost of replacing windows.*	2059	$300	$171	1.8	6.9
Seal drafts (ensure windows and doors are properly aligned and operational; caulk, weatherstrip and foam seal around doors, windows and other spaces to plug air leaks)	1373	$50	$114	0.4	27.5
Replace old inefficient gas furnace with new Energy Star furnace (92% efficient or better)	1808	$1,790	$120	14.9	1.0
Replace old A/C unit with new Energy Star A/C unit (SEER 16 or better)	0	$3,300	$0	N/A	0.0
Install motion sensors to turn off lights when spaces are unoccupied	902	$150	$185	0.8	6.0
Replace energy inefficient refrigerator with Energy Star model	360	$405	$74	5.5	0.9
Replace T12 fluorescent light ballasts and bulbs with T8 or T5 fluorescent bulbs and electronic ballasts	272	$49	$56	0.9	5.5
Replace conventional holiday lights with LED holiday lights (assuming ~420 total bulbs)	53	$60	$11	5.6	0.9
Replace typical inefficient water heater	32	$990	$6	153.3	0.0
Wrap electric water heater with an insulating blanket if heater is hot to the touch	15	$12	$3	4.0	1.2
Install solar panels	5455	$28,735	$1,117	25.7	212.0

Maintenance Action Items	Annual GHG Reduction (lb CO_2e)	Low-End Annual Cost ($)	Annual $ Saved on Utility Bill	Net Annual Savings ($)	Annual GHG Reduction/$ of Cost (lb CO_2e/$)
Develop a maintenance schedule to check air filters monthly and replace if dirty	2059	$120	$171	$51	17.2
Schedule regular maintenance for A/C	0	$100	$0	($100)	0.0

No-Cost Action Items	Annual GHG Reduction (lb CO_2e)	Annual $ Saved on Utility Bill
Organize a carpooling system for the congregation that would reduce the weekly number of car trips by at least 10%	1890	N/A
Decrease thermostat temperature in the winter from 72 to 68°F	1446	$96
Increase thermostat temperature in the summer from 73 to 78°F	0	$0
Cut phantom power by unplugging electronics devices when not in use or using a Smart Strip	613	$125
Keep curtains and blinds closed at night during the winter and during the day in the summer	412	$34
Make signs to remind occupants to turn off lights when leaving	475	$97
Keep water heater's thermostat no higher than 120° F	29	$2

Clear Selections

Pick Education Actions

You've satisfied the Building & Events requirements!

Total GHG reduction (lb CO_2e) from selected actions:
1610 or 3.3% of total GHG emissions
See disclaimer at the bottom of this sheet

Now	Long-Term	Actions	Categories Satisfied			GHG Reduction (lb CO_2e)
☐	☐	**Install efficient windows** Replace poor-performing windows with double-paned, low-e, efficient windows.	High-Impact			1605
☐	☐	**Replace inefficient A/C unit** Replace current inefficient A/C unit with efficient Energy Star SEER 16 A/C unit.	High-Impact			0
☐	☐	**Replace inefficient lightbulbs** Replace incandescent lightbulbs with efficient CFLs or LEDs.	High-Impact			4273
☐	☐	**Seal drafts** Ensure windows and doors are properly aligned and operational. Caulk, weatherstrip and foam seal around doors, windows and other spaces to plug air leaks.	High-Impact			1070
☐	☐	**Replace inefficient gas furnace** Replace an old inefficient gas furnace with a new Energy Star furnace that's 92% efficient or better.	High-Impact			1808
☐	☐	**Install light motion sensors** Install motion sensors to turn off lights when spaces are unoccupied.	High-Impact	High-Visibility		902
☐	☐	**Install programmable thermostat** Set programmable thermostat to increase summer temperatures from 78° F to 85° F and decrease winter temperatures from 68° F to 55° F when building is unoccupied.	High-Impact	High-Visibility		2782
☐	☐	**Upgrade insulation** Upgrade insulation in the attic, ceiling, and other appropriate areas.	High-Impact			2675
☐	☐	**Install solar panels** Install solar panels to offset building's electricity usage.	High-Impact	High-Visibility		5455
☐	☐	**Maintain and replace air filters** Develop a maintenance schedule to check air filters monthly and replace if dirty.	High-Impact			1605
☐	☐	**Increase summer thermostat temperature** Increase thermostat temperature from 73° F to 78° F in the summer. Action only applies if you have A/C.	High-Impact		Behavior	0
☑	☐	**Decrease winter thermostat temperature** Decrease thermostat temperature from 72° F to 68° F in the winter.	High-Impact		Behavior	1083
☑	☐	**Signs to turn off lights** Make signs to remind occupants to turn off lights when leaving. Place signs in a visible location (e.g. near door knob or near light switches if switches are by the exit). Action only applies if you have not already installed motion-detecting sensors for your lights.		High-Visibility	Behavior	475
☐	☐	**Use curtains/blinds effectively** Keep curtains and blinds closed at night during the winter to keep warmth in the building. Keep curtains and blinds closed during the day in the summer to keep heat from getting into the building.		High-Visibility	Behavior	321
☐	☐	**Create a carpooling system** to and from worship events and faith activities. Aim to reduce at least 10% of congregation car trips.	High-Impact	High-Visibility	Behavior	1890
☐	☐	**Cut standby power or phantom electricity** Cut phantom power by unplugging electronics devices when not in use or using a Smart Strip.		High-Visibility	Behavior	613
☐	☐	**Lower water heater temperature** Keep water heater's thermostat no higher than 120° F.			Behavior	33
☐	☐	**Maintain A/C unit** Hire a professional to regularly maintain A/C unit.				0
☐	☐	**Wrap blanket around electric water heater** If the water heater is electric and hot to the touch, wrap it in an insulation blanket.				15
☑	☐	**Replace conventional holiday lights with LED lights** Replace strings of incandescent holiday lights with new, energy-efficient LED holiday lights.				53
☐	☐	**Replace T12 fluorescent lights with T8/T5 lights** Typical T12 fluorescent lights are 40 W per bulb, but T8 or T5 lights have more efficient bulbs, using 32 W per bulb or less.				272
☐	☐	**Replace inefficient water heater** Replace a typical water heater with a tankless or gas-condensing heater meeting the January 2009 Energy Star specifications.				87
☐	☐	**Replace inefficent refrigerator** Replace an old inefficient refrigerator with a current Energy Star model.				360
☐	☑	**Create a community garden** Replace a patch of lawn or parking lot with a garden where community members can practice organic methods of growing fruits, vegetables, or other plants.		High-Visibility		
☑	☐	**Develop and implement a green purchasing plan** Purchase environmentally-friendly products to reduce environmental degradation and improve human health. For more information on green purchasing, see the Green Purchasing information sheet included with your ECOFaith materials (file name: 11_Green_Purchasing_Info.docx).				
☐	☐	**Other: <Enter Description Here>**		<Choose>		

Congratulations! You're done.

Generate Action Plan | Clear Selections

Now	Long-Term	Actions	Categories Satisfied
		Include environmental content in at least 6 sermons or religious education classes Congregation leaders must incorporate environmental content in at least 6 sermons or congregation-wide religious education classes/groups.	Required
		Display signs showing energy efficiency action items that the Green Team has accomplished Educate congregation members about each implemented building and events action through one of the signs provided by ECOFaith.	Required
☑	☐	**Organize a worship building workday** Use congregation volunteers for non-technical energy efficiency upgrades to the worship building to help get people involved.	Hands-On
☐	☐	**Organize a field trip for the congregation** Bring interested congregation members on a field trip to educate them about environmental issues or get them involved in an environmental activity.	Hands-On
☐	☐	**Rent a Kill-a-Watt meter or other energy audit tool and demonstrate its usage** Show congregation members how to use the Kill-a-Watt meter (or other energy audit tool) to identify energy hot spots and let them borrow it to use around the worship buildings or at their own homes.	Hands-On
☐	☑	**Check congregation members' tire pressure** As a group, encourage congregation members to check their tire pressure and help them inflate their tires to the correct pressure.	Hands-On
☐	☑	**Encourage congregation members to conduct a personal energy audit-related activity** Encourage members to calculate their carbon footprints online, order an energy efficiency starter kit from Southern California Gas, or conduct a Southern California Edison energy survey. Methods to encourage participation include: entering participants in a raffle for a green gadget or gift, participating in an ECOFaith-wide contest for the highest participation rate, or another method of your choosing.	Hands-On
☐	☐	**Conduct an environmentally-themed fundraiser** Ideas include holding a raffle, or ordering reusable water bottles or shopping bags with your faith community's name printed on it and selling it to congregation members. Proceeds can be used to fund other educational or building/event efficiency activities.	Hands-On
☐	☐	**Host a community yard sale or book or clothing swap** Host and help advertise a community yard sale or book swap in the worship building parking lot or lawn. Clothing swaps can be held indoors.	Hands-On
☐	☐	**Encourage lending or giving between congregation members** To cut down on waste and unnecessary consumerism, set up a congregation bulletin board or email list where congregation members can ask for items to borrow, lend, give, or receive.	Hands-On
☑	☐	**Host a bike-to-worship day** Encourage congregation members to bicycle to worship as a family. Encourage those who cannot bicycle to take public transportation.	Hands-On
☐	☐	**Conduct an informal waste audit** Conduct a waste audit of the trash and recycling receptacles in the worship building to identify areas for improvement.	Hands-On
☐	☐	**Organize a trip to a local environmental event** Bring congregation members to a local environmental event such as an Earth Day celebration, local food fair, or a solar informational day.	Hands-On
☑	☐	**Start a composting program at your place of worship** Set up a place on your worship grounds where food scraps can be collected. Ask volunteers to help manage the composting program.	Hands-On

☐	☐	**Integrate environmental material into faith education classes** Integrate environmental material into children and adult education classes conducted within the faith community.	Presentation
☐	☐	**Invite a guest speaker to a service, class, or study group** Bring in a guest speaker with environmental expertise to talk to congregation members about a specific environmental issue.	Presentation
☐	☐	**Host a movie showing** Invite congregation members to watch a DVD or YouTube video about an environmental issue.	Presentation
☑	☐	**Invite congregation members to present a demonstration or talk** Certain congregation members may have environmental expertise or knowledge to share. Invite these members to speak to the congregation about their experiences.	Presentation
☐	☐	**Conduct a discussion session amongst congregation members** At a separate event or during a 5-minute session duing service or class, encourage congregation members to talk to each other about ways in which they are currently improving their environmental performance or methods to improve in the future.	Presentation
☐	☐	**Present a skit demonstrating an environmental action** The Green Team or another group of congregation volunteers demonstrates an environmental action to the larger congregation body.	Presentation
☐	☐	**Ask congregation to conduct an environmental action relevant to their worship activities** During service, ask congregation members to conduct an environmental action related to their worship activities, such as sharing or reusing church bulletins, carpooling/biking/walking to service, or another action of your own choosing.	Presentation
☑	☐	**Include environmental facts in bulletins** Include a new environmental fact or suggested action with each community bulletin.	Display
☑	☐	**Exhibit a poster, sign, or display regarding an environmental issue or action** Create a poster, sign, or other type of display on an environmental topic such as recycling or composting. To ensure that most congregation members get a chance to view the display, keep it posted for at least one month.	Display
☐	☐	**Other: <Enter Description Here>**	<Choose>

#	Action	Estimated GHG Reduction (lb CO_2e)	Action Item Owner	Expected Completion Date	Actual Completion Date	Actual Cost
	This Year's Plan					
	Building & Events Actions					
	Education Actions					
1	Include environmental content in at least 6 sermons or religious education classes					
2	Display signs showing energy efficiency action items that the Green Team has accomplished					
	Total GHG reduction from this year's selected actions: 0 lb CO2e, or 0% of total GHG emissions					
	Long-Term Actions					
	Building & Events Actions					
	Education Actions					

Disclaimer: The worksheet provides very rough estimates of cumulative GHG reductions. **Actual emission reductions may be less than stated above** because these estimates may double-count energy savings. For example, if the worship building's insulation is upgraded and its furnace is also replaced, the combined emissions reduction will not be as great as if the insulation is upgraded in one building and another building gets a more efficient furnace. To explain further, once a building is insulated, it will not require as much heat from the furnace. Therefore, the furnace's efficiency would have less impact in a well-insulated building than in a poorly-insulated building.

ECOFAITH EDUCATIONAL ACTION ITEMS

REQUIRED ITEMS

Include environmental content in at least 6 sermons or religious education classes

Congregation leaders must incorporate environmental content in at least six sermons or congregation-wide religious education classes/groups.

Display signs showing energy efficiency action items that the Green Team has accomplished

Many of the most energy-efficient actions we take (both in retrofitting our homes and worships buildings, and the lifestyle changes we make) are the least visible to outsiders. Because education is a vital piece to this program, only implementing these action items without letting other know is ineffective in instructing those around us about action options for themselves.

Using the sign templates provided, customize and post informative yet visually-pleasing signs for each worship building action item you've accomplished in an area that is near where the action took place but visible to the public (Example: post a sign about insulating your furnace on the door outside of the closet your furnace is kept). This will serve as an educational tool for your congregation members as well as a way to show that you are proud to be taking steps towards energy efficiency and environmental stewardship. Post both the English and Spanish versions of these signs if your congregation is bilingual.

HANDS-ON ACTION ITEMS

Organize a worship building workday

Big Picture Problem: U.S. residential and commercial buildings account for 38% of total U.S. carbon dioxide emissions, or nearly 8% of total global carbon dioxide emissions.[1] These emissions are greater than the emissions of any other country except China.[2]

Solution: This activity reduces greenhouse gases by increasing energy efficiency in the worship building while fostering a sense of community and pride of place. In addition, the hands-on experience may help induce people to take similar actions in their own homes.

Details: Use congregation volunteers for non-technical efficiency upgrades to get congregation actively involved in the faith community's Path of Sustainability. This work day should occur after the Green Team conducts the energy audit for the church, which can provide guidance for what energy-efficiency work can be done. Activities may include: changing light bulbs, cleaning or installing new light covers, cleaning windows and screens, painting walls (if necessary), cleaning ventilation and refrigerator coils, weather-stripping or caulking windows and doors, plugging electronic equipment into smart strips, fixing leaky faucets, and setting out recycling bins. Anyone in the congregation with specialized HVAC or other facility-related skills may volunteer to replace or install equipment if needed.

[1] http://buildingsdatabook.eren.doe.gov/TableView.aspx?table=1.4.1

[2] Dietz, T., Gardner, G.T., Gilligan, J., Stern, P.C., & Vandenbergh, M.P. (2009). Household actions can provide a behavioral wedge to rapidly reduce US carbon emissions. *Proceedings of the National Academy of Sciences* 106(44): 18452-18456.

Tying It Together:

- Videos:
    - Energy efficiency how-to videos
        - Description: Provides background on the importance and benefits of energy efficiency. Also gives examples of how people can implement energy-saving techniques in their own homes.
        - http://www.duke-energy.com/indiana/savings/energy-efficiency-videos.asp
    - Big Savings through Integrative Design
        - Description: Hour-long talk by Amory Lovins describing the energy savings that can be achieved through building energy efficiency and integrated design. Appropriate for audiences with an already strong understanding of environmental topics and energy efficiency.
        - http://fora.tv/2009/05/01/Amory_B_Lovins_Big_Savings_Through_Integrative_Design
- Movies:
    - *An Inconvenient Truth*
        - Nobel Peace Prize winner Al Gore describes the problem of climate change.
        - Available at the Santa Barbara Public Library: http://www.blackgold.org/polaris/search/searchresults.aspx?ctx=1.1033.0.0.7&type=Keyword&term=an%20inconvenient%20truth&by=KW&sort=RELEVANCE&limit=TOM=dvd&query=&page=0#__pos1
    - *Energy Crossroads*
        - Describes the energy crisis and provides concrete solutions for individuals.
        - Not currently available at the Santa Barbara public library, but can be purchased online: http://www.energyxroads.com/buydvd.html. The DVD is $25, but a downloadable version is only $10.

Organize a field trip for the Congregation

Big Picture Problem: People can become disconnected with the natural world around them when living in the city and thus disconnected with how their everyday actions may have negative impacts upon the environment.

Solution: These activities help to connect congregants back to the earth and ecosystems around them and can reveal to them the cumulative impact of both their own and others actions. Additionally, they can help educate congregants about small actions they can take that increase positive impacts.

Suggested Destinations & Details:

    - Creek clean-ups: See where improperly disposed of trash, car washing soap, motor oil, etc. ends up if not disposed of correctly.
- City of Santa Barbara, Creeks Division contact Liz Smith lsmith@santabarbaraca.gov or (805) 897-2606.
- City of Goleta, Everett King eking@cityofgoleta.org (805) 961-7576.
- County of Santa Barbara, Clean Water Project, Fray Crease fcrease@cosbpw.net or (805) 568-3546

    - Tree planting: Make a difference by off-setting some CO2 emissions while adding more green to your town!
- Goleta Valley Beautiful (805) 685-7910
    - Beach clean-ups or water quality monitoring:
- Santa Barbara Channelkeeper, (805) 563-3377, or info@sbck.org.
    - Restoration work: Help plant native species, eradicate invasive species, catalog what kinds of plants and animals can be found in out local ecosystems.
- Santa Barbara Audubon Society, Darlene Chirman (805) 692-2008 or email at darlene.chirman@gmail.com.
    - Learn about Community Supported Agriculture (CSA): See what local farms and local food has to over and learn about the advantages of eating locally.
- Fairview Gardens CSA, Goleta. Guided tours start at $100, and they put on numerous classes, workshops and events (from Intro to Bee-Keeping to Learning to Compost) throughout the year. For information, call (805)967-7369 or email info@fairviewgardens.org .
    - Groups such as Habitat for Humanity of Santa Barbara County periodically sponsor green building tours. They will likely give a discount to a large faith group, and all proceeds benefit the organization.
- To learn more, visit www.sbhabitat.org.
    - Visit our local wastewater treatment plant (http://www.sbwater.org/FieldTrips.htm)

Rent a Kill-a-Watt Meter or other energy audit tool and demonstrate its usage

Big Picture Problem: Energy can be a vague, intangible concept that members may find difficult to conceptualize[3]. But energy use in residential and commercial places accounts for over 40% of all energy use in the United States[4] and contributes to greenhouse gases accumulating in the atmosphere.

Solution: The Kill-a-Watt identifies hotspot items to determine where the largest electricity loads are in the worship building or in a congregant's home. The Kill-a-Watt can help to make the abstract concept of energy real in showing how a specific action reduces electricity use (i.e., changing refrigerators or light bulbs). Reducing energy use helps to reduce contributions of greenhouse gases to climate change.

Details: What is a Kill-a-Watt? A Kill-a-Watt is a device (shown in picture) that you plug into an outlet and then plug an appliance into, like a refrigerator, TV, stereo, washing machine, or light fixture. The device tells you how many kilowatt-hours the device uses so that you can know how efficient the appliance really is and how much the device is costing you in electricity per month. For example, if you have a very old refrigerator, it could use up to 1400 kWh per year. The device shows you how much energy it uses and also estimates yearly costs. By contrast, if you plug the device into a new refrigerator, it may show only 350 kWh per year, costing significantly less per year. The device is a great way to show where large electricity loads are taking place and where to focus on energy efficiency projects through the appliances/lights that take up the most electricity.

[3] Parnell, R. and Larson, O.P. (2005). Informing the development of domestic energy efficiency initiatives: an everyday householder-centered framework. *Environment and Behaviour,* 37(11), 787 – 807.
[4] http://www.eia.doe.gov/aer/consump.html

Where can you get a Kill-a-Watt?

- Santa Barbara CEC: send an email to commrel@cecmail.org with subject line: Kill a Watt asking to borrow it
- Southern California Edison: they have one through their Tool Lending Library, visit: http://www.sce.com/b-sb/energy-centers/agtac/tour-agtac/tool-lending-library.htm or call (800) 772-4822 to borrow
- Kill-a-Watts are available through Amazon or at Home Depot (the Kill-a-Watt EZ retails for about $20 each) if you would like to purchase one

Check congregation members' tire pressure

Big Picture Problem: Transportation accounts for over a third of U.S. carbon dioxide emissions.[5] Of transportation greenhouse gas emissions, nearly 60% come from personal vehicle use.[6]

Solution: One-third of all personal motor vehicles have tires that are not properly inflated, reducing gas mileage by an average of 3.3%.[7] If every passenger car in the U.S. had properly inflated tires, we could reduce greenhouse gas emissions equivalent to the total emitted by the entire country of Finland.[8] Holding this event will not only increase the number of cars with properly inflated tires but help encourage individuals to always keep their tires inflated.

Details: As a group - before or after service - encourage congregation members to check their tire pressure and help them inflate their tires to the correct pressure. You can provide pressure gauges and a car-powered air pump for congregation members to inflate their tires on the spot. Take the opportunity to inform them that California law requires service stations to provide free compressed air to its customers, so they can check and inflate their tires every time they fill their gas tank.[9] In addition, let them know that deflated tires seriously reduce the vehicle's handling capabilities, can cause irreparable damage, reduce tread life, and force the engine to work harder.[10]

Encourage congregation members to conduct a personal energy audit-related activity

*Big Picture Problem***:** Congregants may not know where to begin with energy efficiency projects; everyone assumes solar panels will provide them with the energy they need, but energy efficiency projects, though less "interesting" than solar, can reduce a households' electricity significantly.

Additionally, The items we buy, actions we take, and choices we make every day all make an impact on the planet by using valuable natural resources. If everyone on earth lived a similar lifestyle to the average American, we would need five Earth's worth of land and natural resources to be sustainable.

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[5] http://www.eia.doe.gov/oiaf/1605/ggrpt/
[6] http://www.epa.gov/climatechange/fq/emissions.html#q5
[7] Individual Carbon Emissions: The Low-Hanging Fruit (retrieved October 7, 2010, from http://uclalawreview.org/pdf/55-6-6.pdf)
[8] Personal calculation: 33% * 60% * 33% * 3.3% = 0.22%; Finland's share of global carbon dioxide emissions are available at http://en.wikipedia.org/wiki/List_of_countries_by_carbon_dioxide_emissions.
[9] http://www.leginfo.ca.gov/cgi-bin/waisgate?WAISdocID=54824612569+0+0+0&WAISaction=retrieve
[10] http://www.greencarcongress.com/2009/03/california-arb-adopts-tire-pressure-regulation-to-reduce-ghg-emissions.html

Option 1: Encourage congregants to order an energy efficiency starter kit from SoCalGas and/or conduct the SCE home energy survey

Solution: Helping congregants understand how they can make a difference in reducing energy use in their own home will empower them to take action. These two tools are free and can help not only reduce energy use but will also reduce costs for congregants as their utility bills will go down.

Details:

- The Gas Company will send any residential customer a free energy efficiency starter kit, which includes three faucet aerators and a low-flow showerhead. You will need your address and the last four numbers of your gas bill. Visit: http://www.socalgas.com/residential/EE_kit_promo/

- SCE has a home energy survey to help residents who either rent or own how to best conduct energy efficiency projects in their home based on their energy use. Visit: http://www.sce.com/_Tools/Residential/HomeEnergySurvey.htm?from=redirect or see attached PDF of the survey. Online, there is a quick 5 minute survey as well—the longer survey takes 15 minutes or more but will provide more detail as how to how to increase energy efficiency

Finished print surveys should be sent to:
Home Energy & Water Efficiency Survey
Profile Processing Center
155 Grand Avenue, Suite 500
Oakland, CA 94612

- Ideas for how to make this work in church are: to print the link in your bulletin, or have people bring their gas/electric bills to service and have a computer set up where you aid congregants in filling out the form. For SCE's Survey, you can print copies of the survey and have people conduct them either in church or at home. Provide stamped envelopes to reduce barriers to participation. You could perhaps provide a small prize (a CFL? Faucet aerators?) to those who complete and return their surveys.

Option 2: Have congregation members calculate their personal carbon footprint online and report on the results with others in their faith community.

Solution: Developing an awareness of our ecological impact on our planet is the first step towards making lifestyle choices to improve our carbon footprint. Learning what aspects of our lifestyle have the biggest impact on our carbon footprint can help us make Sharing the results with fellow congregation members encourages accountability and can also motivate positive lifestyle choices. To encourage participation, consider offering congregation members an environmentally-friendly reward (such as a CFL or reusable shopping bag) for calculating and reporting on their carbon footprint.

Details: There are several ecological footprint tools available online, however we feel the most informative and accurate is from the Cool Climate Network:
http://coolclimate.berkeley.edu/uscalc

Another popular calculator option can be found at:
http://www.footprintnetwork.org/en/index.php/GFN/page/personal_footprint/

Conduct an environmentally-themed fundraiser

Big Picture Problem: Though virtually all energy-efficient upgrades pay for themselves over their lifetimes, upfront costs can be difficult. Additionally, educational costs are often paid by the educator, while participants are the ones who benefit from lower utility bills. Covering these cost gaps can be difficult for organizations with restricted budgets.

Solution: Environmentally-focused fundraising can be a useful way of raising extra money while being educationally valuable on its own. Several companies produce reusable shopping bags, water bottles, and other products that can be customized with an organization's logo, allowing the organization to resell the items to its members for a profit. Selling reusable items is also an excellent opportunity to educate people about the environmental effects of disposable items.

Details: Many companies work with fundraising organizations by helping them develop customized, resellable products. Some information is listed below to give a general idea of price and purchase quantity requirements, but due to the high variability in costs based on item, customization, color, etc, exact numbers will vary dramatically.

Design a contest or raffle to encourage energy efficiency by congregants:

- Have congregants come up with mini-plans to save greenhouse gas emissions (you could potentially use this in conjunction with the CEC pledge); winners can get prizes or gifts (see raffle section for prize ideas)
- Hold a month-long challenge to see how many people can reduce their electricity use from the same month last year. Ideas can include turning off lights, unplugging unused appliances (like the microwave, toaster, and TV when not in use), upgrading to CFL light bulbs, etc. At the end of the month, have them bring in their electricity bills from this year and last year; they win a prize if it is 10% lower (in kWh).
- Create a contest for kids that include how they will pledge to lower their GHGs or energy use; have them create a plan and talk about it with the family. The contest can include drawing the plans, which can put on display. The kids can win the prizes for use in their home (with their parent's help, of course).

Here are some ideas for how to hold a raffle:

- Hold a raffle where people buy $1 tickets to potentially win any one of the following gifts. Use the raffle money to buy the items. Try to get some of the items donated (by businesses or by willing congregants).
    Prizes and gifts can include (many of these are low-cost items):
    - CFL bulbs (60 W equivalent, bought in bulk)
    - Kill-a-Watt meter
    - Tire pressure caps (http://www.amazon.com/Perfect-Solutions-Tire-Pressure-Valve/dp/B00332EZ1C/ref=pd_sbs_auto_3)

- Stainless steel water bottles
- http://www.discountmugs.com/nc/category/sports-bottles/

- Reusable bags (see reusable bags section of this list for ideas)
- Clothes drying rack (http://www.amazon.com/Moerman-88347-Laundry-Solutions-Outdoor/dp/B002KAOOXW/ref=sr_1_27?ie=UTF8&qid=1288734350&sr=8-27)
- Hot water heater blankets
- Weather stripping/caulking material

Groups can purchase large quantities of reusable bags from several companies.

One bag at a time: http://www.onebagatatime.com/

- Price range: $1-$1.25 for a single NWPP bag with One Bag at a Time logo, $85 for a pack of 100. Jute and cloth bags also available with higher prices, quantity discounts
- Customizable bags available with minimum quantity 100, price dependent on size of order and specified image

Bags on the run: http://www.bagsontherun.com/

Chico bags: http://www.chicobag.com/t-fundraising.aspx

Discount Mugs Promotional Products: http://www.discountmugs.com/

- As a larger company, prices are much lower but customization and customer service is more bureaucratic

Reusable water bottles can be purchased in large quantities from several companies.

Klean Kanteen: http://www.kleankanteen.com/cobrand/cobrand.php

- Can be customized with a logo with a minimum order of 72 bottles. Price depends on quantity but non-profits get a discount; the discounted price for 72-174 single-color logo classic-style bottles is $9.90-$14.85 per bottle depending on size.
- Because quantity pricing is available for custom orders but not for non-custom orders, it is more cost-effective to order 72+ bottles with a logo than it is to order the same number without a logo

Discount Mugs Promotional Products: http://www.discountmugs.com/

- As a larger company, prices are much lower but customization and customer service is more bureaucratic

Below is some useful information that can be given to members to encourage the purchase and use of reusable plastic products:

> According to Californians Against Waste, a non-profit research and advocacy group, Californians use approximately 19 billion single-use plastic shopping bags every year. That comes out to an average of over 500 bags for every single person in the state—and the EPA estimates that only 5% are recycled.
>
> All that waste adds up. According to Heal The Bay, the state spends $25 million per year to dispose of plastic bag waste in landfills, and over $300 million per year in litter cleanup. The city of San Francisco estimates that it spends $8.5 million per year specifically on plastic bag litter, which comes to a cost of 17 cents per bag.

Plastic single-use water bottles cause similar issues. According to the New York Department of Environmental Conservation, Americans purchased 31 billion bottles of water in 2006 and only about 10% were recycled. 18 million barrels of oil are needed to replace those bottles that are not recycled, leading to 800,000 metric tons of additional greenhouse gas emissions. Even if bottles are recycled, the energy involved in transporting and processing recycled material is still a major economic and environmental impact.

Plastic waste, including water bottles and shopping bags, is a particular threat to coastal areas like Santa Barbara. Debris collects on beaches and can be ingested by wildlife, causing potentially life-threatening health effects. Tourism, an important source of revenue for the community, suffers when beaches are littered. Currents and gyres can cause ocean debris, 90% of which is plastic), to accumulate in certain areas. Midway Atoll is one such site. It acts as a home and breeding ground for many marine animals, some critically endangered. 40% of albatross chicks born at the atoll die with their stomachs full of plastic trash, despite living thousands of miles from any significant human settlement.

You can help reduce the incredible amount of plastic garbage by using reusable bags when you do your shopping and a reusable water bottle in place of single-use plastic bottles. Many grocery stores provide small discounts or other incentives to customers who bring their own bags, and refilling a water bottle is certainly more affordable than continuously purchasing new ones.

Host a community yard sale or book or clothing swap

Big Picture Problem: In 2006, U.S. consumers accounted for 32% of global expenditures on goods and services but only 5% of the global population.[11] If everyone consumed like Americans, Earth could only sustain 1.4 billion people, but today there are 6.8 billion people in the world.[12] Meanwhile, in the U.S. the amount of waste each person creates has increased from 2.7 to 4.6 pounds per day.[13]

Solution: The U.S. EPA reports that "the most effective way to stop this trend is by preventing waste from being generated in the first place." Hosting a community yard sale or swap keeps useful items out of the landfill while preventing the manufacture of new products.

Details: Host and help advertise a community yard sale or clothing/book swap. Proceeds from the yard sale can go back to congregation members, or the yard sale could be used as a fundraising event for the religious community. Tips for hosting a clothing swap can be found here: http://www.ehow.com/how_2079586_host-clothes-swap-party.html. Excess clothing or books at the end of the swap can be donated. Consider pairing the event with a viewing of The Story of Stuff (www.storyofstuff.com).

Encourage lending or giving between congregation members

Big Picture Problem: The largest portion of our personal carbon footprint tends to be from the goods and services we purchase. This is because each item we buy, eat, and use contains what is called

[11] http://blogs.worldwatch.org/transformingcultures/wp-content/uploads/2009/04/Chapter-1.pdf
[12] http://blogs.worldwatch.org/transformingcultures/wp-content/uploads/2009/04/Chapter-1.pdf
[13] http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw07-rpt.pdf

"imbedded energy". This is the energy it took to grow, manufacture or produce every ingredient or piece that went into the final product.

Solution: Encourage lending between congregation members using a lending library instead of buying new. We tend to purchase items that we don't use every day, but if we share these items amongst our friends and neighbors, we can lessen the amount of stuff we own. This not only improves our carbon footprint but can save us money as well!

Details: This can be accomplished within your religious community using a message board, email list or Google document where people can post items they are willing to share as well as items they are looking to borrow.

Habitat for Humanity operates a facility called ReStore at 6725 Hollister Avenue in Goleta. Here they serve local families by selling building materials, fixtures and furniture at prices that make it possible for families to renovate their homes. Visit www.sbhabitat.org/restore.php to learn more.

There is also a county-wide organization called The Freecycle Network that operates in a similar fashion. Go to http://groups.freecycle.org/sbfreecycle/description to register with the Santa Barbara Freecycle group. One man's trash is another man's treasure!

Consider pairing the event with a viewing of The Story of Stuff (www.storyofstuff.com).

Host a Bike-to-Worship Day

Big Picture Problem: Approximately 30% of US carbon dioxide emissions come from transportation.[14] At the same time, 82% of trips that are less than five miles from home are made using a personal motor vehicle. These short trips create more pollution per mile, because car engines are less efficient in their first few minutes of operation since they are still warming up.[15]

Solution: Bicycle riding can have a significant effect on reducing climate change. Cars are a major source of greenhouse gas emissions, particularly due to the combined effect of many short trips. Fortunately, the shorter the trip, the more feasible non-motor transportation becomes. Walking or riding a bike for trips that are five miles or less eliminates a significant portion of transportation-related emissions, saves money on gas and maintenance, and increases overall health!

Details: The League of American Cyclists promotes a Bike-to-Work Week and Bike-To-Work Day in May, which is National Bike Month. Congregations can adapt this into a Bike-to-Worship program, whether in May or at a more convenient time. The League offers some suggestions for groups looking to develop such an event:

- Route mapping assistance: Traffic Solutions provides a bike map for Santa Barbara County at http://www.trafficsolutions.info/bikemap-south.htm, as well as instructions for how to receive a paper copy. The Santa Barbara Bicycle Coalition offers commuter safety tips at http://www.sbbike.org/commute/how-to.html. Help interested congregation members prepare for bike commuting by making sure they are properly equipped and pick a safe route.

[14] EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990 – 2008 Executive Summary
[15] http://www.bikeleague.org/resources/why/environment.php

- Bike mentors: If anyone in the congregation regularly bikes or walks to worship, ask if they are willing to answer questions or help encourage participation from other members.
- Commuter convoys: Determine if there are any central gathering points where members can meet up and ride together.
- Energizer rally: Gather riders or walkers together either after they arrive at the worship building or before they leave to go home and offer recognition and encouragement. This is also a helpful way to involve non-participants who are present at the weekly service.
- Challenges and incentives: Offer prizes for special accomplishments such as families that ride together, team development, distance traveled, and general participation.
- Inclusive participation: Congregation members with mobility issues could be invited to participate by walking or carpooling.

For more information, see http://www.bikeleague.org/

Conduct an informal waste audit

Big Picture Problem: Americans recycle or compost only 33% of their waste.[16] The remaining garbage is either land-filled or incinerated, contributing to groundwater contamination[17] and air pollution.[18]
Solution: Conducting a waste audit will give the congregation a better understanding of its own waste disposal habits. The audit can identify specific problems (e.g. lack of recycling in a particular room or a recyclable item repeatedly being thrown away) that can then enable the Green Team to produce appropriate signs or educational materials.

Details:
Supplies needed:
- Puncture-resistant gloves
- Tarps or plastic sheets
- Scale (optional)

The following are suggested steps to completing an informal waste audit:
1. Identify two or three people to lead the waste audit team. It may be helpful to have a member of the facilities or maintenance staff as a leader or, at minimum, a volunteer.
2. Identify a group of other interested volunteers for the waste audit team.
3. Conduct a walk-through of the worship buildings, noting all areas where waste is disposed. Pay close attention to: the lobby area, lounges, kitchens, cafeteria, individual offices and desks, and copy and fax machines.
4. At the end of a service day or, if the trash is taken out on a regular schedule, before a scheduled trash pick-up, the waste audit team should physically sort through the trash.
    a. Team members should wear puncture-resistant gloves and old clothing.
    b. Spread out a large plastic sheet and dump the day's waste onto it.
    c. Make sure to keep recyclables separated from food that might contaminate them.
    d. Record quantities or weight of items in recycling, composting (if applicable), and trash waste streams.
5. Identify items in the trash waste stream that can be recycled or composted (if applicable).

[16] http://www.epa.gov/epawaste/nonhaz/municipal/pubs/msw2008rpt.pdf
[17] http://oceanworld.tamu.edu/resources/environment-book/groundwatercontamination.html
[18] http://www.ecomed.org.uk/content/IncineratorReport.pdf

6. Design a strategy to increase the recycling (especially for hazardous materials) and composting rates. Consider the following ideas:
    a. Post signs near recycling and trash bins about what can be recycled.
    b. Provide bins for recycling of batteries, electronics, and light bulbs.
    c. For every trash can, ensure there is a recycling bin next to it. Many organizations and companies provide a small garbage can and large recycling bin to indicate the relative importance of each.
    d. Post images of landfills near trash cans to provide a visual reminder of where garbage goes.
    e. Near paper towel dispensers and copy paper areas, post signs that remind people of the resources the paper consumed. Create your own signs or purchase stickers from http://thesecomefromtrees.blogspot.com/.

For more information on conducting a waste audit, please visit the following resources:

- http://www.scdhec.gov/environment/lwm/recycle/green_hospitality/pubs/waste_audit.pdf: Information and printouts to help guide you through a waste audit and identifying wastes.
- http://www.wasteaudittool.com/: Online tool that provides detailed guidance and software to help you conduct a waste audit. Requires registration (free).

For more information on the waste policies in your area, please visit the following resources:

- City of Santa Barbara: http://www.santabarbaraca.gov/Recycling-Trash/businesses.htm
- County of Santa Barbara: http://www.lessismore.org/Programs/bsnss_recycling_complete.html
- City of Goleta: http://www.cityofgoleta.org/index.aspx?page=419
    - If your collector is Allied Waste Services: http://www.alliedwastesantabarbara.com/Pages/FAQs.aspx
    - If your collector is MarBorg Industries: http://www.marborg.com/recyclecollection.html

For visuals of landfills, please visit the following links:

- http://climatex.org/media/images-image-image/Garbage_landfill.jpg
- http://swamplot.com/wp-content/uploads/2007/04/landfill-landscape.jpg
- http://www.iadb.org/idbamerica/images/sep05_landfill.jpg
- Many more available through images.google.com

Organize a trip to a local environmental event

Big Picture Problem: Living in a city and going through our daily lives can create a disconnect between our communities and our environment. We can forget that our actions can negatively impact the environment and lack awareness of the environmental resources that surround us.

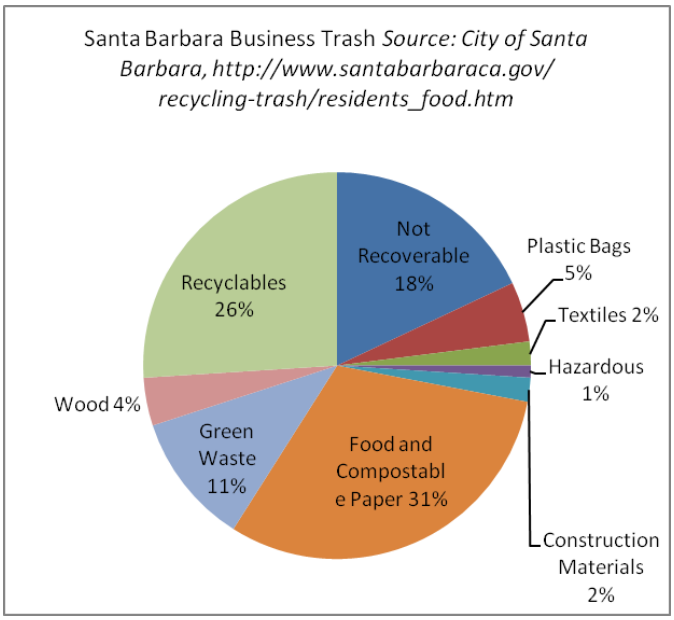
Solution: Organize an outing to participate or attend a local environmental event, such as the Earth Day Festival put on by the CEC (Community Environmental Council), Solar SUNday, International Day of Climate Action, or a local foods event such as the SOL (Sustainable, Organic, Local) Foods Festival. You will learn more about the importance of acting as environmental stewards, connect with like-minded individuals within your community, and have fun doing it!

Details:

- To learn more about Santa Barbara's Earth Day Festival, visit http://www.cecsb.org/index.php?option=com_content&task=view&id=80&Itemid=110 .

- To learn where there are local events on the International Day of Climate Action, visit www.350.org. This event usually falls in mid-October.
- To learn when the next Santa Barbara Independent's Green Shorts Film Festival is, visit www.independent.com. This event is held in conjunction with Earth Day in April.
- To learn when the next SOL Food Festival will be, visit http://www.solfoodfestival.com/. This event will likely be held in October.
- To check out Santa Barbara's Solar SUNday, visit www.cecsb.org. This event will likely be held in July or August. The CEC is a great resource for any new environmental events that are scheduled as well!

Start a Composting Program at your place of worship



Big Picture Problem: A huge proportion of trash in Santa Barbara is made up of food, green waste, or other compostable materials. When these materials are deposited in a landfill, the lack of oxygen prevents natural decomposition so they last indefinitely, taking up a huge amount of space and increasing the need for more landfill area.

Solution: Backyard composting allows natural materials like food scraps, coffee filters and yard waste to decay into a nutrient-rich soil-like material that reduces landfill waste and can be used to naturally and safely improve garden health.

Details: Depending on individual needs, a compost system can range from a simple aerobic pile to somewhat more complex worm bins. The City of Santa Barbara maintains an informational website on composting and provides a booklet on composting procedures, techniques and resources that can help your community design and implement a workable system. For more information, see:

- http://www.santabarbaraca.gov/recycling-trash/residents_food.htm
- http://www.santabarbaraca.gov/recycling-trash/pdf/Composting_Booklet.pdf
- http://www.lessismore.org/Programs/back_yard_composting.html

Maintaining a composting system lessens the community's waste and can be an excellent way to teach congregation members about the sources of landfill inputs and how they can reduce their contributions. Once a system is in place, demonstrations can be given and the resulting compost can be used in the church planters. This is especially effective when paired with a community garden, which several ECOFaith institutions have already developed.

PRESENTATION ACTION ITEMS

Integrate environmental materials into faith education classes

Big Picture Problem: The U.S. Environmental Protection Agency (EPA) advocates for "environmental literacy" for all ages.

Solution: The EPA offers the following reason for engaging in environmental education: "A primary desired outcome of environmental education programs is environmental literacy. Through the many programs funded and led by EPA, people of all ages and backgrounds are being provided multiple experiences that foster development of the combination of knowledge, skills, and attitudes required to be environmentally literate. Because environmental education is a process, it cannot in itself improve the environment, such as by enhancing local air or water quality. Instead, environmental education provides the capability and skills over time to analyze environmental issues, engage in problem solving, and take action to sustain and improve the environment. As a result, individuals are more capable of weighing various sides of an environmental issue to make informed and responsible decisions.[19]"

Details: Here, we focus on children's educational resources because adult education topics are already integrated throughout the Path of Sustainability. Given the widely varying thoughts and attitudes on children's education, we offer a sample of secular educational resources that may inspire children's education at your particular congregation. However, this list is not exhaustive of all of the resources available. Many religious groups offer potential children's activities and approaches to the environment; we suggest conducting a web search to find more resources or contacting ECOFaith member congregations for resources they have used in the past.

This is a rich resource searchable by topic and by age group. It offers several lesson plans and could be incorporated: DOE Lesson Plans for K-12: http://www1.eere.energy.gov/education/lessonplans/

A good portal from the Environmental Protection Agency (EPA) for explaining what climate change is and ways to help: http://www.epa.gov/climatechange/kids/

Another portal for activities from the EPA: http://www.epa.gov/kids/index.htm. Even more EPA resources for teachers introducing sustainability into the classroom (resources from K-12): http://www.epa.gov/greenkit/student.htm#k-8

Energy Star Kids for Parents and Teachers: http://www.energystar.gov/index.cfm?c=kids.kids_index

Pew Center Kids Page for Climate Change—offers simple explanations of climate change and actions to reduce human effects: http://www.pewclimate.org/global-warming-basics/kidspage.cfm

For middle school children, a video produced by the EPA that explains how climate change affects wildlife and wetlands. http://www.globalchange.gov/resources/educators/toolkit/video

Some resources specific to Judaism that could be adapted for other religions: http://www.jewcology.com/search/index/tag:Classroom%20education#Idea+Box (an extensive list of

[19] http://www.epa.gov/enviroed/basic.html

resources mostly targeted towards older children that include environmental advocacy, learning how to save water, reducing food waste, etc.)

Invite a guest-speaker to a service, class, or study group

Big Picture Problem: If we are not aware of our resources or the environmental problems that we face and/or create, how are we supposed to take steps to fix them? It is unlikely that we knowingly do things that harm the earth. What is more likely is that we have not been educated or given the tools to change these actions.

Solution: Having an engaging expert from the environmental field come speak to your congregation can provide the motivation and know-how to begin making a difference in our homes and communities.

Details:

- Southern California Edison has a large speakers' bureau available to lecture on topics such as electric vehicles, smart meters, economic assistance programs, energy conservation, and alternative & renewable energy. To contact Southern California Edison to book a speaker or learn more about available speakers and lecture topics, visit http://www.sce.com/CommunityandRecreation/edison-community/speakers.htm.
- Ecospeakers.com is a speakers' bureau that provides a large variety of lecturers on topics such as sustainable communities, green design & building, energy efficiency, climate & warming, water resources, pollution & toxics, wastes & recycling, and many others. To learn more, visit www.ecospeakers.com.

Host a movie showing

Big Picture Problem: People need more than just printed material to change behavior[20].

Solution: Offering vivid information via media helps people to retain environmental messages[21].

Ideas for movies (both online and for rent/purchase/borrow):

- Vampire Power Awareness: explains what vampire power is (the power that electronics use even when they are not turned on but still plugged in) and offers ways to reduce vampire power http://www.youtube.com/watch?v=mNcHUrg9EQY&feature=share
- The Story of Stuff movies: http://www.storyofstuff.com/
- These include the Story of Electronics, which shows how companies make electronics to be "designed for the dump", the Story of Stuff, a 20-minute video on the consumer culture of America and where it goes when we throw it away, the Story of Cosmetics and how they are toxic, the Story of Bottled Water which explains how we don't need bottled water in the US, and the Story of Cap and Trade, which explains the basics.
- http://greenenergytv.com/watch.php?v=233&c=7 funny video about personal ac that people can change and what would happen if they did something about it

[20] Campbell, M., et al. (2000). "A Systematic Review of the Effectiveness of Environmental Awareness Interventions." *Canadian Journal of Public Health*, 91:2, 137-143.

[21] Stern, P. (1986). Blind Spots in Policy Analysis: What Economics Doesn't Say About Energy Use. *J. of Policy Analysis and Management*, Vol. 5, No. 2, 200-227.

- A Farm for the Future: explores peak oil and its effect on agriculture (originally seen on the BBC's Natural World series) as well as ways to deal with the problem. Watch at: http://www.grinningplanet.com/embed/sustainable-farming-video/a-farm-for-the-future.htm
- Kilowatt Ours (http://www.kilowattours.org/) is a movie about energy use and its effect on the environment as well as how energy efficiency, conservation and renewable energy can help to alleviate climate change.
- Renewal (http://www.renewalproject.net/). This DVD can be ordered and is a video about interfaith efforts to be good stewards of the environment. The movie is 90 minutes long or can be divided into 8 segments, each its own story, on topics such as

Grinning Planet also has a large list of environmental movies by category at: http://www.grinningplanet.com/6001/environmental-movies.htm. Categories include energy, food/nutrition, gardening, water, and trash/waste management. You can tailor the movie towards the topic you would like to discuss. Some of these movies can be found online, while others can be purchased online.

Additionally, Interfaith Power & Light has a suggested list of movies at: http://interfaithpowerandlight.org/resources/films/

Invite congregation members to present a demonstration or talk

Big Picture Problem: While it can be difficult to convince people that environmental issues are important, it is often even harder to get them to actually change their habits even after they have learned the issues. The person must first believe they have both the responsibility and power to act. Lack of time, money, or ability or even just not knowing where to start can hamper even the most well-intentioned individuals and lead to inaction.[22]

Solution: Research shows that people are significantly more likely to trust and be affected by information that comes from reliable sources they are socially connected to, like friends, family or community members.[23]

Details: If your congregation has experts in certain areas, like car mechanics, electricians, repairmen, utility workers or city officials, they may be ideal for leading discussions on home or vehicle improvements. Some topics that could be covered include how to check and fix tire pressure, how to clean filters to improve efficiency, what to check in order to identify energy waste, programs the city has developed for residents, etc. Information coming from a trusted community is more likely to help congregation members get past initial stumbling blocks so they can implement changes.

Conduct a discussion section amongst congregation members

Big Picture Problem: Social support and group interaction is an integral part of changing behavior[24].

[22] Blake, J. (1999). Overcoming the 'value–action gap' in environmental policy: Tensions between national policy and local experience. Local Environment, 4(3), 257–278.
[23] Staats, H., Harland, P., Wilke, H. (2004) Effecting durable change: A team approach to improve environmental behavior in the household. Environment and Behavior. 36(3): 341-367

Solution: Organizing small, short discussions between congregants helps to create a social network of environmental behavior and lets the congregation know that they are not alone in working towards environmental goals.

Details: Ideas include:

- Have congregants talk to their neighbor for a minute during the "announcements" section or whenever convenient about:
    - Ways they can strategize to drive less, or to
    - Ways to not buy brand-new things (i.e., thrift shops, sbfreecycle, Craigslist, trading); encourage other ideas and brainstorming
    - Ways to find locally sourced gifts/crafts/food (i.e., farmer's market, local artists they know, etc.)
    - Places within walking distance of their house that they could walk and not drive to, or how to "cluster" errands better so that they need to use the car less
    - Actions from the pledge that they are taking or plan to take
- At the end of the two-minute discussion, have people raise their hands to offer their ideas to the whole congregation.

Present a skit demonstrating an environmental action

Big Picture Problem: Many individuals may not trust external sources of information about environmental problems and so may never act to improve their environmental performance.

Solution: Research shows that messages coming from friends, family, or community members can increase the creditability of the information.[25] Moreover, a skit is more vivid and personalized than other communication formats, traits that also increase a message's effectiveness.[26]

Details: Use your creativity and the Behavior-Changing Techniques document provided to design a captivating skit. The skit should demonstrate an environmental problem or solution. Ideas include how to wrap your hot water tank with a heater blanket, how to hang dry your laundry, what items can be recycled, actions from the pledge, or a myriad of other ways to increase energy efficiency and environmental behavior within the home!

For information on how to create a skit, you can visit: http://www.wikihow.com/Make-a-Skit.

Ask congregation to conduct an environmental action relevant to their worship activities

Suggestion 1: Encourage congregation members to recycle/reuse/share your weekly bulletin

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[24] Staats, H., Harland, P., & Wilke, H. A. M. (2004). Effecting Durable Change. A Team Approach to Improve Environmental Behavior in the Household. *Environment and Behavior, 36,* 341-367**.**

[25] Parnell, R. and Larsen, O.P. (2005) Informing the Development of Domestic Energy Efficiency Initiatives : An Everyday Householder-Centered Approach. *Environment and Behavior* 37: 787.

[26] Stern, P. (1986). Blind Spots in Policy Analysis: What Economics Doesn't Say About Energy Use. J. of Policy Analysis and Management, Vol. 5, No. 2, 200-227.

Big Picture Problem: Solid waste that goes into our landfills has several negative environmental impacts. Most importantly, as the landfilled waste decomposes, it releases methane, a greenhouse gas that has a global warming potential (GWP) of 23 times that of CO_2 into the atmosphere. Therefore, when we divert waste from the landfill by recycling, reducing, reusing and composting, less dangerous methane will be emitted into our atmosphere. Additionally, as landfills space fill up, additional land must be converted from open space into sprawling landfills. Because it is very difficult to site landfill (due to the hazards of transporting and storing waste), new landfills can be much further away and thus require waste service providers to travel longer distances to deposit their waste. At times waste service providers must use trains to transport waste these especially long distances.

Solution: Do your part to encourage recycling in all aspect of your religious communities' services and events. This can be as simple as a written or spoken reminder to congregation members to share their bulletins and recycle them after the service has concluded.

Details: Provide recycling bins. Call your local service provider to see if you are eligible for free recycling bins.

- City of Santa Barbara local service providers are:
    - MarBorg: (805) 963-1852
    - BFI: (805) 965-5248
- Santa Barbara County (unincorporated areas) service providers are:
    - MarBorg: (805) 963-1852
    - Allied Waste/Browning-Ferris: (805) 965-5248
    - SBC Business Recycling Program: (805) 882-3616

Suggestion 2: Create a carpooling system

Big Picture Problem: Transportation accounts for over a third of U.S. carbon dioxide emissions.[27] Of transportation greenhouse gas emissions, nearly 60% come from personal vehicle use.[28]

Solution: Congregation members save 1 pound of carbon dioxide for each mile of driving each member eliminates. Furthermore, by carpooling, congregation members spend more time together and help to foster a sense of community.

Details: Set up a carpool board in a prominent, visible location within the worship building. Announce the carpooling system to the congregation and encourage members to use it. Instructions for creating a carpool board can be found here: http://www.ehow.com/how_5934542_create-carpool-board.html (though tailored for a work environment, the instructions can be adjusted for faith communities). Consider providing a map of the area with pushpins and labels so congregation members can indicate their location on the map. In addition, Santa Barbara County provides an online carpool system for County residents: http://www.trafficsolutions.info/. The faith community can also leverage this system to find carpooling partners within the congregation.

[27] http://www.eia.doe.gov/oiaf/1605/ggrpt/
[28] http://www.epa.gov/climatechange/fq/emissions.html#q5

DISPLAY ACTION ITEMS

Include environmental facts in bulletins

Big Picture Problem: Energy efficiency and environmental actions need to be communicated frequently so that people are exposed to the problems and the solutions.

Solution: Communication best practices show that information is more likely to be retained when it is repeated often.[29] Providing succinct tips to the congregation can help to show them specific actions to take to increase energy efficiency and environmental awareness.

Details: Try to put a new tip in each weekly bulletin in a section entitled "Did you know?" For the most effective way to communicate the tip, have the pastor or a congregant announce the tip aloud as well. Please see the file on the CD called "10a_Sustainability_Tips.docx" for a complete list of "Did You Know Sustainability Tips."

Exhibit a poster, sign, or display regarding an environmental issue or action

Big Picture Problem: Not all congregation members will be at all worship and education events and may miss important, pertinent environmental information.

Solution: The poster is a permanent display reminding people about an environmental issue that is important to your community.

Details: Create a visually-stimulating poster, sign, or display that discusses an environmental action about which the Green Team is passionate. Consider focusing on action items from the pledge that have low pledge or participation rates. In addition, including a call to action on the display can help congregation members feel empowered to change their behavior for the greater good.

[29] Campbell et al. (2000).

Sustainability Tips… Did You Know?

From: http://www.epa.gov/climatechange/wycd/home.html:

- Change a light, and you help change the world. Replace the conventional bulbs in your 5 most frequently used light fixtures with bulbs that are Energy Star-qualified (i.e., CFLs) and you will help the environment while saving money on energy bills. If every household in the U.S. took this one simple action we would prevent greenhouse gases equivalent to the emissions from nearly 10 million cars.

- Be smart when irrigating your lawn or landscape; only water when needed and do it during the coolest part of the day, early morning is best.

- Turn the water off while shaving or brushing your teeth.

- Do not use your toilet as a waste basket - water is wasted with each flush. And did you know a leaky toilet can waste 200 gallons of water per day? Repair all toilet and faucet leaks right away.

From: http://www.epa.gov/epahome/home.htm:

- A family of four uses 400 gallons of water every day.
    - Don't let the water run while shaving or brushing teeth.
    - Take short showers instead of tub baths.
    - Keep drinking water in the refrigerator instead of letting the faucet run until the water is cool.
    - Scrape, rather than rinse, dishes before loading into the dishwasher; wash only full loads.
    - Wash only full loads of laundry or use the appropriate water level or load size selection on the washing machine.
    - Buy high-efficient plumbing fixtures & appliances.
    - Repair all leaks (a leaky toilet can waste 200 gallons a day).
    - Water the lawn or garden during the coolest part of the day (early morning is best).
    - Water plants differently according to what they need. Check with your local extension service or nurseries for advice.
    - Set sprinklers to water the lawn or garden only - not the street or sidewalk.
    - Use soaker hoses or trickle irrigation systems for trees and shrubs.
    - Keep your yard healthy - dethatch, use mulch, etc.
    - Sweep outside instead of using a hose.
    - Landscape using "rain garden" techniques to save water and reduce stormwater runoff.

- Reduce:
    - Buy permanent items instead of disposables.
    - Buy and use only what you need.
    - Buy products with less packaging.
    - Buy products that use less toxic chemicals.

- Reuse:
    - Repair items as much as possible.
    - Use durable coffee mugs.
    - Use cloth napkins or towels.
    - Clean out juice bottles and use them for water.
    - Use empty jars to hold leftover food.
    - Reuse boxes.
    - Purchase refillable pens and pencils.
    - Participate in a paint collection and reuse program.
    - Donate extras to people you know or to charity instead of throwing them away.

- Recycle:
    - Recycle paper (printer paper, newspapers, mail, etc.), plastic, glass bottles, cardboard, and aluminum cans. If your community doesn't collect at the curb, take them to a collection center.
    - Recycle electronics.
    - Recycle used motor oil.
    - Compost food scraps, grass and other yard clippings, and dead plants.
    - Close the loop - buy recycled products and products that use recycled packaging. That's what makes recycling economically possible.

From: http://www.energystar.gov/index.cfm?c=heat_cool.pr_hvac:

- Check your air filter every month, especially during heavy use months (winter and summer). If the filter looks dirty after a month, change it. At a minimum, change the filter every 3 months. A dirty filter will slow down air flow and make the system work harder to keep you warm or cool — wasting energy. A clean filter will also prevent dust and dirt from building up in the system — leading to expensive maintenance and/or early system failure.

- Install a programmable thermostat: A programmable thermostat is ideal for people who are away from home during set periods of time throughout the week. Through proper use of pre-programmed settings, a programmable thermostat can save you about $180 every year in energy costs.

From: http://www.epa.gov/epawaste/conserve/rrr/composting/index.htm:

- Yard trimmings and food residuals together constitute 26 percent of the U.S. municipal solid waste stream. That's a lot of waste to send to landfills when it could become useful and environmentally beneficial compost instead!

Green Purchasing

Purchasing environmentally-friendly products is an excellent way of reducing environmental damage and, in many cases, improving human health by eliminating toxic compounds. The federal government has implemented its own green purchasing program for products ranging from consumable items like paper and cleaning supplies to more durable goods like carpets and furniture. Details on the program, and on green purchasing in general, can be found at http://www.epa.gov/epp/index.htm.

While we have listed some specific vendors below that focus on green products, we can't include everything. Consumer Reports operates a website, http://www.greenerchoices.org/home.cfm, which provides consumers with information, lists and reviews about a wide variety of products claiming to be better for the environment. http://greenschools.live.radicaldesigns.org/ provides similar information that, while aimed primarily at schools, can be very valuable for faith-based institutions. Organizations like Green Seal (http://www.greenseal.org/Home.aspx) have created a labeling system to mark products that meet their environmental standards, making them easier for customers to recognize. Look for the following symbols on products you purchase:*

Environmental Icons and Terminology	
Icon	Description
	Items identified as recycled contain material that has been diverted and recovered from the waste stream, including post-consumer content and pre-consumer recycled content.
 The mark of responsible forestry FSC – US – 0082 © 1996 Forest Stewardship Council	The Forest Stewardship Council (FSC) logo identifies products that support the responsible use of forest resources. This includes products made of wood from well-managed forests and/or containing post-consumer recycled content certified in accordance with the rules of the Forest Stewardship Council. Learn more at www.fscus.org.
	The ENERGY STAR® mark identifies products that meet U.S. EPA and Department of Energy standards for energy efficiency. Learn more at www.energystar.gov.
	GreenGuard certifies furniture products that result in reduced indoor air pollution. Learn more at www.greenguard.org
	SCS Indoor Advantage identifies furniture that is designed to reduce indoor air pollution. Indoor Advantage Gold identifies products that meet even higher standards for reduced indoor air pollution. Learn more at www.scscertified.com/ecoproducts
	Green Seal certifies products that are holistically designed to be environmentally responsible, including commercial and industrial cleaning products and copy & print paper. Learn more atwww.greenseal.org

	EcoLogo sets standards and certifies products that are eco-preferable across the entire product life cycle. Learn more atwww.ecologo.org/en
	The U.S. EPA DfE program identifies commercial cleaning and maintenance products with improved environmental and human health characteristics. Learn more at www.epa.gov/dfe
	Cradle to Cradle™ is a certification program that certifies products to four levels (Basic, Silver, Gold and Platinum) based on product life cycle environmental impacts. Learn more at www.c2ccertified.com
	EPEAT qualifies PCs, laptops and monitors to three levels (Bronze, Silver and Gold) based on a variety of different design elements including energy efficiency, toxics reduction and design for recycling. Learn more at www.epeat.net
	The Biodegradable Products Institute (BPI) Compostable certification means that products meet ASTM D6400 or D6868 standards for biodegradability when composted. Learn more atwww.bpiworld.org/BPI-Public

Equally important to green purchasing is proper disposal. Please recycle or compost whatever possible, and dispose of potentially toxic products like CFL bulbs, batteries, ink cartridges, and electronics responsibly. Many vendors offer to take back their used products for recycling.

Cleaning and Sanitation Products

Cleaning products can have potentially dangerous effects on the environment. Many are made up of toxic substances that can leak into soil and drain into waterways and threaten organisms living there. They can also emit volatile organic compounds (VOCs) as they age, which can lead to negative health effects in humans. Selecting green cleaning products can help reduce these impacts.

Environmental attributes to look for**

- Minimizes exposure to concentrates
- No ozone depleting substances
- Recyclable packaging
- Recycled-content in packaging
- Reduced bioconcentration factor
- Reduced flammability
- Reduced or no added dyes, except when added for safety purposes
- Reduced or no added fragrances
- Reduced or no skin irritants
- Reduced or no volatile organic compounds (VOCs)
- Reduced packaging

Sources

Healthy Clean Buildings
http://store.cleaningpro.com/index.cfm

Office products

When buying office paper products, select paper with the highest recycled content, highest amount of post-consumer waste, and the lowest amount of chlorine. If possible you also want to look for Forest Stewardship Certification, to make sure that any of the virgin components of the paper products are coming from sustainably harvested forests.

Environmental attributes to look for**

- Non-toxic
- Recyclable
- Recycled-content
- Remanufactured
- Reusable

Sources

Staples EcoEasy
http://www.staples.com/sbd/cre/marketing/ecoeasy/index.html

Food service products

Avoid food service items made from plastic and Styrofoam. Instead, buy plates and "silverware" made from compostable/biodegradable materials, such as agricultural products (corn, wheat, sugar cane), or high recycled-content products. Use washable, reusable products whenever possible.

Environmental attributes to look for**

- Biodegradable
- Energy efficient
- Recyclable
- Recycled-content
- Reusable
- Water efficient

Sources

Excellent Packaging
http://www.excellentpackaging.com

* Chart taken from http://www.staples.com/sbd/cre/marketing/ecoeasy/staples_initiatives.html
**Attribute lists taken from http://www.epa.gov/epp/

Take Advantage of Energy-Efficiency Rebates and Financial Incentives

Big Picture Problem: One of the most-cited reasons for neglecting environmental improvements is a lack of money. Many people assume that environmentally friendly behavior is always more expensive than traditional options, and financial restrictions force them to attend to the most immediate needs.
Solution: When well-meaning people are unable to overcome budgetary concerns about environmental action, it is helpful to show them ways in which the environment can save them money, or at least cost less than they imagine.
Details: ECOFaith has assembled a great deal of information on environmental upgrades than can save their members money in the long term, though some (but not all) actions require an initial investment. For details, see the CEC Pledge and the Cost Benefit Tool. For some upgrades, the government offers rebates and incentives to customers who purchase energy-efficient products. Below is a list of some of these programs; providing this information to your congregation members can be an excellent way of helping them overcome some of the financial issues commonly associated with environmentalism:

Rebates and Credits for In-Home Appliance and Energy Improvements

How purchase rebates and credits help improve efficiency

Energy-efficient home appliances reduce electricity demand, which has the dual benefit of reducing GHG emissions and lowering utility bills. While these products are more expensive than less efficient alternatives, customers who purchase ENERGY STAR® certified appliances will see an immediate reduction in energy use and will make up the difference over the product lifetime.

To help offset the high initial investment cost, utility companies and the state and US government have all developed programs designed to provide financial support or rewards to residential customers who purchase efficient appliances or who trade in old, inefficient models. Below are some of the programs you should be aware of if you plan to purchase a new appliance or dispose of an old one, and the first steps to take if you would like to participate:

Recycling an old appliance AND purchasing a new appliance (temporary, limited funding)

The Cash for Appliances Program is a program funded by the American Recovery and Reinvestment Act. California received $35.2 million to be used to provide rebates to consumers who recycle old appliances and purchase new energy efficient appliances. Funding began on April 22, 2010 and will continue until funds are exhausted. Approximately $6 million is still available as of November 13, 2010. **To receive a rebate, a customer must purchase a new eligible appliance from a CA retailer, recycle an old appliance with a certified recycler, and submit all necessary application material.** Only residents may participate; landlords are ineligible as the program is not designed for commercial gain.

Rebates are available for refrigerators ($200 rebate), clothes washing machines ($100), window air conditioners ($50), dishwashers ($100), and freezers ($50). Water heaters are also eligible for rebates ($100-$750, depending on purchased unit) as are Heating, Ventilating, and Air Conditioning (HVAC) systems ($200-$1000).

More information can be found here: http://www.cash4appliances.org/index.html

Recycling an old appliance

Refrigerator

Program: Refrigerator and Freezer Recycling Program
Payment: $50
Details: SCE will pay $50 for old refrigerators and freezers, and will pick up the item free of charge. The refrigerator owner must be an SCE customer, and the unit must be working, located at the customer service address, and between 10 and 32 cubic feet in size.
First steps: Go to http://www.pickupmyfridge.com/interview/SCECustomer.asp or call 1-800-234-9722 (M-F 7am-6pm, Sat 7am-330pm) to set up an appointment for pickup.

Purchasing a new appliance

Air Conditioner

Program: ENERGY STAR® Qualified Room Air Conditioner Rebate
Payment: $50 rebate check
Details: SCE will provide a $50 rebate to their customers who purchase a new ENERGY STAR® room air conditioner and submit an online application with basic purchase information.
First steps: Check http://www.sce.com/NR/rdonlyres/6768A2DC-334F-4590-A617-0ECDA9473B86/0/100512_RoomACQPL.pdf to find a list of eligible models, make purchase, then go to https://www.sce.com/HEEROnline/OnlineApplication.aspx to fill out purchase and customer information for rebate application.

Clothes Washer

Program: ENERGY STAR® Clothes Washers
Payment: $35 instant rebate or rebate check
Details: Customers who purchase an ENERGY STAR® certified clothes washer are eligible for a $35 rebate from SoCalGas. Select vendors are able to provide this rebate instantly, otherwise the customer must apply by mail.
First steps: Purchase an ENERGY STAR® clothes washer. If the purchase is made at Costco or Home Depot, the store will apply the rebate instantly. Otherwise, be sure to keep records of all information including purchase receipt, date of purchase and installation, and a recent gas bill. Fill out the store-provided rebate paperwork, or download a rebate form from http://www.socalgas.com/documents/rebates/SFApplication2010.pdf

Dishwasher

Program: ENERGY STAR® Dishwasher
Payment: $30 instant rebate or rebate check
Details: Customers who purchase an ENERGY STAR® certified dishwasher are eligible for a $30 rebate from SoCalGas. Select vendors are able to provide this rebate instantly, otherwise the customer must apply by mail.
First steps: Purchase an ENERGY STAR® dishwasher. If the purchase is made at Costco or Home Depot, the store will apply the rebate instantly. Otherwise, be sure to keep records of all information including purchase receipt, date of purchase and installation, and a recent gas bill. Fill out the

store-provided rebate paperwork, or download a rebate form from http://www.socalgas.com/documents/rebates/SFApplication2010.pdf

Furnace

Program: ENERGY STAR® Natural Gas Furnace
Payment: $200 instant rebate or rebate check
Details: Customers who purchase an ENERGY STAR® certified gas furnace are eligible for a $200 rebate from SoCalGas. Select vendors are able to provide this rebate instantly, otherwise the customer must apply by mail.
First steps: Purchase an ENERGY STAR® gas furnace. If the purchase is made at Costco or Home Depot, the store will apply the rebate instantly. Otherwise, be sure to keep records of all information including purchase receipt, date of purchase and installation, and a recent gas bill. Fill out the store-provided rebate paperwork, or download a rebate form from http://www.socalgas.com/documents/rebates/SFApplication2010.pdf

Water Heater

Program: ENERGY STAR® Electric Water Heater Rebate
Payment: $30 rebate check
Details: SCE will provide a $30 rebate to their customers who purchase a new ENERGY STAR® electric water heater and submit an online application with basic purchase information.
First steps: Check http://www.sce.com/NR/rdonlyres/23AD9AF0-CE10-4087-9188-A85C424E356E/0/100106_ElectricWaterHeaterQPL.pdf to find a list of eligible models, make purchase, then go to https://www.sce.com/HEEROnline/OnlineApplication.aspx to fill out purchase and customer information for rebate application.

Program: High Efficiency Gas Water Heater
Payment: $30 (storage) or $200 (tankless) rebate check
Details: Customers who purchase a gas water heater with an Energy Factor (EF) of 0.62 or greater are eligible for a rebate from SoCalGas. For traditional storage water heaters, a $30 rebate is available; for tankless water heaters a $200 rebate is available. Select vendors are able to provide this rebate instantly, otherwise the customer must apply by mail.
First steps: Purchase an efficient gas water heater—approved models can be researched at http://www.ahridirectory.org/ using the search criteria of EF min 0.62. If the purchase is made at Costco or Home Depot, the store will apply the rebate instantly. Otherwise, be sure to keep records of all information including purchase receipt, date of purchase and installation, and a recent gas bill. Fill out the store-provided rebate paperwork, or download a rebate form from http://www.socalgas.com/documents/rebates/SFApplication2010.pdf

Shower Head

Program: Low-Flow Showerhead Rebate
Payment: $15 instant rebate
Details: Purchase a low-flow showerhead from SoCalGas and receive an instant $15 rebate off the purchase price. Other low-flow options are also available.

First steps: Go to http://www.energyfederation.org/012709/default.php and purchase a low-flow shower head. Rebates will be applied at checkout.

Refrigerator

Program: ENERGY STAR® Qualified Refrigerator Rebate
Payment: $50 rebate check
Details: SCE will provide a $50 rebate to their customers who purchase a new ENERGY STAR® refrigerator and submit an online application with basic purchase information.
First steps: Check http://www.sce.com/NR/rdonlyres/4DCB6723-653D-446D-8E1A-2F6E49150BB5/0/100720_RefrigeratorQPL.pdf to find a list of eligible models, make purchase, then go to https://www.sce.com/HEEROnline/OnlineApplication.aspx to fill out purchase and customer information for rebate application.

For more information:
Southern California Edison Rebate Center: http://www.sce.com/residential/rebates-savings/
Southern California Gas Company Rebate Center: http://www.socalgas.com/rebates/residential/
ENERGY STAR® Program: http://www.energystar.gov/

Other Home Improvement Programs

Insulation

Program: Attic or Wall Insulation
Payment: $0.15 per square foot rebate
Details: SoCalGas will provide a rebate for improving insulation in attics or walls. To be eligible, current attic insulation must be R-11 or less, and must be replaced with R-30 or R-19 if there is less than 24" of attic clearance. Walls must be previously uninsulated and the installed insulation must achieve a minimum of R-13.
First steps: Obtain rebate form at http://www.socalgas.com/documents/rebates/SFApplication2010.pdf after installation is complete.

Home Efficiency Improvement Loans

Program: emPowerSBC
Payment: Loan of $2,500 to $75,000 at competitive fixed interest rate
Details: emPowerSBC is a program run by the County of Santa Barbara that provides financing to help residential, commercial and industrial property owners make energy efficient upgrades. Property owners apply for the program, describing the energy and/or water saving improvements they intend to make. If approved, the County and the property owner enter into an assessment contract, through which the County pays the up-front costs of the improvements. The County places an assessment lien on the property, and the property owner repays the County for the improvements as an assessment on his or her property tax bill over a 5, 10, or 20 year period. The property owner will have 180 days to get the work completed. After all improvements have been completed and final documentation is submitted to emPowerSBC staff, financing will be disbursed directly to the property owner or the property owner's authorized agent.
First steps: Go to https://empowersbc.org/systems/energy for more information, eligibility requirements, and planning and application instructions.

[[[Keep an eye on the Home Star program, "cash for caulkers", http://www.whitehouse.gov/the-press-office/fact-sheet-homestar-energy-efficiency-retrofit-program]]]

Low and Fixed-Income Resources

Program: Direct Assistance Program
Payment: No-cost energy efficiency upgrades
Details: The Gas Company offers no-cost energy-saving home improvements and furnace repair or replacement services for qualified limited-income renters and homeowners. Available upgrades include improving attic insulation, weather stripping, caulking, pipe and water heater insulation, minor repairs, etc.
First steps: Visit http://www.socalgas.com/residential/assistance/dap/ or call 1-800-331-7593 for more information.

Program: Energy Management Assistance Program
Payment: No-cost energy efficiency upgrades
Details: The Energy Management Assistance (EMA) program helps income-qualified renters and homeowners conserve energy and reduce their electricity costs. SCE pays all the costs of purchasing and installing energy-efficient appliances and equipment, which are free to eligible customers. Potential improvements include refrigerator replacement, wall air conditioning replacement, window replacement, lighting replacement, and weatherization.
First steps: Visit http://www.sce.com/residential/income-qualified/ema/energy-management-assistance.htm or call 1-800-736-4777 for more information.

Check ups and home audits

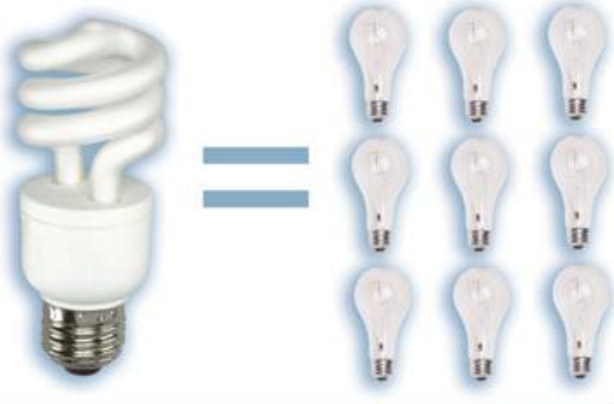
SCE online survey: http://www.sce.com/_Tools/Residential/HomeEnergySurvey.htm

Example of Action Item Sign

ECOFaith

Environmental Coalition of
Faith Communities, Santa Barbara

(Name of institution) replaced *XX* incandescent light bulbs with energy-efficient compact fluorescent light bulbs (CFLs) … and you can too!



Why?

Because lighting can be a significant user of energy in our homes and offices. You are wasting up to $43 a year on every incandescent light bulb you use. But, changing just 5 light bulbs in your house can reduce your carbon footprint by 1311 lbs of carbon dioxide (CO_2) per year. That is equivalent to saving 67 gallons of gasoline!

Want to learn more about lighting and rebate programs that can help you replace your lighting for less? Go to http://www.fypower.org/res/tools/rgl.html and http://www.sce.com/residential/rebates-savings/rebates-savings.htm

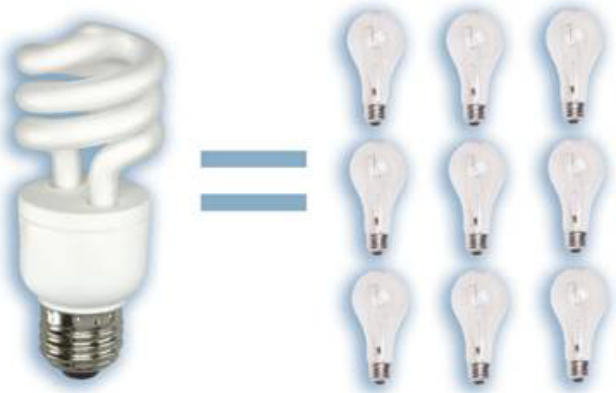
www.ecofaith-sb.org

Example of Action Item Sign in Spanish

ECOFaith

Coalición Ambiental de las Comunidades de Fe, Santa Barbara

(Nombre de la institución) reemplazó *XX* bombillas de luz incandescente con bombillas de ahorro de energía compactas de luz fluorescente … y usted también puede hacerlo!



¿Por qué?

Debido a que la iluminación puede ser un importante consumidor de energía en nuestros hogares y oficinas, usted está perdiendo hasta $43 al año en cada bombilla de luz incandescente que utilice. Sin embargo, el cambio de sólo 5 bombillas en su casa pueden reducir su huella de carbono en 1311 libras de dióxido de carbono al año.
Eso es equivalente al ahorro de 67 galones de gasolina!

¿Quieres saber más sobre los programas de alumbrado y rebajas que pueden ayudarle a cambiar su iluminación por menos?
Ir a las páginas http://www.fypower.org/res/tools/rgl.html y http://www.sce.com/residential/rebates-savings/rebates-savings.htm

www.ecofaith-sb.org

Community Environmental Council Pledge

Get Energized

Instructions: Fill out the pledge form below by indicating which energy-saving actions you already perform in your household and which you plan to start doing in the next year. If an action is not feasible given your lifestyle, simply leave it blank. Items marked with a double asterisk (**) may be more appropriate for property owners, while unmarked items are typically achievable for both renters and owners.

Name of Pledger: _____

Date:_____

I already:	I will:	Action:	Annual Savings: lbs CO_2e	gal. H_20
		Appliances		
○	○	Unplug unused fridge/freezer	298	--
○	○	**Replace old washing machine with efficient unit	141	3499
○	○	**Replace old fridge/freezer with efficient unit	126	--
○	○	**Replace old dishwasher with efficient unit	79	674
○	○	Air dry clothes at least half the year	69	--
○	○	Plug electronics/TV into a Smart Strip or unplug when not in use	55	--
		Food		
○	○	Reduce consumption of beef and pork to once per week and fish, poultry and eggs to twice or fewer per day	427	--
○	○	Cut intake of sugary sweets by half	48	--
○	○	Purchase > 25% of food a week from farmer's market or local source	--	--
		Waste		
○	○	Become familiar with Santa Barbara's recycling policies and recycle all possible waste	156	--
○	○	Compost kitchen and lawn scraps	--	--
		Heating and Cooling		
○	○	**Install higher-performing insulation in attic and around ducts	100	--
○	○	Turn furnace thermostat down to 68 degrees in the winter when at home and 55 degrees when not at home	73	--
○	○	**Change single pane windows to Energy Star qualified windows	60	--
○	○	Check air filters monthly and replace them if necessary	60	--
○	○	**Replace old furnace with efficient unit	44	--
○	○	**Caulk and weatherstrip all windows and doors	40	--

○	○	Turn A/C thermostat up to 78 degrees in the summer when at home and 85 degrees when not at home	35	--
○	○	**Replace old central A/C with efficient unit	34	--
○	○	Professionally tune-up A/C system at least once a year	14	--
		Lighting		
○	○	Replace most or all incandescent bulbs with CFL bulbs	253	--
○	○	Consistently turn off lights when leaving the room	51	--
		Transportation		
○	○	Replace car with one that gets at least 30 miles per gallon	4642	--
○	○	Alter driving habits by accelerating more slowly, reducing unnecessary braking, reducing idling	2420	--
○	○	Reduce air travel by 5,000 miles by teleconferencing or vacationing locally	2138	--
○	○	Drive 30 fewer miles by carpooling or taking public transportation 2 days a week	1890	--
○	○	Keep car maintained, getting regular oil changes and tune-ups, changing the air filter, and checking the oxygen sensor	788	--
○	○	Purchase low-rolling resistance tires for car	644	--
○	○	Drive at least 10 fewer miles per week by combining trips, walking, or biking	630	--
○	○	Keep tires properly inflated	473	--
○	○	Regularly remove excess weight from car	143	--
		Water Heating		
○	○	**Install a tankless or more efficient water heater	204	--
○	○	Limit showers to 5 min.	148	1939
○	○	Wash clothes in warm water and rinse in cold water	136	--
○	○	Install a low flow showerhead	68	896
○	○	Turn water heater to no higher than 120 degrees	59	--
○	○	Wash only full loads of laundry	25	1185
○	○	Insulate an old inefficient electric water heater	21	--
○	○	Install faucet aerators or EPA WaterSense faucets	17	219
		Water Conservation		
○	○	**Implement xeriscaping (using water-wise plants instead of lawns)	--	18812
○	○	**Install a high efficiency toilet with a 1.3 gallon tank instead of a 3.5 gallon tank	--	4092
○	○	Adjust irrigation schedule as weather changes	--	3815
○	○	**Install rotating nozzles on spray head sprinklers	--	3762
○	○	Check for household leaks in faucets and toilets	--	3468
○	○	Use mulch throughout garden	--	--
		Solar		

○	○	**Install a 3 kW solar PV system	1259	--
○	○	**Install a solar water heating system	552	--
		Consumer Goods		
○	○	Reduce purchases of clothing and shoes by 25%	207	--
○	○	Quit smoking	36	--
○	○	Reduce purchases of cleaning supplies by 25%	18	--

Scoring: After filling out the pledge form, add up the annual kg CO_2e and gallons of H_2O reduced for all actions you pledged to **start** doing for each category. Enter the totals below:

Appliances:	_____ lb CO_2e	_____ gal. H_2O
Food:	_____ lb CO_2e	_____ gal. H_2O
Waste:	_____ lb CO_2e	
Heating and Cooling:	_____ lb CO_2e	
Lighting:	_____ lb CO_2e	
Transportation:	_____ lb CO_2e	
Water Heating:	_____ lb CO_2e	_____ gal. H_2O
Water Conservation:		_____ gal. H_2O
Solar:	_____ lb CO_2e	
Consumer Goods:	_____ lb CO_2e	
Total:	_____ lb CO_2e	_____ gal. H_2O

Comments:

_____

_____

_____

How much of an impact am I really making?[1]

- Reducing emissions by **100 lbs CO_2e** has the same effect on reducing climate change as growing **1.2 new trees** for **10 years.**
- **100 lbs CO_2e** is created for every **5.1 gallons** of gasoline burned**.**

[1]http://www.epa.gov/cleanenergy/energy-resources/calculator.html

For more information: Visit the Community Environmental Council at http://www.cecsb.org/

Pledge Tally Form

Community Environmental Council Pledges	
Faith Community Name	
Estimated # of Congregation Members	
Total # of Pledge Sheets Collected	
Date Pledges Taken	

ECOFaith Pledge Categories	Subcategory	# People Already Taking Action (Count "I Already" column)	# Pledgers (Count "I Will" column)	CO_2e Reduction (lb) per Action Annually	Amount of CO_2e Pledged to Save Annually (lb)	Water Reduction (gal) per Action Annually	Amount of Water Pledged to Save Annually (gal)
Appliances	Unplug unused fridge/freezer			298	0		
	Replace old washing machine with efficient unit			141	0	3,499	0
	Replace old fridge/freezer with efficient unit			126	0		
	Replace old dishwasher with efficient unit			79	0	674	0
	Air dry clothes at least half the year			69	0		
	Plug electronics/TV into a Smart Strip or unplug when not in use			55	0		
Appliance Total		**0**	**0**		**0**		**0**
Food	Reduce consumption of beef and pork to only once per week, and fish, poultry and eggs to twice or fewer times per day			427	0		
	Cut intake of sugary sweets by half			48	0		
	Purchase > 25% of food a week from farmer's market or local source						
Food Total		**0**	**0**		**0**		
Waste	Familiarize myself with Santa Barbara's recycling practices and recycle all recyclable waste			156	0		
	Compost kitchen and lawn scraps						
Waste Total		**0**	**0**		**0**		
Heating and Cooling	Install higher-performing insulation in attic and around ducts			100	0		
	Turn furnace thermostat down to 68 degrees in the winter when at home and 55 degrees when not at home			73	0		
	Change single pane windows to Energy Star qualified windows			171	0		
	Check air filters monthly and replace them if necessary			60	0		
	Replace old furnance with efficient unit			44	0		
	Caulk and weatherstrip all windows and doors			40	0		
	Turn A/C thermostat up to 78 degrees in the summer when at home and 85 degrees when not at home			35	0		
	Replace old central A/C with efficient unit			34	0		
	Professionally tune-up A/C system at least once a year			14	0		
H/C Total		**0**	**0**		**0**		
Lighting	Replace most or all incandescent bulbs with CFL bulbs			253	0		
	Consistently turn off lights when leaving the room			51	0		
Lighting Total		**0**	**0**		**0**		

Transportation	Replace car with one that gets at least 30 miles per gallon			4,642	0		
	Alter driving habits by accelerating more slowly, reducing unnecessary braking, reducing idling			2,420	0		
	Reduce air travel by 5,000 miles			2,138	0		
	Drive at least 30 fewer miles by carpooling or taking public transportation 2 days/week			1,890	0		
	Get regular oil changes and tune-ups for car, making sure to change the air filter and check the oxygen sensor			788	0		
	Purchase low-rolling resistance tires for car			644	0		
	Drive at least 10 fewer miles per week by combining trips, walking, or biking			630	0		
	Keep tires properly inflated			473	0		
	Regularly remove excess weight from car			143	0		
Transportation Total		**0**	**0**		**0**		
Water Heating	Install a tankless or more efficient water heater			204	0		
	Limit showers to 5 min.			148	0	1,939	0
	Wash clothes in warm water and rinse in cold water			136	0		
	Install a low flow showerhead			68	0	896	0
	Turn water heater to no higher than 120 degrees			59	0		
	Wash only full loads of laundry			25	0	1,185	0
	Insulate an old inefficient water heater			21	0		
	Install faucet aerators or EPA WaterSense faucets			17	0	219	0
Water Heating Total		**0**	**0**		**0**		**0**
Water Conservation	Implement xeriscaping (using water-wise plants instead of lawns)					18,812	0
	Install a high efficiency toilet with a 1.3 gallon tank instead of a 3.5 gallon tank					4,092	0
	Adjust irrigation schedule as weather changes					3,815	0
	Install rotating nozzles on spray head sprinklers					3,762	0
	Check for household leaks in faucets and toilets					3,468	0
	Use mulch throughout garden						0
Water Conservation Total		**0**	**0**				**0**
Solar Power	Install a 3 kW solar PV system			1,259	0		
	Install a solar water heating system			552	0		
Solar Total		**0**	**0**		**0**		
Consumer Goods	Reduce purchases of clothing and shoes by 25%			207	0		
	Quit smoking			36	0		
	Reduce purchases of cleaning supplies by 25%			18	0		
Consumer Goods Total		**0**	**0**		**0**		
Total benefit of pledged actions					**0** lb CO_2e		**0** gallons

Disclaimer: This worksheet provides very rough estimates of cumulative GHG and water reductions. **Actual emission and water reductions may be less than stated above** because these estimates may double-count savings. For example, if a congregation member upgrades the insulation in her attic and also installs a more efficient furnace, the combined emissions reduction will not be as great as if one person upgrades her attic insulation and another person installs a more efficient furnace. To explain further, once a home is insulated, it will not require as much heat from the furnace. Therefore, the furnace's efficiency would have less impact in a well-insulated home than in a poorly-insulated home.

ECOFaith Progress Reports and Evaluations

ECOFaith asks that member congregations complete a progress report three months after finalizing their action plan, and again after one year. The goal of these reports is to provide early warning of potential resource gaps and roadblocks in order to ensure that ECOFaith members can stay on track with their projects and maintain forward momentum. These reports also act as a major data resource of ECOFaith activity, which is vital when we apply for grants and other funding. We ask therefore that you be as accurate as possible.

Progress reports should be submitted to ECOFaith upon completion, after which an ECOFaith staff member will evaluate the congregation based both on the report and on other interactions and observations. ECOFaith will determine if the congregation appears to be on track to accomplish its goals, and will offer ideas for overcoming difficulties, or, in the case of major roadblocks, reshaping the action plan to better fit with the congregation's needs and resources.

We encourage you to fill out the progress report throughout the year, particularly for the action items. Some information will be repeated between the 3-month and 1-year forms, though ongoing efforts should be updated with the most current information.

ECOFaith 3-Month Progress Report

Congregation Name:_____Date: _____

Please fill out the form below briefly describing your participation in the ECOFaith process. Include your evaluation of program successes, shortcomings, and how you hope to continue to advance your congregation's commitment to the environment.

In addition to the questions below, please attach the following, either as printouts or as electronic files:

- Congregation vision statement
- CEC Pledge tally spreadsheet
- Completed utilities spreadsheet (for previous two years if possible)

Part I. Commitment

1. How has the institution's commitment to the environment been communicated to members of the congregation? How well has it been received?

2. Briefly describe the organizational structure that you have developed in your congregation to implement environmental improvements (Green Team, committee meetings, etc.).

Part II. Action Item Progress
Fill out the following form for each of the Priority Action items listed in your Action Plan.

Action # _____ Description: _____

_____

_____

Date Implemented: _____

Category (from Action Plan guidelines): _____

Is this an ongoing activity or a one-time event? _____

If this is an ongoing activity, what follow-up actions and monitoring will be performed? _____

_____

Cost of project and source of funds: _____

Did you use any special tools, resources or outside contacts? _____

_____

_____

Estimated CO2e savings (calculated from data provided with ECOFaith introductory material):

_____

Did you encourage congregation member involvement or awareness with the activity? Describe.

_____

_____

_____

How many congregation or community members participated, if any? _____

Please describe any difficulties or successes with the project and any lessons learned.

_____

_____

_____

Any other comments?

_____

_____

_____

ECOFaith 1-year Progress Report

Congregation Name: _____Date: _____

Please fill out the form below briefly describing your participation in the ECOFaith process. Include your evaluation of program successes, shortcomings, and how you hope to continue to advance your congregation's commitment to the environment.

In addition to the questions below, please attach the following, either as printouts or as electronic files:

- Congregation vision statement
- CEC Pledge tally spreadsheet
- Completed utilities spreadsheet (for previous two years if possible)

Part I. Commitment

3. In general, how have the opinions and habits of individual congregation members changed as a result of improving your environmental actions?

4. What challenges has your Green Team encountered as it tries to implement changes? How have these challenges been dealt with?

Part II. Action Item Progress
Fill out the following form for each of the Priority Action items listed in your Action Plan.

Action # _____ Description: _____

_____

_____

Date Implemented: _____

Category (from Action Plan guidelines): _____

Is this an ongoing activity or a one-time event? _____

If this is an ongoing activity, what follow-up actions and monitoring will be performed? _____

_____

Cost of project and source of funds: _____

Did you use any special tools, resources or outside contacts? _____

_____

_____

Estimated CO2e savings (calculated from data provided with ECOFaith introductory material):

_____

Did you encourage congregation member involvement or awareness with the activity? Describe.

_____

_____

_____

How many congregation or community members participated, if any? _____

Please describe any difficulties or successes with the project and any lessons learned.

_____

_____

_____

_____

Any other comments?

_____

_____

Part III. Congregation and Individual Information Survey Update

What is your congregation's average attendance at weekly services?

How frequently do most congregants attend services, events, or classes at the worship building?

Can you provide an estimate of the percent of congregants who travel in the following transportation modes?

1. Single family vehicles
2. Carpooling with members outside your family
3. Public transportation
4. Walking/biking

Please enter the miles staff traveled on congregation business last year for each transportation mode, or amount spent on each transportation mode:

1. Automobiles (including personal vehicles, taxis, carpools)
2. Bus, including metro and long distance service
3. Rail, including subways, inner-city light rail, cross country trains
4. Air travel

How much does the facility administration spend on monthly garbage service at the worship building?

Please estimate how much money your community spends per year for each category of goods and services below:

1. Paper and paper products
2. Office supplies
3. Cleaning supplies and services
4. Furniture and fixtures
5. Construction and renovations
6. Food services (e.g. catered or pre-prepared food)
7. Food (ingredients, or food congregation brings for potlucks, etc)
8. Do you consciously avoid purchasing meat and dairy products when possible?
9. Apparel, linens, and other textiles
10. Printing and publishing (if someone else prints for you)
11. Other goods and services

ECOFaith 3-Month Evaluation

Congregation Name: _____Date: _____

How effective has the Green Team been at transitioning from planning to implementation (circle)?

Exceptional Effective Acceptable Inconsistent Ineffective

How effectively have the institution's initial actions included its congregation members and inspired them to improve environmental performance in their own lives?

Exceptional Effective Acceptable Inconsistent Ineffective

How effective have the first steps in the plan been at improving environmental performance?

Exceptional Effective Acceptable Inconsistent Ineffective

What are the particular strengths in this congregation and how can they be capitalized on?

_____

_____

_____

_____

What are the particular difficulties and how can they be confronted? Even if progress is smooth now, are there any looming issues that may be problematic later?

_____

_____

_____

_____

Additional comments:

_____

_____

_____

_____

_____

Final Evaluation:

_____ Congregation has successfully transitioned from planning to implementation.

The congregation Green Team appears fully able and on track to continue implementation of its action plan. Necessary resources are readily available or can be obtained, and no major roadblocks have developed thus far.

_____ Congregation has had some difficulty with implementation, but shows progress.

Additional time or resources are needed for the Green Team to successfully implement the initial stages of its action plan. This may be because of an unforeseen difficulty or unrealistic expectations. ECOFaith will work with the Green Team to help smooth the transition into implementation and ensure continued success. While an ongoing conversation will take place, initial suggestions include:

_____

_____

_____

_____

_____

A follow-up evaluation will occur on (date): _____

_____ Congregation has not begun implementation of its action plan.

The congregation and Green Team have had difficulties beginning implementation of the action plan. ECOFaith will work with the institution to identify the roadblocks (funding, manpower, interest, etc.) and find solutions. If necessary, the action plan will be revised. While an ongoing conversation will take place, initial suggestions include:

_____

_____

_____

_____

_____

After working with ECOFaith leadership to redefine and refocus its efforts, the congregation will begin implementation of its action plan and will be re-evaluated at a later date.

ECOFaith 1-Year Evaluation

Congregation Name: _____Date: _____

How successful was the Green Team in implementing its action plan (circle)?

Exceptional Effective Acceptable Inconsistent Ineffective

How effectively did the institution's actions include its congregation members and inspire them to improve environmental performance in their own lives?

Exceptional Effective Acceptable Inconsistent Ineffective

How strong of an environmental impact was the plan able to bring about?

Exceptional Effective Acceptable Inconsistent Ineffective

What were the particular strengths in this congregation?

_____

_____

_____

_____

What were the particular difficulties?

_____

_____

_____

_____

Additional comments:

_____

_____

_____

_____

_____

Final Evaluation:

_____ Congregation has successfully completed first year of ECOFaith implementation.

The congregation Green Team will re-evaluate itself to determine what additional environmental actions can be taken on now that the initial list is complete and the community has fully incorporated environmentalism into its daily mission. The congregation will also continue all actions requiring ongoing attention and effort, and will regularly seek to further inspire its members to improve their own actions.

_____ Congregation needs additional time to implement planned actions but is on track.

Additional time or resources are needed for the congregation to complete the implementation of its action plan. The congregation will take the following steps, with ECOFaith assistance or support:

_____

_____

_____

_____

_____

A follow-up evaluation will occur on (date): _____

_____ Congregation is not on track to complete its action plan as written.

Congregation needs to revise its vision taking into account available resources, time and/or ability. ECOFaith will work with the organization to develop a feasible, effective plan that meets the specific needs of the congregation and will help the congregation secure additional resources to help with implementation. While a more in depth review will take place, initial comments include:

_____

_____

_____

_____

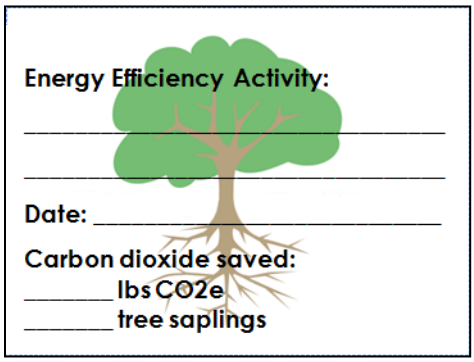
_____

After working with ECOFaith leadership to redefine and refocus its efforts, the congregation will implement its updated action plan and will be re-evaluated at a later date.

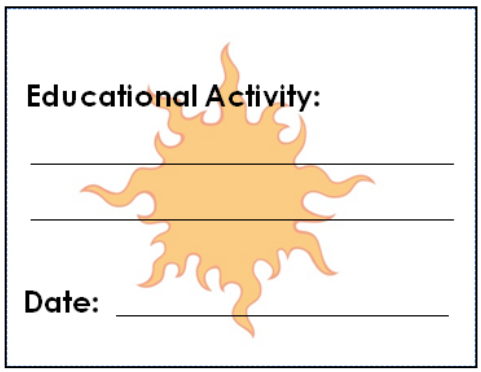
ECOFaith Path of Sustainability Poster Instructions

We have created a visual for ECOFaith congregation Green Teams can use to show off their planned and completed Path of Sustainability actions to other congregation members. To create and display the poster, the user will need two files, which can be found in the ECOFaith resource toolkit. The Adobe InDesign File (file name: 20_Path_Poster.pct) is the blank poster, ready for customization by the individual congregation (see next page for example), and file name: 21_Path_Poster_Labels.docx contains the action item and month labels that are used to display the Action Plan schedule.

The congregation will begin with the blank poster file, developed using Adobe InDesign. The user should open the file and insert the congregation name in the first line of the heading, above "ECOFaith Path of Sustainability". The user also has the option of adding a verse or quote to the poster in the designated area, or deleting that section entirely if desired. Once this is complete, the file can be saved and taken to a printer, who can print the poster at its full size.

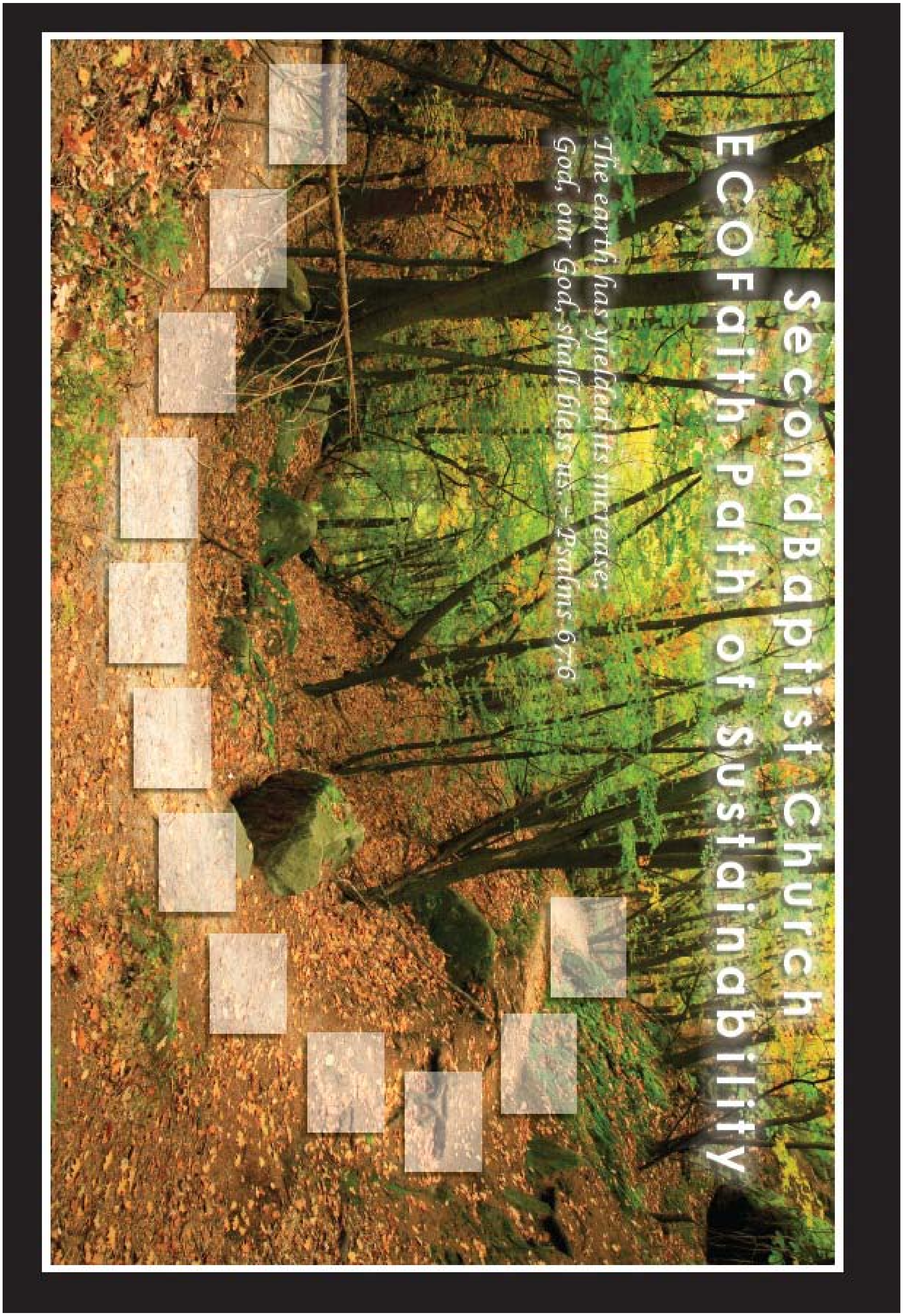


The second component of the poster is the labels that will display each of the planned actions. The label file has three pages. The first page is formatted to display the congregation's chosen Path of Sustainability Energy Efficiency Actions, the second page is for Educational Actions, and the third page is simply to label the poster's 12 steps with the months of the year. We kept the months as separate stickers rather than pre-printing them directly on the poster so that congregations would be free to start their Path during any month of the year.



The Educational and Energy Efficiency labels can be filled out either by hand after printing or electronically, as long as any inserted text stays within the formatted table cells. These pages should be printed on white 2" x 2-5/8" Avery labels (Avery product numbers 6572 or 6578). The month labels should be printed on clear 2" x 2-5/8" Avery labels (Avery product number 6581). The "Carbon dioxide saved" on the energy efficiency labels can be filled out using the Action Item Pick List, which displays the lbs of CO_2 each action saves. Users can determine how many tree saplings are needed to save an equivalent amount of CO_2 by going to the EPA's GHG Equivalencies Calculator at http://www.epa.gov/cleanenergy/energy-resources/calculator.html.

Once printed and filled out, the month labels can be placed directly on the poster in the designated square, and the action item labels can be placed on or near the month during which they will occur. The Green Team should then make sure that the poster is displayed prominently so all members of the congregation can see it.


Second Baptist Church
ECOFaith Path of Sustainability
The earth has yielded its increase;
God, our God, shall bless us. ~ Psalms 67:6

APPENDIX II

Background Information

The focus of this review is to establish the connection between religion and the environment in order to better understand how education might translate into behavior changes, and how religious communities might successfully enact change within their congregations to address sustainability.

Introduction: Understanding Faith-based Environmentalism

A common concern amongst faith-based environmental organizations is that their secular environmental partners do not understand the religious community and its cultural, political, and organizational functioning (Smith 2006). Therefore, this literature review seeks to provide a historical and cultural context for our project, an understanding of the obstacles and challenges under which our client operates, as well as a perspective on our client's unique motivations and opportunities.

Background and History

From an environmental perspective, the mid- to late-nineteenth century in the U.S. was marked by increasingly widespread deforestation and fossil fuel-pumping as well as the dawn of the automobile age. The large-scale environmental degradation and landscape transformation that resulted began to generate considerable alarm in Americans. In the midst of this anxiety, a budding consideration of the role that religion plays in shaping environments emerged. This new thinking is reflected in the art and philosophy of that period, from the sublime natural landscapes depicted by the Hudson School paintings and Ansel Adams' photography to the literary works of Henry David Thoreau and their articulation of a spiritual basis for conservation. (Taylor et al. 2005)

From this background, two distinct environmental ethics emerged: one led by Sierra Club founder John Muir, and the other by the Chief Forester of the U.S. (1899-1910), Gifford Pinchot. Muir, heavily influenced by Thoreau, espoused the sacredness of natural systems and was one of the most prominent early adherents of what became known as the "nature preservation" ethic. Pinchot, however, as subscriber to the "Social Gospel" movement that sought to apply Christian principles to social problems, called for a more utilitarian environmental ethic. Rather than preservation, Pinchot favored the fair and responsible use of nature for the benefit of all people, including future generations. He believed that natural resources should be protected from corporate interests and conserved to aid the poor. (Taylor et al. 2005)

The two men clashed publicly over land use decisions in Yosemite. Muir resisted the damming of the Tuolumne River, maintaining that flooding the Hetch Hetchy Valley would desecrate sacred land. Gifford, however, felt a religious duty to develop natural resources for the good of mankind. This controversy, termed a "spiritual watershed" in American

environmental history by historian Roderick Nash, still reverberates in land use debates today. (Taylor et al. 2005)

Modern faith-based environmentalism emerged around the same time as the mainstream environmental movement. One particularly catalytic event was the 1967 publication of Lynn White's article titled, "The Historical Roots of Our Ecological Crisis," in *Science*. In his article, White pursued the thesis that Western Christianity is largely to blame for the current ecological crisis, stating that "we shall continue to have a worsening crisis until we reject the Christian axiom that nature has no reason for existence save to serve man." Calling Christianity the "most anthropocentric religion the world has ever seen," White pointed to Christian teachings that promote human domination over other living beings and man's duty to exploit nature for his own ends. Yet, despite his strong censure of Christianity, White firmly believed that environmental disasters would be averted not through science and technology but through "a new religion, or [a rethinking of] our old one." Indeed, he asserted that, "Since the roots of our trouble are so largely religious, the remedy must also be essentially religious." (White 1967)

While White was not the first to verbalize these views, his article provided fertile ground for debate and induced a wide range of responses. Some readers, already influenced by Romantic thought, heartily agreed with him (Taylor et al. 2005). Perhaps more relevant to our study, however, were the reactions from both laypeople and scholars within the Abrahamic traditions of Judaism, Christianity, and Islam. These responses can be divided into three categories: apologetic, but arguing that under alternative interpretations these traditions supported environmental sensitivity; confessional, acknowledging the truth of the criticisms and calling for religious reform to promote environmental responsibility; and indifference, viewing environmental concerns as matters unimportant to faith (Taylor et al. 2005). Regardless of the variation in reactions, however, White's article seems to have prompted many religious communities to establish or refine an eco-theology to defend their faith—an action that eventually resulted in the development and proliferation of environmental consciousness in mainstream faith communities (Wilkinson 2009; Smith 2006).

Religion and the Environment

Though ECOFaith is an interfaith organization that welcomes all religions, a treatment of every religion and its relationship with the environment is outside the scope of this review. Therefore, this section focuses on the faiths represented by the four ECOFaith pilot projects: Protestantism, Catholicism, and Islam.

Christian Environmental Engagement

One study examining Christian environmentalism in the U.S.—through interviews, observation, and literature review—identified three general models of Christian eco-theology (Kearns 1996), which are described briefly below.

Christian Stewardship is founded on the biblical mandate for humans to take care of the earth and reinterprets the Genesis commandment of dominion as a divine decree to steward creation. Adherants of Christian Stewardship tend to be fundamentalist Christians or Evangelicals who believe that the current environmental crisis stems from human arrogance, ignorance, greed, and disobedience of God. In response to Lynn White's assertion that Christianity is largely to blame for current environmental degradation, Christian Stewards would likely say that the problem is not with Christianity but with humans not being true to Christianity. The solution they propose is to correct traditional Christian doctrine and restore Christianity as a guide to humanity. They seek a balance between biology and the Bible, looking for ways to incorporate scientific knowledge within a religious worldview.

Creation Spirituality, on the other hand, adopts cosmological physics as a starting point, reorienting the creation story around the creation of the universe. This model rejects the traditional hierarchical relationship between humans and nature, establishing instead that humans are merely one part of the whole of creation. In contrast to Christian Stewards, Creation Spiritualists are usually liberal or ecumenical Christians who point to anthropocentrism, human alienation from nature, and the artificial separation between religion and science as causes of ecological problems. They aim to address the environmental crisis by creating a new worldview or religion that integrates spirituality and science and rejects the dualism omnipresent in contemporary society.

Eco-Justice differs from both Creation Spirituality and Christian Stewardship in its focus on changing society's institutions and structures rather than individuals. Adherents of Eco-Justice tend to be mainline Christians who have expanded their traditional focus on social justice issues to include environmental degradation, especially as it relates to poverty, oppression, and injustice. Like Christian Stewards, their worldview is generally anthropocentric, but Eco-Justice Christians believe that environmental degradation results from institutional injustice and inequality and the economic system that promotes them, rather than the sins of individuals. Therefore, their preferred method of addressing the ecological crisis is through grassroots organizing and government reform.

Protestant-Specific Environmental Engagement

The greening of American Protestantism was led by denominational elites, clergy, and bureaucrats at around the same time that the secular movement was gaining momentum. Early pioneer Joseph Sittler began publishing works about the Christian need to preserve the environment in the 1950s and 1960s, and his work has been cited by many others as being influential. During the mid-1960s, the Faith-Man-Nature Group was created, in association with the liberal National Council of Churches, to develop a liaison between religious thinkers and scientists. Several of its members eventually became prominent figures in Protestant environmentalism. (Fowler 1995)

Two crucial background factors underpin green Protestantism. As a result of Lynn White's article and similar criticisms from the secular community, contemporary Christian ecological thought often contains a tone of defensiveness. The charges have presented both

a challenge and a stimulant to the greening of Protestant thought. The other factor is an overwhelming sense of crisis—often with apocalyptic undertones. This sense of crisis explains the drive toward rapid and expansive results and, for green Protestants, produces a stark image of humanity's failure to live by and for God. They view the earth's crisis as a crisis of creation, which humans caused by allowing environmental deterioration. Note, however, that not all Protestants agree a crisis exists; fundamentalist Christians especially are divided on this issue. (Fowler 1995)

Stewardship is by far the most common framework proposed by green Protestants. While other models have also been offered, both liberal and conservative Protestant publications have espoused this ethic (Fowler 1995). Christian Stewardship, however, has been addressed above, so its details will not be repeated here.

Green Protestants typically seek three types of structural reforms:

- Sustainable development: In promoting sustainable development through slowing and simplifying lifestyles and downsizing appetites, Protestant environmentalists also recognize the additional benefit of leading more peaceful and thoughtful lives.
- Eco-Justice: Eco-justice is also frequently coupled with sustainable development as members attempt to unite "environmental sustainability" with "economic justice." Green Protestants, however, have discovered that there is often a tension between the two goals.
- Egalitarian Community: Protestant environmentalists have expanded the idea of community from "local community" to "planetary community." To them, nature itself demonstrates the concept of community, by manifesting a holism or interrelatedness. Furthermore, they believe that fostering a society of equals with common ends and close personal bonds ensures the earth will flourish. (Fowler 1995)

Over the past few decades, every mainline Protestant denomination has taken an environmental stand. The most oft-mentioned topic in these resolutions is energy policy, but land use, pollution, world hunger, and lifestyle challenges are also frequently addressed. In addition, Evangelicals are becoming more environmentally aware as well. One possible driver of this trend is the Au Sable Institute, which has strong ties to the evangelical Christian College Coalition. The institute's educational programs, which combine environmental science with Christian faith, have done much to legitimize Christian environmentalism in the evangelical community. Though ambivalence amongst conservative Protestants still continues, the 1990 establishment of the Evangelical Environment Network demonstrates that evangelical support is undeniable (Wilkinson 2009). Overall, this is strong momentum in the Protestant community toward increased environmental engagement. (Fowler 1995)

Catholic-Specific Environmental Engagement

Early Christianity contained elements of earth stewardship as well as dominion, both affirming the goodness of all of God's creation as well as proclaiming humanity as its crown.

While the hierarchical structure of the Catholic Church often favored a dominion perspective, the Church still retained a strong creation-centered frame for understanding human life. In particular, the monastic orders, often housed in rural retreats, espoused a creation stewardship ethic that promoted sustainable agriculture and forestry management as well as a deep engagement with the surrounding fields, woods, and animals. (French 2005)

Saint Francis of Assisi (1181-1226) and Saint Thomas Aquinas (1225-1274), two great figures in the Medieval Church, still influence Catholic thinking about humanity's relationship with the natural world today. Francis, named the patron saint of ecology by Pope John Paul II in 1979, found God's presence throughout nature and emphasized the kinship between humans and animals. Orders branching from the original Franciscan trunk have generally been on the Catholic forefront in championing environmental responsibility. (French 2005)

Thomas was given special authority when Pope Leo XIII (1878-1903) officially adopted Thomism as the foundation for theological education in Catholic seminaries, colleges, and universities. Though traditionally his theological works have been read as an affirmation of human superiority over the rest of nature, more recent attention has been directed at his second organizing principle. In the "whole community of the universe," the individual is subservient to the good of the species, and the good of the species is subservient to the good of all creation. Furthermore, new readings view his works as theological condemnations of anthropogenic habitat destruction and species extinction. (French 2005)

Pope John Paul II has also engaged in expanding and articulating a Catholic theology for the environment. As the first pope to address ecological issues, John Paul II's 25-year pontificate evolved from espousing domination of nature to a dominion ethic to a more stewardship approach. True to his social focus, the former Pope's 1987 encyclical *On Social Concern*, though the first encyclical to give attention to emerging ecological problems and acknowledge a limit to humanity's dominion, still maintained that the "goods of creation" were meant to serve humans. Nevertheless, his January 1990 address, "The Ecological Crisis: A Common Responsibility," more strongly recognized stewardship of the Earth as a moral issue, proclaiming that caring for creation is a common responsibility of all peoples, and condemning the overconsumption of rich, industrialized societies. (French 2005)

Bishops' Conferences, however, have moved beyond the anthropocentrism of the Pope's message to express a more deep-rooted understanding of humans' interrelatedness with creation. They have promulgated several important pastoral letters on the topic, including a letter from the Filipino Bishops in 1988 connecting human suffering with environmental degradation and calling for the Church to end its neglect of the ecological crisis. Another example is a 1991 tract from the American Bishops called "Renewing the Earth" that expands the traditional understanding of common good to encompass "planetary common good," and "love of neighbor" to include future generations. (French 2005)

Finally, the development of several contemporary Catholic movements indicates a bottoms-up interest in supplying a theological foundation for human-environment relationships.

Some theologians are attempting to engage medieval theology's pre-modern sense of nature as a living community with post-modern ecological thinking about nature. Eco-Thomists are finding associations between Thomas' notion of conforming human action to natural law and contemporary scientific outcomes that imply the same. Through these associations, they aim to shift the understanding of natural law from an "order of reason" to the more ecological "order of nature." Others, such as Thomas Berry and Matthew Fox, are leading a movement toward "creation-centered spirituality," which celebrates God's presence in the natural world and views modern science as a revelation of creation's grandeur and beauty. Meanwhile, Liberation Theology seeks to illuminate the bond between the degradation of nature and oppression of the poor, maintaining that human liberation requires sustainable development and protection of natural ecosystems. Similarly, eco-feminism explores the connection between the oppression of women and environmental degradation. This breadth and variety of study point to Catholics' mounting interest in developing a spiritual underpinning for environmental engagement. (French 2005)

Islamic Environmental Engagement

Early ecologically-oriented Islamic thinking was rooted in the notion of *wahdat al-wujud* ("unity of being"), based in the verse, "Withersoever you turn, there is the Face of God" (Qur'an 2:115). In suggesting an alternative to the then-dominant anthropocentric viewpoint, however, this philosophy was rejected by orthodox Islam as dangerously approaching pantheism. (Foltz 2005)

Islamic environmental thinking has not figured prominently in contemporary discussions of religion and the environment, especially in the United States where the Muslim population is relatively small. Muslim writers typically characterize environmental degradation as stemming from a subset of humans (usually Westerners) taking more than their fair share of the world's resources. Others tend to react to doomsday scenarios with a fatalistic trust in God, though some Islamic environmentalists have countered that God endowed humans with rational intelligence, which should be used to recognize crises and find ways to avert impending disaster. In general, however, mainstream Islamic thought is more focused on the relationship between Allah and humanity; the world and its environmental problems are merely a passing concern. (Foltz 2005)

Despite this apparent disinterest, some Islamic environmentalists have begun to elucidate the connection between their religion and the environment through activism, policy-making, and especially writing. In recent years, many have published essays that ground a stewardship ethic in scriptural sources. They define environmentalism as a facet of the more general Qur'anic concept of stewardship (*khalifa*). In addition, the notion of *tawhid* (or unity) has been expanded from its historical interpretation as oneness of God to mean "all-inclusive," establishing more equal grounding between humans and the rest of creation in opposition to the traditional hierarchical worldview. Another concept, *fitra* ("the very nature of things"), is a Qur'anic description of Islam that also has the modern interpretation that a truly Islamic lifestyle will "naturally" be environmentally sensitive. Others have highlighted passages in the Qur'an commanding the good treatment of animals and plants

and condemning those who despoil the earth. Finally, hadith have also been explored for instructions on environmentally-conscious behavior. For example, Islamic scholar Mustafa Abu-Sway argues that a hadith enjoining Muslims from relieving themselves on public pathways or into water sources can be modernized into a prohibition against pollution. The work of these Islamic thinkers provides a promising foundation for a more thorough probing of Islam's relationship with nature. (Foltz 2005)

Faith-Based Environmental Organizations

ECOFaith is one of several dozen existing faith-based environmental organizations operating in the U.S. Due to the relatively recent emergence of the movement, however, few scholarly articles have critically studied these groups. One article (Smith and Pulver 2009), based on research conducted by Smith (2006), provides a demographic overview as well as an analysis of the organizations' motivations and priorities.

Demographics

Smith's 2006 study of U.S. faith-based environmental organizations revealed that existing groups formed predominantly in the 1990s (53%) and after (27%). Only 20% were formed prior to the 1990s, and all but one of those were formed in the 1980s. While these trends do not account for the attrition of earlier groups and so may be biased, they still may indicate that the propagation of faith-based environmental groups is a relatively recent phenomenon.

The geographical profile of these groups indicate that those that operate on a sub-national scale are predominantly based in "liberal states" (defined as those that voted for Kerry in the 2004 election), with only 11% working from "conservative states." Most operations are located in the Northeast (25%), Middle Atlantic (21%), Midwest (19%), and Pacific (19%), with far fewer organizations in the South, Southwest, and Rocky Mountain regions.

Denominationally, 44% of the organizations are, like ECOFaith, interfaith groups with members that are not solely Christian nor solely Judaic. Another 34% work with multiple denominations within the broader Christian or Judaic traditions. Only 22% focus on just a single denomination. While at first glance the organizations seem to be dominated by participants from certain denominations, hypothesis tests indicate that there is no significant difference between participation rates among Catholics, Jews, Protestants, Orthodox, and non Judeo-
Christians.

Funding

Smith identified difficulty obtaining funding as a common characteristic amongst the faith-based environmental organizations studied, with 63% stating that it was "difficult" or "very difficult" to find funding. This result is especially pertinent given that 79% of interviewed groups found their funding inadequate and most groups asserted that lack of funding strongly limited their ability to act. Of the groups that reported that they were unable to

concentrate on their top three goals, 50% cited lack of money and time as a primary reason. 21% pointed to lack of time and staff to devote to their goals, and even groups who could spent time on their goals wished they could hire more staff.

The study reported that groups typically seek financing from members and individuals, public grants, religious organizations, private faith-based foundations, private environmental foundations, and other foundations, with members and individuals providing the greatest percentage of funds (39.3%). The researcher's interviews with faith-based environmental groups uncovered challenges to obtaining funding from both religious or faith-based sources as well as secular sources. Some interviewees suggested that the mainstream religious community had not yet made the connection between faith and the environment and also posited that the environment was seen as a lower priority compared to other social causes such as poverty and hunger. This viewpoint coupled with the reality that the religious institutions are themselves consistently underfinanced likely explains the lack of funds from this quarter.

Smith suggests that lack of funding from secular foundations reflects a secular preference for projects that focus on specific issue campaigns or can provide immediate, quantifiable results. Much of the work conducted by faith-based environmental groups, however, focus on changing ethics and tend to operate on a longer timeframe with less measurable outcomes. This disconnect raises a potential barrier to receiving funding from secular sources.

Motivations

Several critics of the mainstream environmental movement have voiced concern over the movement's preoccupation with political, technical, or legal solutions while neglecting to promote a broader, more sustainable environmental ethic (Shellenberger and Nordhaus 2004, as cited in Smith and Pulver 2009). Faith-based environmental organizations with their ethical focus and moral command are therefore well-positioned to fill that void, and many of them are heeding the call. (Smith and Pulver 2009)

Smith and Pulver's research indicates that these groups view ethics-based work as integral to generating lasting environmental change. Furthermore, they see changing value systems as the particular specialty of the faith community, where influence over ethics is expectedly strong. Many of the groups' founders were motivated to start their organizations because they felt the faith community's response to environmental problems was inadequate. They saw a need to increase awareness of environmental issues among people of faith and not only organize them to act but encourage them to take leadership in solving environmental problems. Furthermore, they recognized that religion's doctrinal basis for environmental stewardship and its moral and humanitarian focus could appropriately guide the environmental movement within the faith community.

Priorities

In their study, Smith and Pulver differentiated between "issues-based" and "ethics-based" environmentalism. Issues-based environmentalism addresses specific environmental issues such as climate change or biodiversity loss and urges action on that particular issue. Ethics-based environmentalism focuses on achieving attitudinal and behavioral changes by establishing a broader ethical framework through which actions and issues can be viewed. The researchers found that 76% of the groups studied tended to believe more strongly in the importance of ethics-based work, with only two of forty-two groups leaning heavily toward issues-based work. Furthermore, those that engaged in ethics-based work outnumbered those undertaking issues-based work by two to four times, depending on the examined variable.

Nearly all participants in the Smith and Pulver study, however, believed that ethics-based and issues-based work should be complementary. None of the groups engaged in consciousness-raising or educational activities without also tying them to specific issues and actions, from lifestyle changes to political advocacy or activism. Furthermore, groups recognized that ethics-based work occurs on a long timeframe and that some environmental issues may require immediate action. Those situations compel the groups to engage in issues-based work, though the products of this type of work are widely seen by faith-based environmental organizations as less permanent than the products from ethics-based work.

Though perhaps more permanent, the results from ethics-based work are less calculable. Aside from personal testimonies directly reported to the faith-based environmental group, there are few objective ways of measuring ethics-based efforts as tracing, quantifying, and sometimes even recognizing changes in ethics is inherently difficult. While issues-based work is typically more quantifiable and hence more readily funded, Smith (2006) noted that the groups seem little swayed to change their goals or focus to access more money, believing that their true strength lies in ethics-based work. The researchers therefore stress the importance of developing measures to assess the effectiveness of ethics-based work, both to attract funders as well as to facilitate self-evaluation. Finding a suitable set of metrics may well be one of the most significant challenges facing organizations undertaking ethics-based environmentalism. (Smith and Pulver 2009)

Greening of Worship Buildings

Greenhouse Gas Emission Accounting

Via the release of greenhouse gases (GHGs), humans have contributed to the current and future net warming of the earth's atmosphere.[164] Scientists deem carbon dioxide (CO_2) to be the most important contributor to net warming, identifying the combustion of fossil fuels as its primary source.[165] In the absence of overarching global treaties and action plans to address climate change, local and regional organizations must lead in reducing GHG emissions into the atmosphere.

Studies have characterized technology changes that contribute to mitigating climate change[166] as "reducing demand for carbon-intensive products, increasing energy efficiency,

and switching to low-carbon technologies."[167] Research shows that the buildings sector in particular has the potential to reduce CO_2 emissions over 40% at costs below $\$20/tCO_2$.[168] With 350,000 religious organizations in the United States[169] and an estimated 50,000 congregations in California,[170] the number of worship buildings in the United States encompasses a significant number of buildings and therefore has the potential to reduce GHG emissions considerably. Although ECOFaith itself has 21 organizations under its umbrella, the scope and applicability of ECOFaith's measures and actions could be replicated across an extremely large community.

In order to assess how a particular building has increased its energy efficiency, an organization must conduct a baseline assessment. This GHG inventory is an accounting of GHGs "emitted to or removed from the atmosphere over a period of time."[171] The most widely-used international standard to conduct greenhouse gas accounting is the Greenhouse Gas Protocol.[172] The protocol provides a framework of reporting standards and calculation tools that organizations can use to establish baseline GHG emissions and voluntarily report continuing emissions and mitigation efforts.[173] The California Climate Action Registry (now known as The Climate Registry) developed a California-specific protocol based on the GHG Protocol.[174] The GHG Protocol and the Climate Registry accounting tool, however, operates on a coarser level than ECOFaith would find useful, since it is designed primarily for corporations and community-level accounting. Nonetheless, since the GHG Protocol and the Climate Registry procedures give a solid framework within which to establish our own methods for GHG accounting in the worship buildings, we intend to use the GHG Protocol as the basis for conducting our own assessment of baseline GHGs and subsequent reductions. Because the ECOFaith pilot projects occurred without setting a baseline, we will use pre-project electricity, water, and gas bills to establish GHG baselines for these projects. For subsequent churches engaging in projects, we intend to provide a tool for these congregations to establish their own baseline.

<u>The Role of Green Building and Retrofitting</u>

Buildings account for approximately 40% of all energy usage internationally; in the temperate region of Santa Barbara where heating and cooling loads are minimal, buildings still generate approximately 37% of energy use.[175] Countering global climate change must therefore include changing the way the populace designs, constructs, and retrofits the built environment in order to more efficiently use energy and water and to minimize this enormous source of greenhouse gas emissions.[176] Policies at the federal, state, and local level have strived to achieve this goal in recent years and to put into place financial incentives to motivate and support these initiatives. A barrier that religious institutions face when retrofitting, however, is a lack of funding. Moreover, because faith-based institutions are 501(c)3 tax-exempt non-profits, they cannot take advantage of incentives that rely on tax credits. Recently, however, more of the policies that promote improved building performance now allow not-for-profit organizations to take advantage of available incentives. Additionally, congregation members could take advantage of eligible incentives despite the institution itself not qualifying for a tax rebate.

Rating and certification systems for energy efficient building and design practices, such as the US Green Building Council's LEED program, provide additional motivation for utilizing green building practices. The exponential growth in participation in these voluntary programs indicates not only the growing public concern with climate change and energy efficiency, but also the enhanced social and economic value placed on individuals, businesses, and communities that take responsible action to improve energy efficiency.[177] While factors such as age of buildings, atypical occupancy patterns, or lack of financial resources for commissioning and auditing may preclude ECOFaith's participating institutions from achieving certification, ECOFaith can utilize many valuable and technically applicable elements from each of these rating systems to improve their process, assess their projects and perhaps implement a small-scale certification system of their own.[178]

Federal Policy

In June 2009, the House passed the **American Clean Energy and Security Act** (Waxman-Markey Bill HR 2454), which focuses on five aspects: clean energy, energy efficiency, reducing global warming pollution, transitioning to a clean energy economy and agriculture and forestry related offsets. While as of this writing the Senate has yet to pass the corresponding Kerry-Lieberman bill, a final bill should result in considerable actions for energy efficiency related to building, lighting, appliance, and vehicle energy efficiency programs. The bill sets target aggregate emissions reductions for GHGs 17% below 2005 levels in 2020, 42% in 2030 and a monumental reduction of 83% by 2050.[179] The final form and implications of this bill, however, are largely dependent upon the outcome of the 2010 elections to the Senate.

- Section 202 of the bill would establish a building retrofit program (REEP) for residential and nonresidential buildings. The state-administered programs would fund the implementation, incentivizing, and initial capital for retrofits and utility-operated retrofit programs.
- Section 211 deals with lighting efficiency standards (mainly outdoor lighting) and would require that portable light fixtures be an Energy Star rated fluorescent, an LED or a CFL.
- Section 264 authorizes grants to private and non-profit organizations for the purpose of increasing the flow of capital and benefits to low-income communities, minority- and women-owned businesses and other projects located in low-income communities in order to reduce environmental degradation, foster energy conservation and efficiency, and create job and business opportunities for local residents.

California State Policy

The Global Warming Solutions Act, AB 32 is a bill passed in 2006 that aims to reduce greenhouse gas emissions to 1990 levels by approximately 15% from current emissions levels. The scoping plan details numerous strategies to achieve this goal, including the implementation of a cap-and-trade program, large reductions in transportation-related

GHG emissions, an improved electricity and energy efficiency standard, auditing of the state's largest industrial emitters, reduction and capture of refrigerants that have a high Global Warming Potential, preservation of forests for sequestration measures, improved efficiency in agricultural practices, and better management of waste and recycling in order to reduce methane emissions from landfills.[180]

- The Electricity and Energy section of AB 32 promotes a number of priorities: 33% of energy generation from renewable sources by 2020, bolstered use of combined heat and power, the 1 Million Solar Roofs campaign, promotion of solar hot water heating, green building practices and water efficiency initiatives. [181]
- The scoping plan upholds that energy efficiency is the greatest energy resource, and that investment in greening existing buildings can save business and property owners up to $0.60 a square foot, reducing per-square-foot energy costs by as much as 40%.[182]

Many of the implementation procedures of this bill are not finalized, however, and the upcoming state election could significantly impact them.

Title 24 is the California Building Standards Code that sets regulations governing the design and construction of all buildings, associated facilities and equipment. California first adopted the standards in 1978 and the State Legislature amends them periodically. The most recent 2008 standards went into effect January 1, 2010, and include changes to comply with AB 32 such as:

- Compliance through participation in New Solar Homes Partnership
- Added cool roof requirement for new roofs and reroofing of steep-sloped roofs
- Upgraded insulation requirements for roofs, walls and floors
- New and expanded credit requirements for energy efficient lighting, duct sealing, ventilation, building envelope, etc.[183]

Despite these amendments, many environmental groups voice concern that Title 24's minimum efficiency standards are not stringent enough and encourage local municipalities to enact ordinances that hold contractors and developers to an even higher standard.

California passed **AB 811** in 2008. This bill establishes financial districts for renewable energy and building energy efficiency. Under it, property owners can take out low-interest loans to complete solar installation or energy efficiency retrofits. Loans are paid back through property taxes. **AB 474** expands AB 811 to cover water conservation measures as well.[184]

CPUC Long-term Energy Efficiency Strategic Plan (CLEESP, 2008) lists strategies and target goals to improve energy efficiency such as a reduction of 20% by 2015 and 40% by 2020 through improvements in HVAC, building envelope, lighting, heating, water heating and electronic and appliance plug loads.[185]

<u>Regional Policy</u>

The Community Environmental Council, based in Santa Barbara, established the **Fossil Free by '33** campaign in 2004 in order to motivate local citizens to do their part in helping

California achieve the targets set forth in AB 32 and eliminate our dependence on GHG-emitting fossil fuels. They work closely with community groups to promote energy efficiency and conservation, and recognize the importance of gaining the support and motivating the action of faith-based organizations such as ECOFaith in order to achieve this communal goal.

Applicable Financial Incentives

The **CaliforniaFIRST Program** is a statewide Property Assessed Clean Energy program authorized by AB 811 and AB 474 to provide financing for energy efficiency and renewable energy projects on residential and commercial properties. With this program, the property owner repays the cost of a clean energy project (between $5000 and $75,000) through a line item on their property tax bill with a repayment between five and twenty years.

EmPower Santa Barbara is a brand-new program that will provide upfront financing for county residents and businesses to green their property through a voluntary property assessment and improvements/retrofits such as attic/wall insulation, duct repair, lighting controls, HVAC systems, door/window improvements and sealings, tankless or solar thermal water heaters, low flow faucets and showerheads, and solar PVs. In line with AB 811, this low-cost financing would be paid back over 20 years as part of the property owner's property tax assessment.[186]

The CPUC's **California Solar Initiative (CSI)** is a small-scale feed-in tariff that provides considerable rebates for the installation of solar photovoltaic systems. Both the faith buildings as well as congregates who are homeowners are eligible for this incentive.[187]

Introductory Green Building Best Practices Research

The CEC body of research provides us with a solid start on our research for the development of a cost-benefit analysis tool identifying retrofitting priorities. Their studies have concluded that some of the most cost-effective energy efficiency retrofit measures for residential & commercial buildings to take are installing the following:

1. High efficiency tube fluorescent lighting (i.e. T8/electronic ballasts with reflectors)
2. Double pane windows
3. CFLs (due to the aggregate number, switching to these would result in by far the highest energy and cost savings overall)
4. High efficiency washers, freezers, and refrigerators
5. Energy Star-certified refrigerators
6. Heat pump space and water heaters (with insulation for the water heaters)
7. Automated lighting systems with occupancy sensors
8. Office equipment power management
9. Low-flow toilets, showerheads and faucet aerators[188]

The CEC also identified the most effective conservation measures that both individuals and businesses can take to significantly contribute to energy savings in our region. These simple, actionable lifestyle changes are just a few of the many that can be integrated into ECOFaith's education plan in the promotion of energy efficiency amongst congregation members. These include setting the water heater thermostat to 120 degrees, setting heating thermostats to 68 degrees when home and lower when away, closing heating vents in rarely used or unused rooms, turning off lights upon leaving a room, using energy-saving settings on appliances, air-drying clothing, and fixing leaky faucets and toilets.[189,190]

Green Building Rating Systems

The U.S. Green Building Council developed and maintains the **Leadership in Energy and Environmental Design (LEED)** rating process, the dominant national standard in green building practices and certification. Many of the approaches encouraged through the LEED certification process take advantage of the synergistic effects on energy use reduction. Some of the credit strategies that ECOFaith could utilize are:

- Establishing an alternative transportation plan
- Reducing heat island effects (e.g. through landscaping, permeable paving, green roofs, etc.)
- Improving indoor plumbing fixture and fitting efficiency
- Planting water-efficient landscaping
- Implementing performance measurements such as system level metering (i.e., determining which appliances are using the most electricity)
- Evaluating on-site & off-site renewable energy options
- Optimizing energy efficiency performance using energy modeling software
- Creating a sustainable purchasing policy and solid waste management policy
- Improving lighting
- Establishing a high-performance cleaning program[191]

While most of ECOFaith's participating members will not aim to achieve LEED certification for their worship buildings due to its scrupulous standards and in-depth process, the LEED for Existing Buildings: Operations and Maintenance framework may be an excellent tool to follow in determining Best Practices for building retrofits component of ECOFaith's process.

Carbon Calculators and Other Measurement Tools

A number of programs exist for businesses and individuals to establish baseline CO_2 equivalent emissions; as a group, these tools are known as "carbon footprint calculators." Some of the tools, which are almost all web-based calculators, seek to estimate an individual's or a business's carbon footprint through "an estimate of the carbon dioxide emissions that an individual [or business] is directly responsible for over a given period."[192] A study of ten of these US-based carbon calculators found that:

Although these calculators employ similar approaches to CO_2 estimation, their results often vary, even when using uniform inputs. These variations may be due to differences in calculating methodologies, behavioral estimates, conversion factors, or other sources. However, the lack of transparency makes it difficult to determine the specific reasons for these variations and to assess the accuracy and relevance of the calculations.[193]

The lack of transparency in existing carbon calculators and seeming irrelevancy of many calculators for faith-based organizations led us to conduct our own assessment of these tools in relation to our proposed software. We looked at three carbon calculators that seemed most applicable to faith-based institutions and explore their strengths and weaknesses. These tools are explored elsewhere in this report; please see APPENDIX IV: Other Evaluated Programs for this entire review

Greening of Congregations

Connections between Environmental Awareness, Values, and Behavior

According to its mission statement, one of ECOFaith's goals is to "educate and encourage [its] congregations to adopt environmentally sustainable lifestyles as a dimension of spiritual practice." Popular movements describe environmentally friendly behavior with the slogan "think globally, act locally," meaning that the small-scale, day to day choices made by individuals and groups can add up to achieve global protection. ECOFaith educates its community members in order to promote a better understanding of environmental threats and encourage a willingness to reduce those threats as part of a spiritual responsibility towards Creation. This section explores sociological behavior models that show that education based entirely on facts may not successfully shape behavior and explains how education coupled with an appeal to value systems may cause significant and lasting positive changes.

Many studies have investigated the effects of education on environmentally friendly behavior changes in individuals. Behavior models from the 1970s generally assumed a linear progression where an increase in environmental awareness through education leads to an increase in pro-environment attitudes, which in turn leads to increase in pro-environment behavior.[194] Research has since shown that the correlation between improved awareness and environmental behavior is weak; an individual will not necessarily change her lifestyle to be more environmentally friendly after she learns how her actions impact the earth. Carter (2008) examined this relationship by evaluating the actions by participants in a conference on environmental issues both before and after the event.[195] While her results showed some increase in environmentally favorable behavior following the conference, the low survey response rate, self-reporting bias, and the conference's original self-selection bias made it impossible to form a statistically relevant conclusion on the source or size of the change. Her results showed a weak effect of education on behavior, even less strong than many would-be educators would consider as justifying their time and resources.

With the education-to-behavior linear model weakened, two new questions emerge. First, if education does not have a direct impact on behavior, does it at least have an indirect effect? Second, if education and issue awareness are not the main factors in driving behavior, what are? Several studies have explored these questions. Barr (2003) investigated recycling and waste minimization in a residential area of the UK.[196] While he found no significant correlation between these specific behaviors and general global environmental awareness, he did find a high correlation between more specialized knowledge about what is recyclable and the actual act of recycling. The greatest drivers of recycling behavior were convenience (areas with curbside pickup had much higher recycling rates than areas where residents had to take material to a central location) and social pressure (visible recycling bins and general social acceptance of the activity makes recycling much more common than waste minimization, which is less obvious to others). Barr's results suggest that education can play a role in driving behavior, but administrators must specifically tailor the education to the desired action rather than focus on general or global needs, and they must show that the behaviors are socially acceptable.

Rajecki (1982) parallels Barr's conclusion with a list of factors that can reduce environmental behavior even when the individual is well educated on the issue: 1) when an individual gains knowledge indirectly rather than through concrete experience; 2) when an individual gains knowledge in the somewhat distant past; 3) when the desired behavior conflicts with cultural or personal norms; or 4) when the knowledge is broad and vague and does not tie to a specific activity.[197] Azjen and Fishbein (1980) also support the idea that social norms play a major role in defining individual behavior even when general values are more positive; a person may feel that climate change is a serious threat but is still unlikely to stop driving her car as long as doing so is socially acceptable.[198] Blake (1999) states that a person's environmental concern can only translate into environmental behavior if she can overcome three categories of potential barriers.[199] First are individual barriers, such as motivation and level of interest; second are responsibility barriers where the individual must feel that she has both the means and the responsibility to act; and third are practicality barriers, where logistics such as time, money and resources prevent the change in question. If any of these barriers are present, the behavior will not occur even when the person is well informed and intends to act.

The studies we have examined thus far suggest that education best shapes behavior change when it is specific and focused on the action in question rather than made up of "big picture" ideas. Research also suggests that issue awareness is only one factor that shapes behavior; others include convenience of the action, the individual's feeling of responsibility and influence, and social pressure. Barriers such as a lack of time, money, or power can block even the most interested individuals, so a successful education plan should also include information on available resources to reduce these burdens. As a faith-based institution, however, ECOFaith has the power to inspire people to change their behavior not only through education and reason but also by appealing to their personal value systems. Two studies suggest a two-dimensional axis model to describe individual value systems in regards to environmental behavior.[200] The first axis ranges from "conservation" to "open to change" and the second from "self-transcendence" to "self-enhancement"; each quadrant is further divided into motivation types:

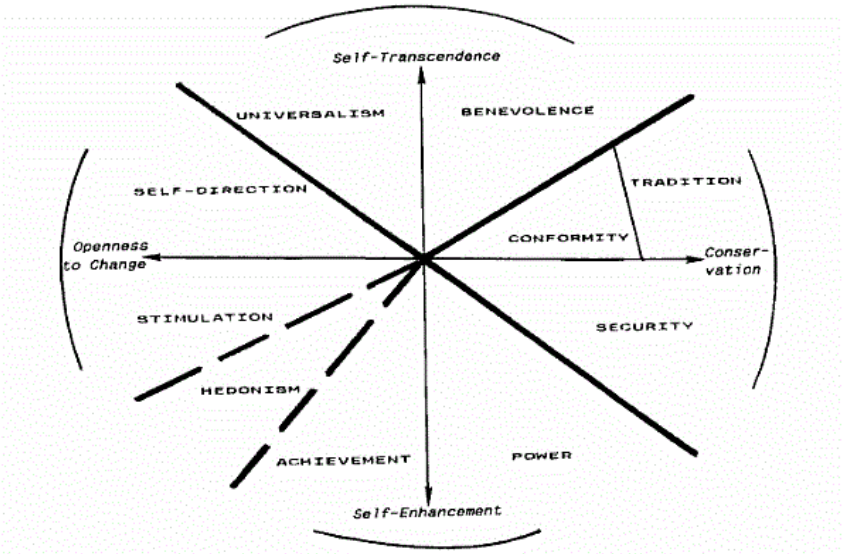


Fig. 1: Schwartz (1992) theoretical model of motivational type and higher-order value types[201]

The researchers assigned individuals to a motivation type based on how strongly they personally identified and prioritized values such as "choosing own goals," "inner harmony," "social power," et cetera. These studies both found that individuals who fall into the open to change/self-transcendence quadrant are significantly more likely to engage in environmentally friendly behavior. As a faith-based environmental organization, ECOFaith can appeal to its members to move into this quadrant if they are not already by connecting environmental responsibility and the need for social change to their spiritual faith. This tactic increases the chance of successfully changing member behavior, particularly when integrated with a well-designed education program as described above.

If ECOFaith carefully designs its educational process to harmonize with congregation members' motivations as faith-based individuals, it can be a powerful tool in encouraging and improving environmental behavior. Therefore, ECOFaith congregation leaders should consider these models and observations when designing their education plan. The ideal system would provide specific, action-related information, where educators would present information in such a way that people perceive the encouraged behavior to be socially acceptable; remove potential barriers by showing how changes can be economically beneficial; and fit within reasonable time and resource constraints. To be effective as a faith-based organization, ECOFaith must conduct all the above within a larger, holistic framework centered around Creation. The potential for such an organization to effect deep and lasting behavior change is significant, and its work can help communities achieve a new environmental consciousness.

<u>Sociological Methods for Evaluating Education Programs</u>

In developing our methodology for evaluating the ECOFaith education programs, we explored a number of qualitative sociological techniques, including observations, interviews, focus groups, and surveys. The following section reviews these methods and discusses their relevance to our project.

Because the pilot project education programs already took place, we cannot use real-time observations to gather assessment information. Moreover, because this technique typically requires well-qualified, extensively-trained, objective observers,[202] we do not believe it is an appropriate method for ECOFaith to evaluate its own performance.

In-depth personal interviews, on the other hand, can yield rich data and allow the interviewer the flexibility to explore topics in depth.[203] Conducting interviews, however, can be extremely time-consuming and may not be appropriate given our and ECOFaith's time constraints. Furthermore, the volume and detail of information from each individual interview may be too large to be manageable or useful[204] for an organization and community already strapped for time and resources.

A third option is to hold focus groups. Focus groups are helpful in identifying and defining project problems, strengths, weaknesses, and recommendations as well as obtaining perceptions of project outcomes and impacts and generating new ideas. Their advantage over interviews is that they are less time-intensive and can foster group interaction that may stimulate richer responses and highlight conflicting opinions.[205] While interviews can be a more appropriate tool to understand how attitudes and behaviors link together on an individual basis, we do not feel this benefit justifies the extra time required, nor do we see it as more important than the benefits offered by focus groups.

In conducting focus groups, practitioners must make a variety of decisions about group structure and dynamics to optimize for their research question. Such decisions include the size, makeup and characteristics, and quantity of focus groups as well as the way in which moderators should direct the flow of conversation. Focus groups typically last 1-2 hours and number between 4-15 participants, though experts recommend a group size of 6-10[206]—large enough to keep discussion flowing but small enough so that all participants get a chance to speak.[207] In terms of the type of participants to recruit, the group members should neither be too heterogeneous as to make them uncomfortable, nor too homogenous as to prevent a diversity of opinions.[208] Generally, groups should be homogenous in the characteristics that affect the discussed topic and heterogeneous in features that are irrelevant to it, with the aim of representing every segment of the population related to the research question.[209] Characteristics researchers should consider include respondents' social class, age, cultural background, gender, and familiarity with the topic.[210] Experts are divided on whether participants in a focus group should have pre-existing social connections or should be as unknown to each other as possible. Most maintain that pre-existing relationships between group members can prevent participants from talking freely and frankly with each other,[211] but some assert that relationships allow people to better relate to each other's comments and correct each other's contradictions.[212] In any case, the ECOFaith focus groups may not be able to avoid some degree of group member familiarity as participants will come from the same congregation.

Another key set of questions revolve around the focus group topic guide and group moderation. The topic guide is a list of topics or question areas that the focus group should cover[213] and can range from a list of structured questions that the moderator should ask to a broad set of topics to which the focus group should respond.[214] The content of the topic guide will establish how the focus group will address the research question, so researchers should give considerable thought to its development. Researchers should also decide how to moderate and record the focus group sessions. Some experts recommend one moderator to facilitate group discussion and another to take notes and ensure that recording devices function properly.[215] Others, however, suggest that having a note-taker or observer can inhibit participation and responses as group members often perceive that person as an evaluator.[216]

The sociological literature also provides a set of best practices for recruiting for, moderating, and analyzing data from focus groups. When recruiting, focus group practitioners should explain the reason for the study but only give a vague idea of the theme to be discussed so that candidates do not arrive with prefabricated opinions.[217] To boost attendance, researchers can send written reminders as well as confirm by phone a few days prior to the meeting, though they should also recruit 20% more people than they expect to need in case of absences.[218] Incentives, such as food or other forms of compensation, can also increase participation rates.[219] During the meeting, moderators should promote debate, encourage participation by all group members, probe for details, move the conversation forward when it flags, keep the session focused, remain neutral, and avoid giving personal opinions.[220] Most of all, moderators must maintain consistency across focus groups.[221] Once the data has been collected, researchers should listen repeatedly to the complete discourse to gain an impression of the conversations as a whole, then group the data into identified themes, and finally synthesize the result from each theme, selecting quotations that capture the main ideas expressed in the focus groups.[222]

While we can gather information from a larger number of participants with focus groups rather than individual interviews, it is still not typically possible to generalize from focus group data.[223] Therefore, we would like, time permitting, to get a more representative if less in-depth sample of the entire ECOFaith congregation. To this end, a survey, which can gather a small amount of information from a large number of people,[224] may be the most appropriate mechanism. Furthermore, results from the focus groups can help us determine the most effective questions to ask on a survey.[225]

Surveys are a huge undertaking and require a significant amount of time and resources. A typical questionnaire can take up to seven weeks to develop and administer.[226] We address the major steps for conducting a survey in our Methodology and Deliverables section.

Primary concerns for quantitative data collection methods such as surveys include the problems of sampling error, sample bias, and response bias. Sampling error results from using a sample rather than the entire population under study. While it is nearly impossible to sample the entire population, maximizing sample size can reduce sampling error. Sample bias occurs when members of the sample provide incomplete information or do not

participate. Two methods to correct for this type of error are to repeatedly attempt to reach out to non-respondents or to compare the characteristics of non-respondents with respondents to describe any differences that may exist. Finally, discrepancies between true opinions or behaviors and survey responses can cause response bias. These deviations may result from participants misunderstanding the questions or choosing not to answer truthfully. Focus groups and pilot testing questionnaires can help to mitigate this type of error.[227]

APPENDIX III

Pilot Projects: Greenhouse Gas Reductions, Utility Bills, and Pledge Results

Pilot Project GHG Reductions

Grace Lutheran	
Replaced 10 incandescent bulbs with CFL bulbs	10 bulbs * 253 CO_2e/5 bulbs = 506 lb of CO_2e reduced annually[1]
Islamic Society of Santa Barbara	
Projected LEED Silver building (to be built in the future, as compared with an average building)	Building a LEED Silver worship building (LEED buildings save 30-50% of energy[2] * electricity projected at 4.9 kWh/square foot/year[3] * 0.884 lb of CO_2e/kWh of electricity[4] * 7,572 square feet = 9,840 to 16,400 lb of CO_2e reduced annually)
Second Baptist Church	
Replaced 3 exit lights in Sanctuary from incandescent to LED	3 exit lights * 1016 kWh saved per year[6] * 0.884 lb of CO_2e per kWh_4 = 2,694 lb of CO_2e reduced annually)
Replaced lamps and ballast in fluorescent lights	50 kWh saved per year[5] * 0.884 lb of CO_2e per kWh = 44 lb of CO_2e reduced annually
Insulated water heater and pipes	134 lb of CO_2e reduced annually[1]
Unplugged 2nd refrigerator when not in use	378 lb of CO_2e saved per fridge per year[1] * unused 50% of the time[6] = 189 lb of CO_2e reduced annually
Holy Cross Catholic Church	
Installed 2 waterless urinals in the renovated bathrooms of the parish hall	Approximately 1 gallon saved per use[7] * 250 male parishioners per week[8] * 25% of parishioners who use the urinal[8] * 0.003 lb of CO_2e per gallon[9] * 52 weeks per year = 10 lb of CO_2e reduced annually and 3,250 gallons of water saved
Installed 4 low-flow toilets in the renovated bathrooms of the parish hall	Approximately 2.2 gallons saved per use[10] * 250 female parishioners per week[8] * 25% of parishioners who use the toilet[8] * 0.003 lb of CO_2e per gallon[9] * 52 weeks per year = 21 lb of CO_2e reduced annually and 7,150 gallons of water saved
Replaced two old furnaces with efficient models	2 furnaces * 280 lb of CO_2e reduced per furnace[1] = 560 lb of CO_2e reduced annually

[1] Community Environmental Council. "Get Energized Pledge." Accessible online at: <http://www.getenergized.org/takepledge>

[2] Hedderman, Domini. "Inspiring Buildings to Save Energy: Taking the LEED." *Cooperator*. Accessed at: < http://www.cooperator.com/articles/1492/1/Inspiring-Buildings-to-Save-Energy/Page1.html>

[3] California Climate Action Registry General Reporting Protocol v. 3.1. (2009). "Annual Electricity Intensity Based On Principal Building Activity ." accessed at: < http://www.climateregistry.org/resources/docs/protocols/grp/GRP_3.1_January2009.pdf>

[4] In Santa Barbara, CO_2 emissions for electricity are 0.884 lb/kWh, assuming mix of coal and natural gas from SCE and no carbon emissions from renewable energy and nuclear. Source: Nichols, S. et al. (2010). Synergistic Energy

and Water Conservation Strategies for the Commercial Sector. Bren School of Environmental Science & Management. Accessed at: < http://fiesta.bren.ucsb.edu/~synergy/Synergy_FinalReport.pdf>

[5] Estimate, Second Baptist Pilot Project Energy Audit. Accessed at: < http://ecofaith-sb.org/wordpress/wp-content/uploads/2010/05/Part5_2ndBabtist.pdf>

[6] *Ibid*.

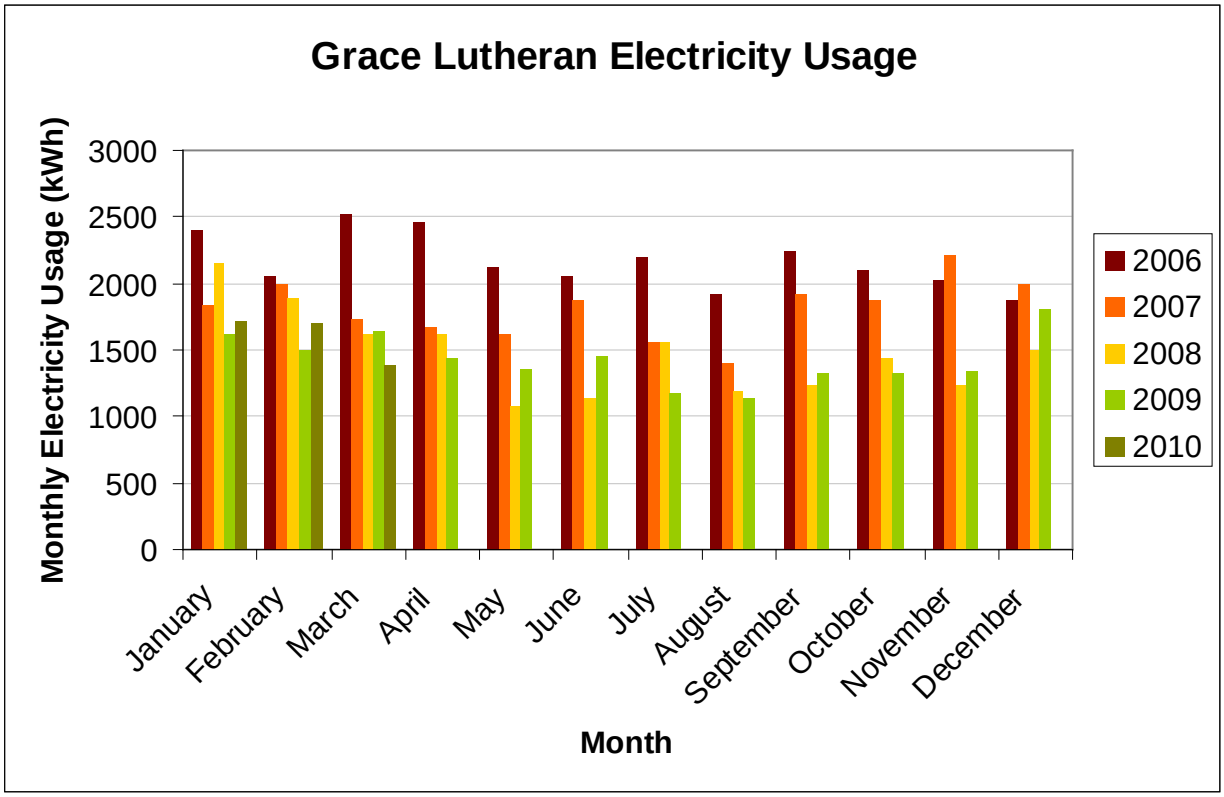
[7] A waterless urinal saves ~ 1 gallon/flush. Source: City of Portland, OR, Office of Planning and Sustainability. "Waterless Urinals." N.d.p. Accessed at: <http://www.portlandonline.com/bps/index.cfm?a=116075&c=42121>

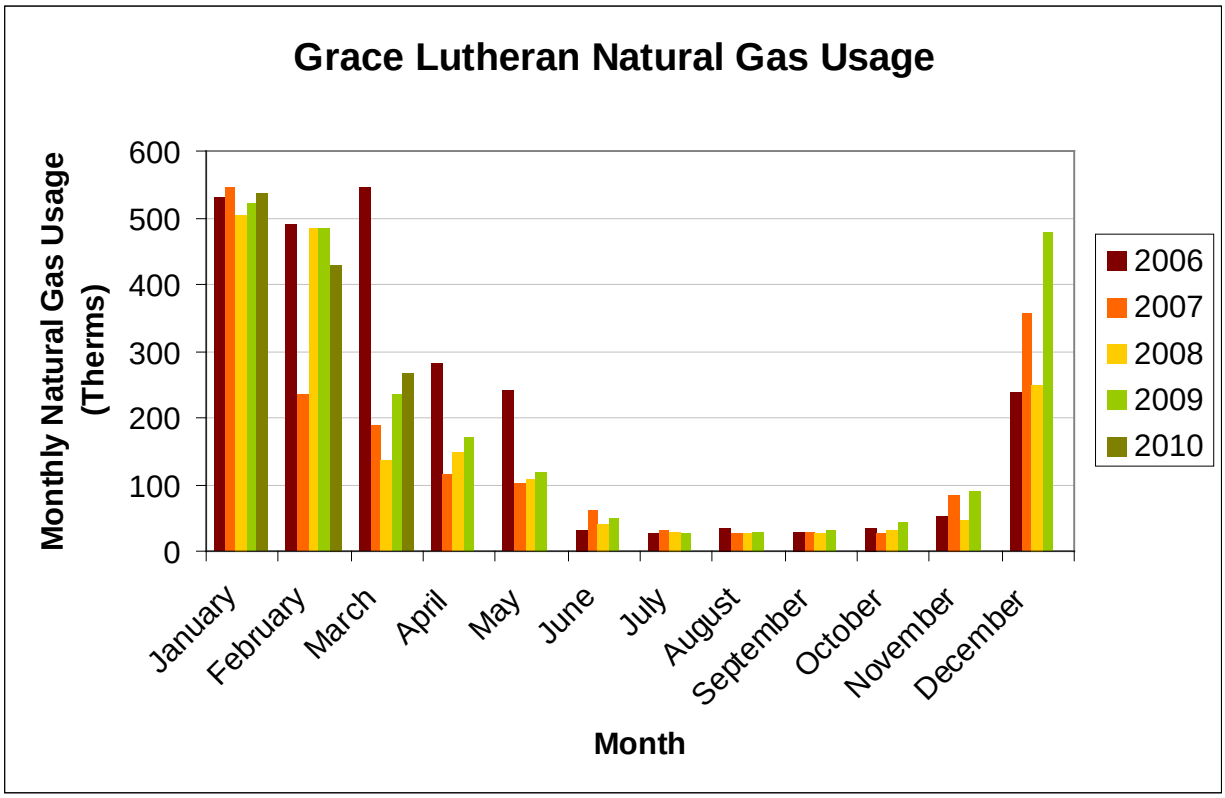
[8] Estimation based on personal communication with Church personnel.

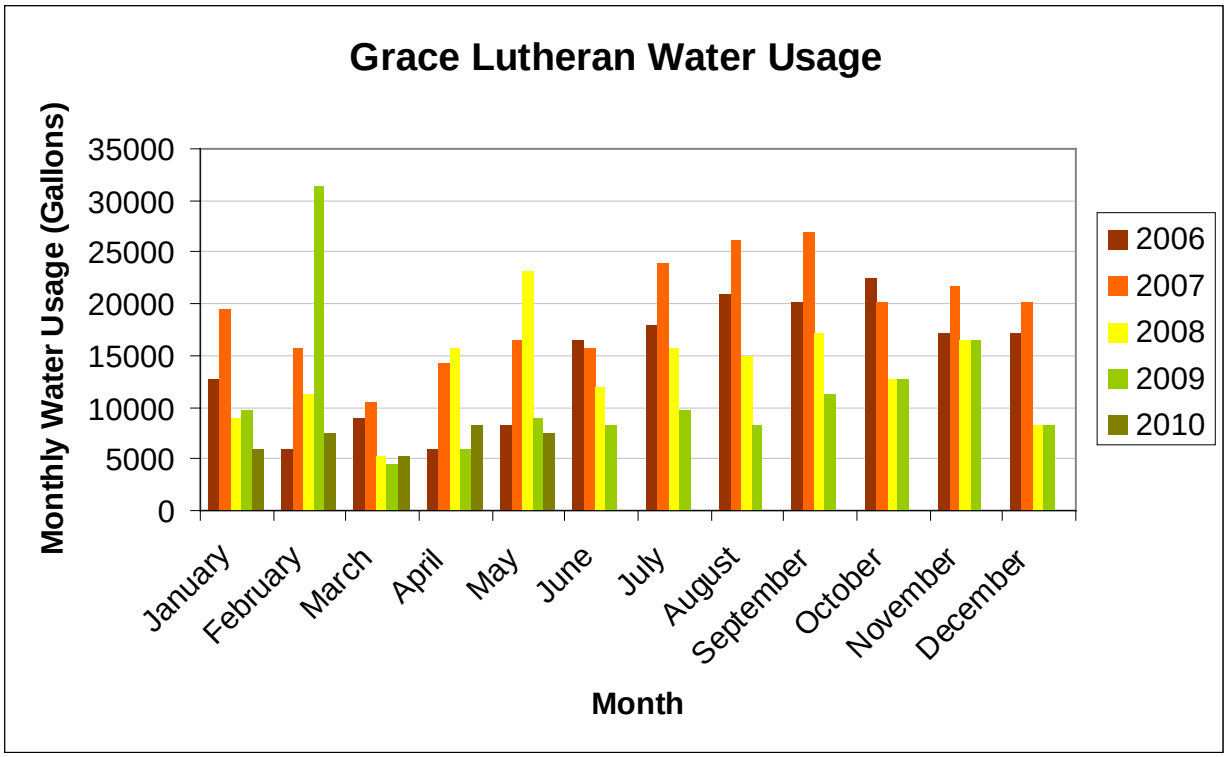
[9] Assumption is that in Santa Barbara, 1 gallon of water saved saves 0.003 lb/CO_2. Source: Nichols, S. et al. (2010). Synergistic Energy and Water Conservation Strategies for the Commercial Sector. Bren School of Environmental Science & Management. Accessed at: < http://fiesta.bren.ucsb.edu/~synergy/Synergy_FinalReport.pdf>

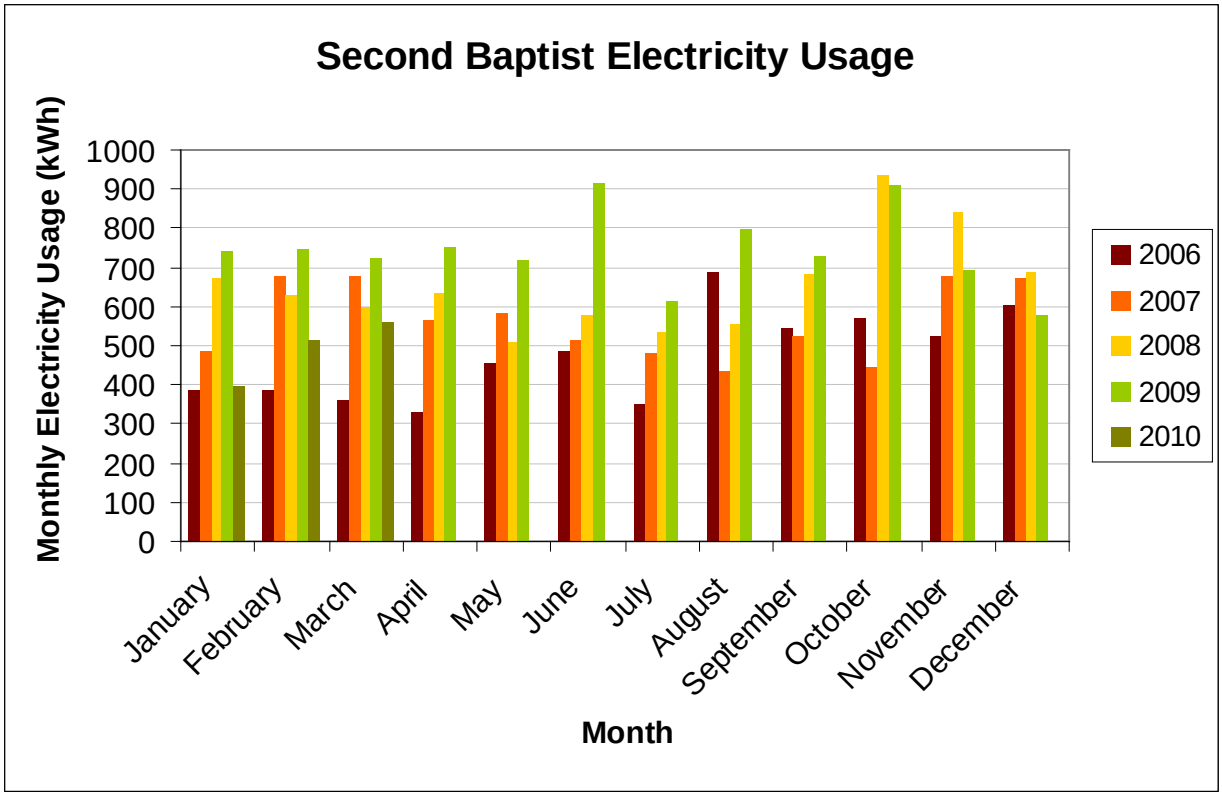
[10] Low-flow toilets save ~1.9-3.4 gallons/flush (Source: <http://www.americanstandard-us.com/pressroom/10-years-after-low-flow-toilet-regulations-went-into-effect-plumbing-innovations-make-major-inroads-in-efficiency-flushability/>), or 2.2-5.7 gallons/flush (Community Environmental Council Get Energized Pledge); we chose 2.2 gallons/flush.

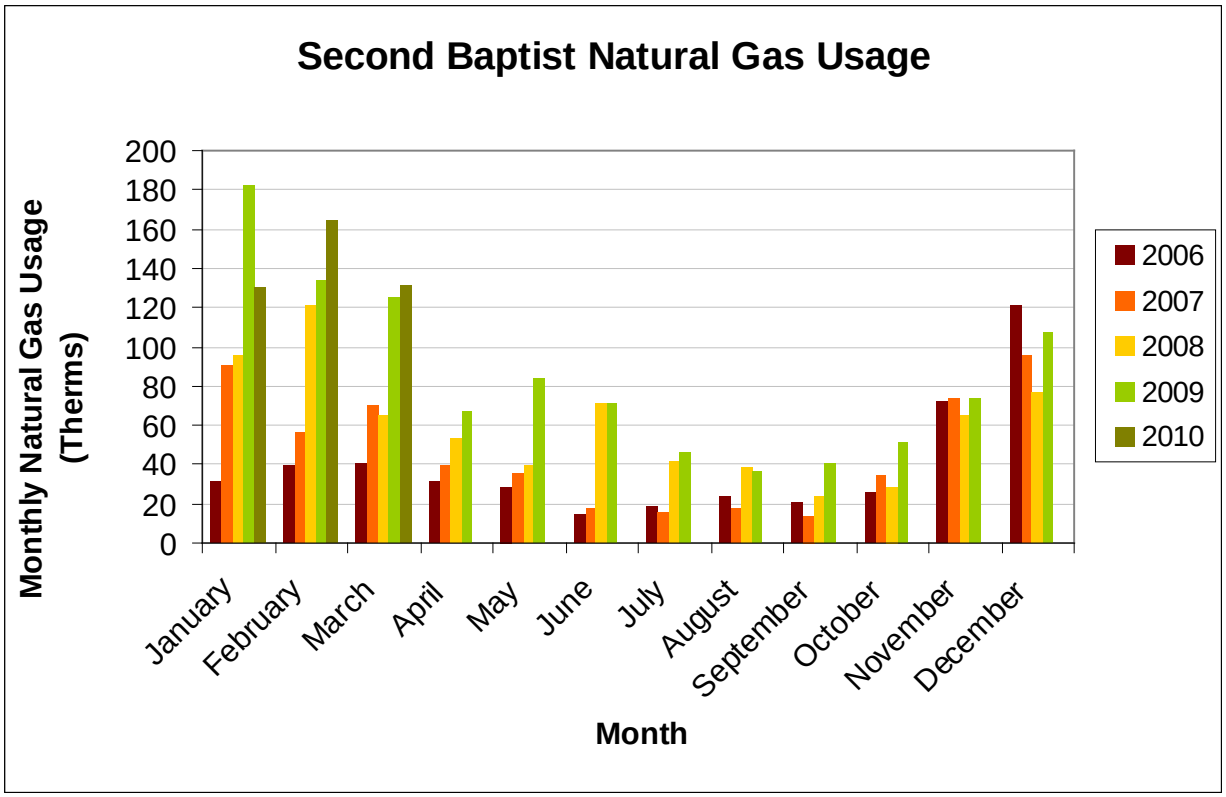
Utility Use, by Pilot Project Congregation

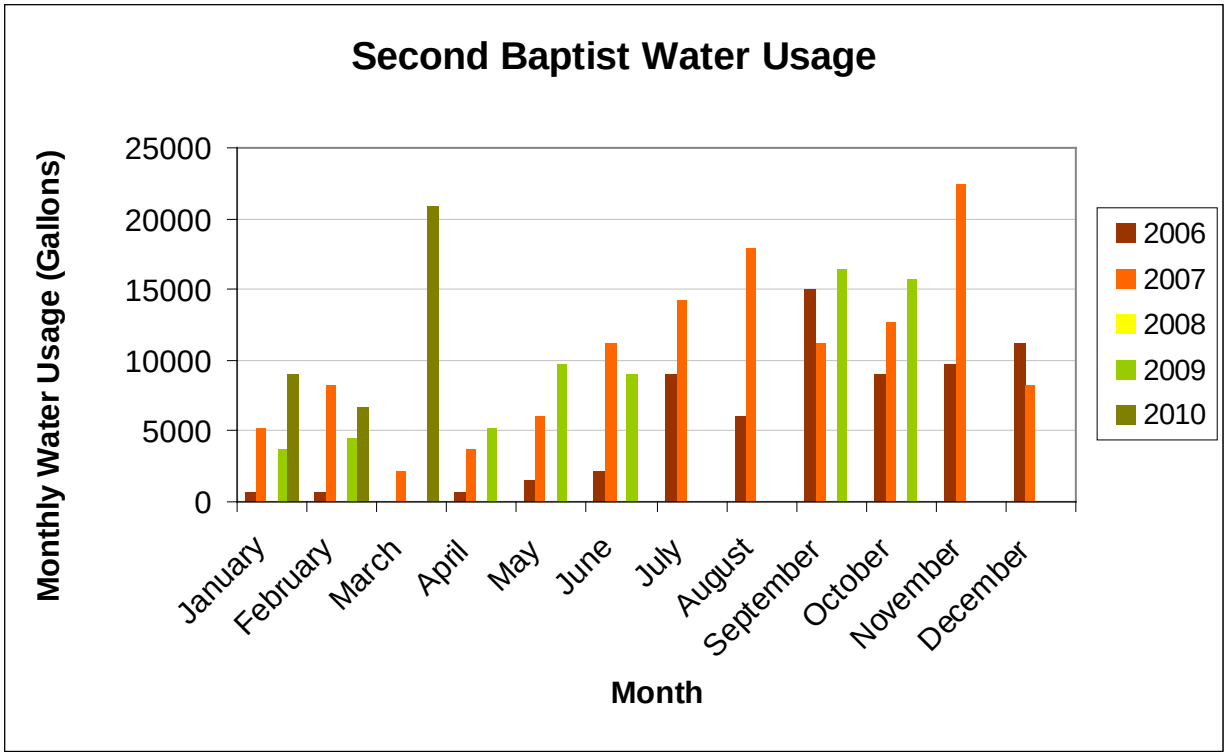


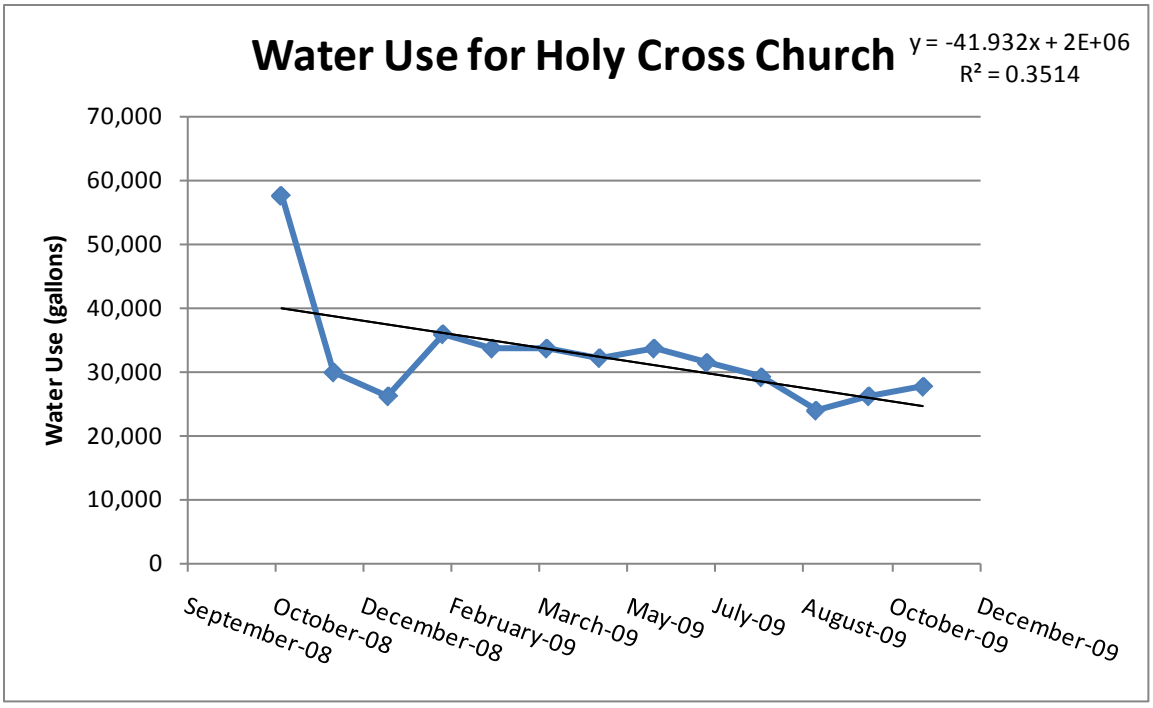


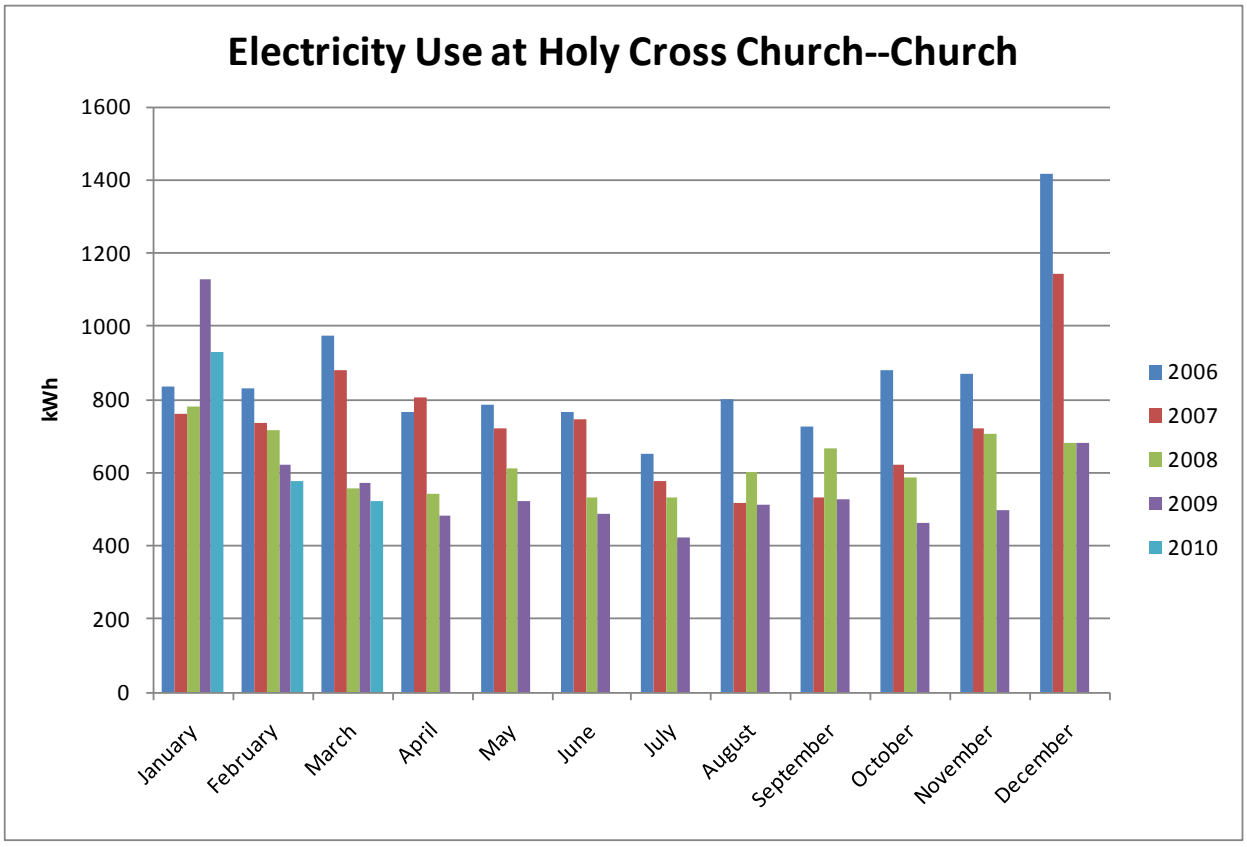

Grace Lutheran Water Usage
Monthly Water Usage (Gallons)
35000
30000
25000
20000
15000
10000
5000
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2006
2007
2008
2009
2010

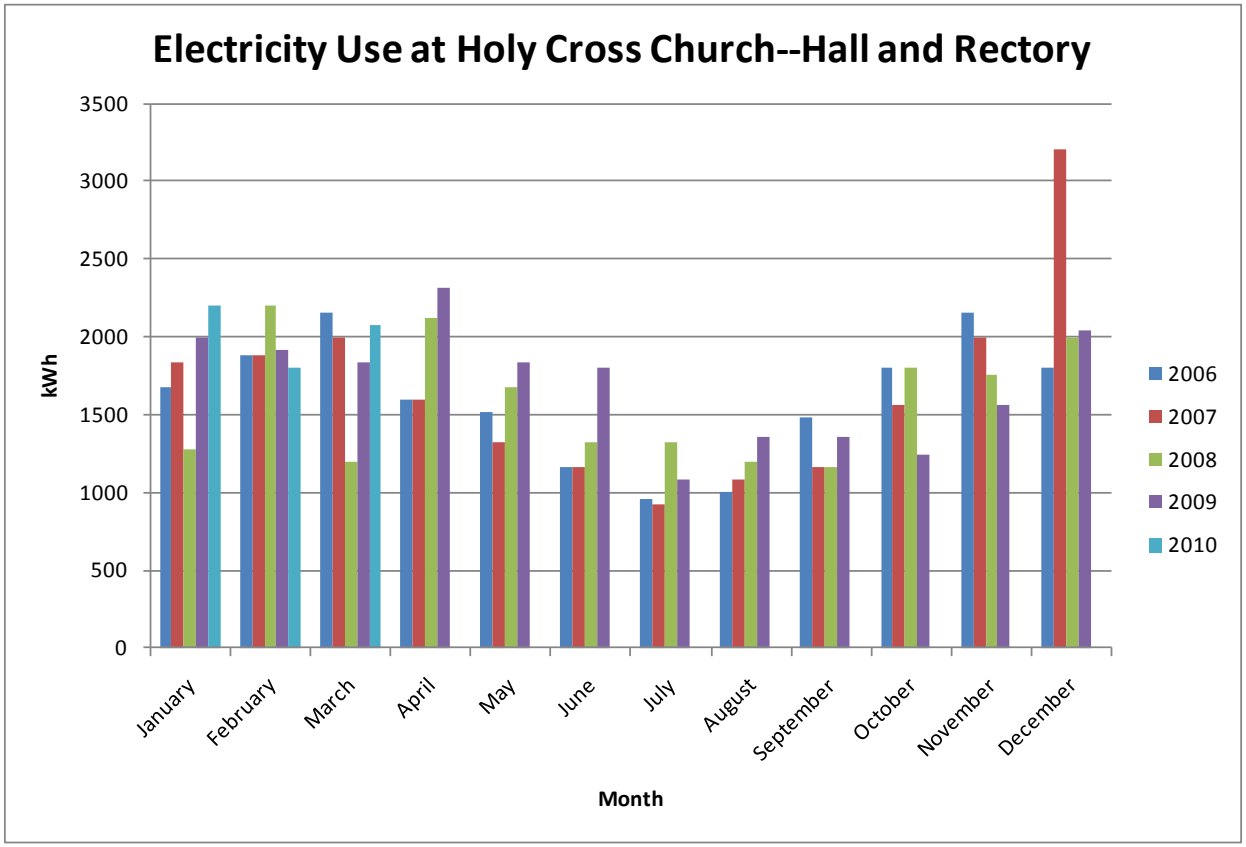

Second Baptist Electricity Usage
Monthly Electricity Usage (kWh)
1000
900
800
700
600
500
400
300
200
100
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2006
2007
2008
2009
2010

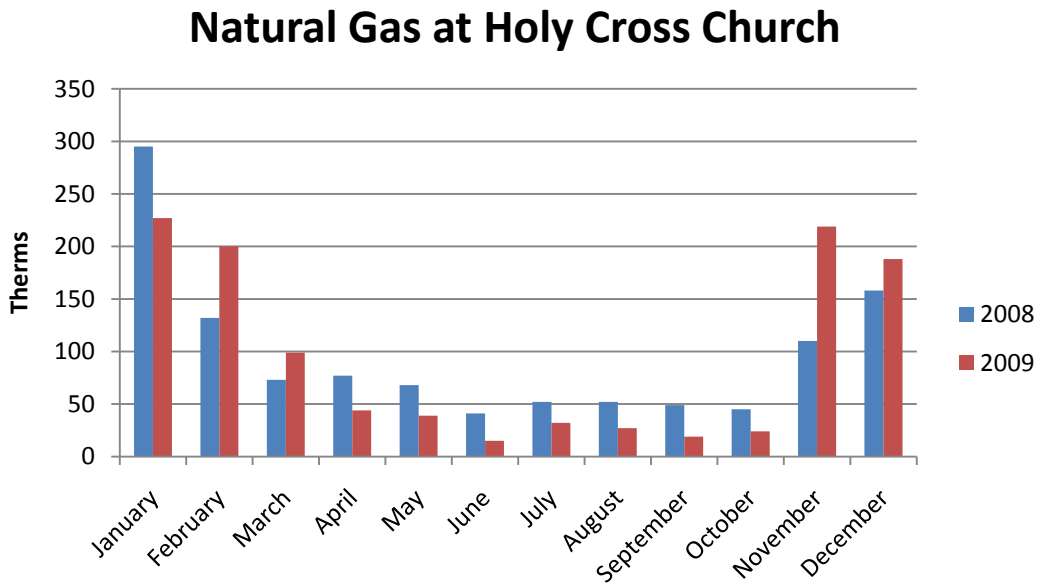

Second Baptist Natural Gas Usage
Monthly Natural Gas Usage (Therms)
200
180
160
140
120
100
80
60
40
20
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2006
2007
2008
2009
2010


Second Baptist Water Usage
Monthly Water Usage (Gallons)
25000
20000
15000
10000
5000
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2006
2007
2008
2009
2010


Water Use for Holy Cross Church
y = -41.932x + 2E+06
R² = 0.3514
Water Use (gallons)
70,000
60,000
50,000
40,000
30,000
20,000
10,000
0
September-08
October-08
December-08
February-09
March-09
May-09
July-09
August-09
October-09
December-09


Electricity Use at Holy Cross Church--Church
kWh
1600
1400
1200
1000
800
600
400
200
0
January
February
March
April
May
June
July
August
September
October
November
December
2006
2007
2008
2009
2010


Electricity Use at Holy Cross Church--Hall and Rectory
kWh
3500
3000
2500
2000
1500
1000
500
0
January
February
March
April
May
June
July
August
September
October
November
December
Month
2006
2007
2008
2009
2010


Natural Gas at Holy Cross Church
Therms
350
300
250
200
150
100
50
0
January
February
March
April
May
June
July
August
September
October
November
December
2008
2009

Pilot Project CEC Pledge Results

Community Environmental Council Pledges--Annual CO2 Pledged to Save											
		Number of Pledgers					Amount of CO2 Pledged to Save Annually				
CEC Pledge Categories	Subcategory	Second Baptist	Islamic Society	Holy Cross	Grace Lutheran	CO2 Reduction (lbs) per Action Annually	Second Baptist	Islamic Society	Holy Cross	Grace Lutheran	Total Annual CO2 Reduction (lbs)--All Pilot Projects
Appliances	Unplug fridge/freezer	2	1	3	0	756	1,512	756	2,268	0	4,536
	Replace old fridge/freezer	1	1	2	0	478	478	478	956	0	1,912
	Air dry clothes	2	3	2	2	363	726	1,089	726	726	3,267
	Replace old washing machine	0	1	0	0	599	0	599	0	0	599
	Replace old dishwasher	0	1	0	0	423	0	423	0	0	423
	Unplug TV	1	4	4	0	512	512	2,048	2,048	0	4,608
	Electronics on Smart Strip or unplug when not in use	1	2	4	2	405	405	810	1,620	810	3,645
Appliance Total							3,633	6,203	7,618	1,536	18,990
Food	Choose locally-grown food	0	3	6	0	N/A	N/A	N/A	N/A	N/A	0
	Purchase > 25% of food a week from farmer's market or local source	0	3	4	0	14	0	41	55	0	97
	Eat one completely local meal a week	0	2	3	0	N/A	N/A	N/A	N/A	N/A	0
	Eat meat one less meal a week	0	0	4	0	307	0	0	1,228	0	1,228
Food Total							0	41	1,283	0	1,325
Heating and Cooling	Set my furnace thermostat down 2 degrees	1	2	5	1	75	75	150	375	75	675
	Close all doors/windows in the house when AC or heater is on	1	0	5	3	40	40	0	200	120	360
	Caulk and weatherstrip all windows and doors	1	1	4	2	193	193	193	772	386	1,544
	Change single pane windows to Energy Star qualified windows	1	1	2	2	112	112	112	224	224	672
	Keep up with basic maintenance on heating and AC systems	1	2	3	2	290	290	580	870	580	2,320
	Replace old central A/C with efficient unit	2	1	0	1	107	214	107	0	107	428
	Replace old furnance with efficient unit	0	2	0	0	280	0	560	0	0	560
	Set my AC thermostat up 2 degrees	0	0	4	0	150	0	0	600	0	600
H/C Total							924	1,702	3,041	1,492	7,159
Lighting	Consistently turn off lights and electronics when I leave the room	4	1	6	3	116	464	116	696	348	1,624
	Replace x number of incandescent bulbs with CFL bulbs	15	30	10	15	253	759	1,518	506	759	17,710
Lighting Total							1,223	1,634	1,202	1,107	5,166
Solar Power	Install a solar water heating system	0	1	0	1	1678	0	1,678	0	1,678	3,356
	Install a 3 kW solar PV system	1	1	1	0	2804	2,804	2,804	2,804	0	8,412
Solar Total							2,804	4,482	2,804	1,678	11,768
Transportation	Drive 10 fewer miles per week by combining trips, walking, or biking	0	3	6	3	462	0	1,386	2,772	1,386	5,544
	Drive 30 fewer miles by carpooling or taking public transportation 2 days/week	0	2	4	4	1387	0	2,774	5,548	5,548	13,870
	Save 10% on fuel costs by maintaining car	2	0	5	2	1111	2,222	0	5,555	2,222	9,999
	Save 15% on fuel costs by obeying speed limit and avoiding quick starts and stops	0	3	4	4	1667	0	5,001	6,668	6,668	18,337
	Replace car with one that gets 20 more miles per gallon	0	1	0	0	5289	0	5,289	0	0	5,289
	Reduce air travel by 5,000 miles	1	0	3	1	6800	6,800	0	20,400	6,800	34,000
Transportation Total							9,022	14,450	40,943	22,624	87,039
Water Conservation*	Check for household leaks in faucets and toilets	0	1	4	0	8.1	0	8	32	0	41
	Install a high-efficiency clothes washing machine	0	0	1	0	16.206	0	0	16	0	16
	Wash only full loads of laundry	0	0	5	0	6.612	0	0	33	0	33
	Install a high efficiency toilet with a 1.3 gallon tank instead of a 3.5-3.7 gallon tank	0	0	3	0	60.885	0	0	183	0	183
	Install rotating nozzles on spray head sprinklers	0	1	0	0	N/A	N/A	N/A	N/A	N/A	N/A
	Adjust my irrigation schedule as weather changes	0	1	1	0	N/A	N/A	N/A	N/A	N/A	N/A
	Use mulch throughout my garden	0	2	3	0	N/A	N/A	N/A	N/A	N/A	N/A
	Remove areas from lawn that are not used for recreational purposes	0	2	3	0	N/A	N/A	N/A	N/A	N/A	N/A
	Use water-wise plants	0	0	2	0	183	0	0	366	0	366
Water Conservation Total							0	8	630	0	638
Water Heating	Wash clothes in cold water	3	1	6	3	75	225	75	450	225	975
	Turn water heater to no higher than 120 degrees	1	0	2	1	134	134	0	268	134	536
	Insulate water heater	1	1	2	1	134	134	134	268	134	670
	Install a tankless water heater	0	1	0	0	672	0	672	0	0	672
	Limit showers to 5 min.	2	1	4	3	285	570	285	1,140	855	2,850
	Install a low flow showerhead	2	0	4	2	172	344	0	688	344	1,376
	Install faucet aerators	1	1	1	0	104	104	104	104	0	312
Water Heating Total							1,511	1,270	2,918	1,692	7,391
Total Pounds of CO2 equivalents pledged to save							**Second Baptist**	**Islamic Society**	**Holy Cross**	**Grace Lutheran**	**All Pilot Projects**
							19,117	29,791	60,440	30,129	139,476

*The pledges that Grace Lutheran and Second Baptist took did not include a Water Conservation Section

APPENDIX IV

Other Evaluated Programs

The following report evaluates existing faith-oriented and general energy efficiency programs. We describe each program and then assess it based on its ability to meet our client's needs.

The Greenhouse Gas Protocol/CARROT

The most widely-used international standard to conduct greenhouse gas accounting is the Greenhouse Gas Protocol,[228] which is used to establish baseline GHG emissions and to voluntarily report continuing emissions and mitigation efforts. The GHG Protocol provides a framework for GHG reporting standards and calculation tools.[229] The California Climate Action Registry (now known as The Climate Registry) developed a protocol based on the GHG Protocol[230], and uses CARROT, the Climate Action Registry Reporting Online Tool for reporting purposes.

Tool benefits:

- Provides accounting standards to estimate baseline GHG emissions for religious organizations, which would enable ECOFaith to accurately inventory its emissions and their sources
- The GHG Protocol is the leading international standard for quantifying and reporting baseline and ongoing GHG emissions and is the best available metrics-gathering framework for businesses and governments; adopting such a robust and widely-accepted standard may attract certain funders to ECOFaith

Tool limitations:

- Designed primarily for corporations and community-level accounting and not project-based accounting; not tailored to smaller institutions such as religious organizations; makes baseline assumptions that are too coarse for ECOFaith's buildings (GHG reductions are based on estimated average energy intensities and therefore do not provide the level of detail necessary to reflect changes in ECOFaith's typically smaller worship buildings)
- Does not provide suggestions for energy efficiency actions or other ways to reduce GHG emissions

Interfaith Power and Light

Interfaith Power and Light (http://www.interfaithpowerandlight.org) is one of the largest grassroots organizations dedicated to energy efficiency in faith-based institutions. The national chapter offers several resources for reducing energy use in faith-based communities, such as links to Energy Star for Congregations and other external resources, book and film recommendations, a carbon calculator for worship buildings, and more. IPL has a California chapter and accepts all faiths into its eco-stewardship, creation-care focused path.[231] According to California Interfaith Power & Light

(http://www.interfaithpower.org), of the 50,000 congregations in the state of California, 480 of these belong to CIPL and have pledged to fight global warming through "energy conservation, energy efficiency, and renewable energy."[232] Their work includes helping to educate congregations, providing energy audits for worship buildings and encouraging the congregations to implement the recommendations, and advocating for climate policy at local, state and federal levels. The ECOFaith Program Director already has several connections within CIPL and believes that ECOFaith can collaborate with this organization.

Program benefits:

- Aimed at faith-based communities of all sizes and beliefs
- Provides some specific resources, such as films, bulk purchasing agreements, and handbooks that describe blueprints for implementing environmental actions within a congregation
- Supplies a checklist for energy efficiency action items, as well as an energy audit checklist with information specific to worship buildings and activities
- Includes a simple congregant carbon footprint calculator
- Provides a congregation-level carbon calculator (Cool Congregations Calculator, http://www.coolcongregations.com) specifically tailored to the faith community (inputs include # of congregants, transportation methods to church, # of trash bags/week, etc.); calculator reports congregation's overall emissions in several easy-to-understand ways (e.g., pounds of CO_2 per congregant, acres of land required, and number of developing world congregations that could be supported on an equivalent amount of energy)

Program limitations:

- Client prefers collaboration with CIPL rather than identification with CIPL
- Does not provide a way to prioritize energy efficiency actions or recommend how to proceed (e.g., by identifying which actions are most cost effective)
- Energy audit does not provide detailed information about the action items; congregants with little expertise may not know how to conduct the energy audit or what the benefits of each action item would be
- Educational resources must be purchased, potentially preventing certain congregations from participating
- Calculations, data, and assumptions underlying carbon calculator are not transparent (e.g. no explanation of how recycling translates into GHG reductions, or how data might vary among different regions); the default values for carbon calculator inputs appear to be on the high end (e.g., "always recycle all paper and glass", for offsets, provides a default of "122 acres of conservation land ownership"), which could bias the outputs; the carbon calculator does not have a way to change the unit of measurement for utility data (e.g., kWh, million BTUs), which could hinder users with utility bills reported another way
- The program provides few opportunities for churches to benchmark progress, other than a statewide "Energy Oscars" rewarding the highest performers

Energy Star Program Portfolio Manager / Energy Star for Congregations

Produced by a collaboration between the U.S. Environmental Protection Agency and the U.S. Department of Energy, Energy Star for Congregations is a guidebook "for analyzing and upgrading" a worship building facility.[233] The program also suggests using the Energy Star Program Portfolio Manager as a way to benchmark progress.[234] Energy Star for Congregations aims to give congregations "free, unbiased information and technical support from ENERGY STAR, [to] more easily improve stewardship of your budget's energy dollars, and of the earth by reducing energy waste and energy costs, while protecting the environment."[235] The program includes a guide for action, marketing resources, and awards applications, among other resources. In California, 389 congregations are affiliated with the Energy Star for Congregations program.

Program benefits:

- Energy Portfolio Manager is designed to be consistent with the GHG Protocol in terms of accounting, inventory, and reporting methodologies, which could be attractive to funders
- Energy Portfolio Manager has a "Houses of Worship" category, and would enable ECOFaith to create a portfolio that tracks members as a whole or separately; the tool captures solid baseline data and allows users to view carbon reductions progress over time
- Gives guidelines for energy management, and contains checklists of energy "to-do" action items as well as "sure energy savers"
- Provides many resources for energy efficiency rebates, funding opportunities, and more information about energy efficiency projects

Program limitations:

- Energy Portfolio Manager could be difficult to use, especially for the un-trained
- Energy Portfolio Manager contains only a small number of inputs specific to religious organizations, so it may not be granular enough for all sizes of worship buildings
- Does not provide a cost-benefit analysis to help prioritize energy actions, though it does provide suggestions for how to improve efficiency
- Energy Portfolio Manager and Energy Star for Congregations are not linked to each other in a comprehensive program that would provide GHG accounting and analysis of reduction actions in the same place
- Does not provide education actions or resources
- The Small Building resource tool is designed for small businesses, not worship buildings, and may require a higher level of expertise than available to most ECOFaith members
- Resources include an overwhelming multitude of web links that do not provide location-specific information

GreenFaith

GreenFaith is a New Jersey-based religious environmental organization that provides a two-year certification program for religious organizations promoting spiritual education on environmental action, environmental justice advocacy, and stewardship action items for the worship building (http://www.greenfaith.org). GreenFaith has conducted several pilot programs in order to discover what methods work to motivate and retain congregations of varying sizes (from 16 to 3,000+ members). The director of the certification program for GreenFaith, Stacey Kennedy, finds that gathering metrics and quantifying actions have been challenging. Successes, on the other hand, can be attributed to public member commitment to the process as well as a program structure that has been tested and adapted over several years to provide maximum definition and programmatic success.[236]

Program benefits:

- Aimed at diverse faith communities, providing specific actions and measures of progress (e.g., certification)
- Unifies education and worship building energy efficiency measures in an integrated program
- Provides organized and centralized listing of extensive resources
- Program process and requirements are easy to follow

Program limitations:

- Fee-based structure is not ideal for ECOFaith organizations
- Location on the East Coast may limit its ability to develop location-specific resources for Southern California
- Leadership is not located in Santa Barbara, which may hinder efforts to form a strong local community and to promote buy-in to the program
- Focuses on faith-based communities that already have an environmental program in place, while ECOFaith's philosophy is to include all interested communities, regardless of current experience

APPENDIX V

Explanation of Action Pick List Implementation

Overview

In an effort to make the ECOFaith sustainability program as easy to implement as possible, we developed an Excel-based tool to help members create a Path of Sustainability yearly action plan that satisfies the Bren-developed program requirements. The Action Pick List contains the Cost-Benefit Analysis tool as well as lists of action items to fulfill the worship-related GHG reduction and education activity categories. Within these lists, members can select which practices they intend on implementing that year as well as actions for long-term planning, and the tool provides real-time feedback on the requirements that have been fulfilled and which requirements are still remaining. In addition, at the click of a button, the Action Pick List takes the user's selected items and automatically generates the action plan onto a print-ready worksheet. It also contains step-by-step instructions so that users can easily refer to directions as they are using the tool.

Real-Time Feedback about Action Plan Requirements

As the user selects actions from the "Pick Building & Events Actions" and "Pick Education Actions" tabs, the tool automatically updates to tell the user what requirements still remain. To meet the Building & Events requirements, the user needs to select four practices that satisfy all three category requirements of "High-Impact," "High-Visibility," or "Behavior-Changing." Similarly, the Education requirements are that the user selects six actions satisfying the three category requirements of "Hands-On," "Presentation," and "Display." The gold status bar displays the number of actions that still need to be picked and which categories still need to be satisfied. In addition, on the "Pick Building & Events Actions" tab, the bar also shows the amount of total GHG reductions as well as the percentage of emissions reductions that would be achieved if the selected practices were implemented. The total GHG reductions are calculated by summing the individual GHG reductions from each selected action. The percentage of emissions reductions are calculated as follows:

$$\frac{TotalGHG\ \text{Re}ductionsFromSelectedActions}{ElectricityUsage \times ElectricityEF + NaturalGasUsage \times NaturalGasEF + GasFromCongregationDriving \times GasEF}$$

Users make their selections by clicking in one of two checkboxes next to the action description. To select the action for the current year, they click on the checkbox on the left. The checkbox on the right is for adding the action to the long-term plan. These checkboxes are tied to cells in hidden columns, which change their value between TRUE (checked) or FALSE (unchecked) based on the user's selections. The cell in the gold status bar that shows the number of actions still to be selected uses the Excel function COUNTIF to count the number of TRUE cells in the hidden selection column.

Three other hidden columns reflect which categories the action satisfies. A "1" in the appropriate column means that action satisfies the category that column represents. For example, in the "Pick Building & Events Actions" tab, the first hidden column represents "High-Impact," the second "High-Visibility" and the third "Behavior-Changing." A "1" in the second and third columns would indicate the action is both "High-Visibility" and "Behavior-Changing." A hidden row in the gold status bar tallies the number of selections for each category by using the Excel function SUMIF, summing the hidden column for that category if the action has been selected (i.e. the cell in the selection column for that action is TRUE). The text in the status bar that indicates the categories still to be fulfilled appears or disappears based on an IF statement referencing these tallies. In other words, if the tally for a particular category is greater than zero, that category disappears from the list of categories still to be fulfilled. When all three categories are fulfilled, the status bar text changes to reflect that the user is finished.

Conditional Formatting

To provide an additional visual cue that the user has made a selection, the action title for the selected practice turns green. We implemented this feature using conditional formatting for the action title cell. The conditional formatting references the relevant cell in the selection column. Note that while this feature functions properly in Excel 2003, Excel 2007 has known painting issues, and the action titles do not turn green until the user scrolls off the screen and back on again.

Macros

We developed the automatic action plan generation feature using Excel macros written in Visual Basic. We also used macros to automatically clear all the selections in the pick list and to switch from the "Pick Building & Events Actions" to the "Pick Education Actions" tab. The functionality of these macros is described below:

CreateActionPlan()

Clicking the "Generate Action Plan" button calls the CreateActionPlan() macro. CreateActionPlan() first initializes the global variables by calling InitializeGlobalConstants() and then clears the current "Action Plan" tab by calling the sub-function ClearActionPlan() (see below). It then prints a heading for the current year's action plan and calls the sub-function CopySelectedActions() (see below) to copy over the selections for the current year from the "Pick Building & Events Actions" and the "Pick Education Actions" tabs. Then it prints the total GHG reductions from the selected practices, which it gets from the "Pick Building & Events Actions" tab. Finally, it prints the heating for the long-term action plan and then calls CopySelectedActions() again to copy over the selections for the long-term plan.

InitializeGlobalConstants()

Several constants (Strings and Integers) are referenced throughout the macro code. In case these values need to be changed in the future, we created global constants for them so they only needed to be changed in one place. InitializeGlobalConstants() sets the values for these constants:

- BuildingEventsPickListWorksheetName: the name of the tab that contains the building and events actions (currently "Pick Building & Events Actions")
- EducationPickListWorksheetName: the name of the tab that contains the education actions (currently "Pick Education Actions")
- ActionPlanWorksheetName: the name of the tab that contains the action plan (currently "Action Plan")
- FirstNonHeaderRowInActionPlanRowNumber: the row number of the first non-header row in the action plan
- FirstNonRequiredActionItemInEducationPickListRowNumber: the row number of the first action item in the "Pick Education Actions" tab that is not required (the Path of Sustainability requires that ECOFaith members display signs publicizing their implemented energy efficiency practices and include environmental content in six sermons or congregation-wide education classes)
- PickListActionTitleColumnNumber: the column number of the column in the "Pick Building & Events Actions" and "Pick Education Actions" tabs that contains the title of the action (e.g. "Replace inefficient gas furnace")
- PickListGHGReductionColumnNumber: the column number of the column in the "Pick Building & Events Actions" tab that contains the GHG reduction estimate for each action
- ActionPlanActionTitleColumnNumber: the column number of the column in the "Action Plan" tab that will contain the titles of the selected actions
- ActionPlanActionNumberColumnNumber: the column number of the column in the "Action Plan" tab that will contain the action number (selected actions are numbered in the action plan)
- ActionPlanGHGReductionColumnNumber: the column number of the column in the "Action Plan" tab that will contain the GHG reduction for each action
- CurrentActionPlanSelectionColumnNumber: the column number of the column in the "Pick Building & Events Actions" and "Pick Education Actions" tabs that indicates whether or not the user has selected that action for the current year's action plan
- LongTermActionPlanSelectionColumnNumber: the column number of the column in the "Pick Building & Events Actions" and "Pick Education Actions" tabs that indicates whether or not the user has selected that action for long-term planning
- TotalEmissionsReductionCellName: the name of the named cell on the "Pick Building & Events Actions" tab that contains the total GHG reductions for the selected actions
- PercentageEmissionsReductionCellName: the name of the named cell on the "Pick Building & Events Actions" tab that contains the percentage of GHG emissions reduced from the selected actions

Important: If any columns or rows are added to the "Pick Building & Events Actions" or "Pick Education Actions" tabs or if any of the tab names are changed, InitializeGlobalConstants() should be updated to reflect the changes—otherwise the action plan generation feature will likely not work.

ClearActionPlan()

This sub-function iterates through the "Action Plan" tab and clears all the content.

CopySelectedActions()

CreateActionPlan() calls this sub-function to copy the selected actions for both the current year and the long-term plan. It takes as inputs:

- SelectionColumnNumber: the column number in the "Pick Building & Events Actions" or "Pick Education Actions" tab that indicates whether or not the user selected the action (the column number will be different depending on whether CopySelectedActions() is being called for the current year's action plan or the long-term plan)

- ActionNumber: the next unused number for numbering the actions in the action plan

- ActionPlanCurrentRowNumber: the row number of the next unused row in the action plan

These inputs are passed by reference because CopySelectedActions() will change their values throughout its execution.

CopySelectedActions() first creates a sub-heading for the building and events actions. Then it iterates through all the rows in the "Pick Building & Events Actions" tab. When it finds a selection (the cell contains TRUE in the selection column for that row), it copies the action title and the GHG reduction over to the "Action Plan" tab and assigns an action number. When it finishes with the building and events list, it does the same for the education list.

ClearBuildingEventsSelections()

Clicking the "Clear Selections" button on the "Pick Building & Events Actions" tab calls the ClearBuildingEventsSelection() macro. The macro first initializes the global constants by calling the sub-function InitializeGlobalConstants(). Then it iterates through the "Pick Building & Events Actions" tab and sets the selection columns for both the current and the long-term action plans to FALSE for each row.

ClearEducationSelections()

Clicking the “Clear Selections” button on the “Pick Education Actions” tab calls the ClearEducationEventsSelection() macro. The macro first initializes the global constants by calling the sub-function InitializeGlobalConstants(). Then it iterates through the “Pick Education Actions” tab, starting with the first *non-required* action, and sets the selection columns for both the current and the long-term action plans to FALSE for each row.

GoToEducationPickList()

Clicking the “Pick Education Actions” button on the “Pick Building & Events Actions” tab calls the GoToEducationPickList() macro. The macro activates the “Pick Education Actions” tab.

APPENDIX VI

Questionnaire for Faith Community Carbon Footprint Screening Analysis

1. What is your congregation's average attendance at weekly services? [faith leader]
2. How frequently do most congregants attend services, events, or classes at the worship building? [faith leader]
3. Can you provide an estimate of the percent of congregants who travel in the following transportation modes? [faith leader]
    a. Single family vehicles
    b. Carpooling with members outside your family
    c. Public transportation
    d. Walking/biking
4. Please enter the miles staff traveled on congregation business last year for each transportation mode, or amount spent on each transportation mode: [bookkeeper/administrative official]
    a. Automobiles (including personal vehicles, taxis, carpools)
    b. Bus, including metro and long distance service
    c. Rail, including subways, inner-city light rail, cross country trains
    d. Air travel
5. How much does the faith community spend on garbage collection at the worship building facility each month? [bookkeeper/administrative official]
6. Please estimate how much money your congregation spent per year for each category of goods and services below: [bookkeeper/administrative official]
    a. Paper and paper products
    b. Office supplies
    c. Cleaning supplies and services
    d. Furniture and fixtures
    e. Construction and renovations
    f. Food services (e.g. catered or pre-prepared food)
    g. Food (ingredients)
        i. Do you consciously avoid purchasing meat and dairy products when possible?
    h. Apparel, linens, and other textiles
    i. Printing and publishing (someone else prints for you)
    j. Other goods and services (whatever has not been captured by the questions above)

APPENDIX VII

CEDA4 Product Emission Factors Used in Screening Analysis

Questionnaire Category	CEDA4 Category	CEDA4 Category Code	Unadjusted kg CO_2e/$	Price Conversion Factor	Price Deflator	Adjusted kg CO_2e/$
Meat (lowest impact, i.e. "best-case")	Poultry processing	311615	1.5025	1	0.7884	1.1846
Meat (highest impact)	Animal (except poultry) slaughtering, rendering, and processing	31161A	3.1489	1	0.8242	2.5955
Other food (lowest impact)	Flavoring syrup and concentrate manufacturing	311930	0.4419	0.7154	0.8920	0.2820
Other food (highest impact)	Cheese manufacturing	311513	2.4827	1	0.8393	2.0838
Prepared food	Food services and drinking	722000	0.0684	1	0.7853	0.0537
Paper	Paper mills	322120	1.5071	0.9418	0.7920	0.0925
Janitorial service	Services to buildings and dwellings	561700	0.1005	1	0.8674	0.0872
Construction and renovations	Nonresidential maintenance and repair	230101	0.1854	1	0.6610	0.1226
Printing and publishing	Printing	323110	0.5591	0.9628	0.8829	0.4752
Gardener	Services to buildings and dwellings	561700	0.1005	1	0.8674	0.0872
Pens	Office supplies (except paper) manufacturing	339940	0.0985	1	0.9395	0.0925
Printer lease	Commercial and industrial machinery and equipment rental and leasing	532400	0.0727	1	0.8903	0.0648
Cleaning supplies	Soap and cleaning compound manufacturing	325610	0.1590	1	0.7659	0.1217
Toilet paper	Sanitary paper product manufacturing	322291	0.2700	1	0.7843	0.3088
Van rental	Automotive equipment rental and leasing	532100	0.0074	1	0.7811	0.0058
Telephone services	Telecommunications	517000	0.0431	1	1.0722	0.0462

APPENDIX VIII

Initial Exhaustive Pool of Potential Actions to Reduce Worship-Related GHG Emissions

#	Action	Inclusion in ECOFaith List & Reasoning
1	Seal drafts (ensure windows and doors are properly aligned and operational; caulk, weatherstrip and foam seal around doors, windows, and other spaces to plug air leaks)	Included: high GHG-reducing impact
2	Make sure doors/windows separating conditioned from non-conditioned areas (including outdoors) are closed	Not included: GHG-reducing impact difficult to estimate and likely limited
3	Install weather-appropriate windows	Included: high GHG-reducing impact
4	Properly insulate building (between conditioned/unconditioned spaces and in roof/ceiling and around ducts and pipes)	Included: high GHG-reducing impact
5	Keep curtains and blinds closed at night during the winter and during the day in the summer	Included: high-visibility, behavior-changing, no financial cost
6	Make sure that thermostats are locked or inaccessible so that occupants do not tamper with them	Not included: difficult to estimate impact of occupants tampering with thermostat
7	Locate thermostats in a central location, away from areas subject to extreme temperature fluctuations (e.g. a window or heating or cooling unit)	Not included: may not be applicable to many buildings; difficult to estimate impact
8	In the summer, turn up thermostat from 73 to 78 degrees	Included: high GHG-reducing impact
9	Use fans to make spaces feel cooler without having to turn down the thermostat	Not included: difficult to estimate impact
10	In the winter, turn down thermostat from 72 to 68 degrees	Included: high GHG-reducing impact
11	Schedule activities in spaces that can be conditioned separately from the rest of the building	Not included: difficult to estimate impact due to variability in activity schedules
12	Install a programmable thermostat to automatically adjust temperatures based on expected times of occupancy	Included: high GHG-reducing impact
13	Post signs reminding people not to put objects in places where they will obstruct air flow	Not included: data about frequency of the problem is not available; difficult to estimate impact
14	Stop using unnecessary exhaust fans and re-wire restroom exhaust fans to operate only when lights	Not included: no data on impact of this action

	are on	
15	Replace air filters monthly (develop a maintenance schedule and install filter pressure-drop gauges)	Included: high GHG-reducing impact
16	Install a new Energy Star furnace or boiler if you need one	Included: high GHG-reducing impact
17	Schedule regular maintenance for your A/C unit	Included: high GHG-reducing impact
18	Replace your old A/C with a more efficient one	Included: high GHG-reducing impact
19	Keep your water heater's thermostat no higher than 120° F	Included: moderate to low GHG-reducing impact (but data available); no financial cost; does not require building ownership
20	If your (electric) water heater is more than 5 years old, wrap it in an insulating jacket	Included: moderate to low GHG-reducing impact (but data available); low cost; does not require building ownership
21	Replace your standard water heater with a high-efficiency Energy Star unit	Included: moderate to low GHG-reducing impact (but data available)
22	Reduce water temperatures to the lowest setting during unoccupied periods either manually or with an automatic control device	Not included: buildings occupied almost all year so impact likely low; limited data on GHG-reducing impact
23	Replace old light bulbs (including exit signs) with compact fluorescent light bulbs or LEDs	Included: high GHG-reducing impact
24	Replace T12 fluorescent lights with T8 bulbs	Included: moderate GHG-reducing impact; low cost
25	Make signs for building occupants to turn off the lights in unoccupied areas	Included: moderate GHG-reducing impact, high-visibility, behavior-changing, no financial cost; does not require building ownership
26	Install motion sensors or timed switches to turn off lights	Included: high GHG-reducing impact
27	To prevent glare, eyestrain, and headaches, do not "over-light"	Not included: difficult to estimate impact and current level of over-lighting
28	Create a regular cleaning schedule for lamps, light fixtures, windows, screens, ceilings, and other reflective surfaces	Not included: difficult to estimate impact
29	Replace or upgrade broken or yellowed light covers	Not included: difficult to estimate impact
30	Use natural lighting whenever you can by putting	Not included: difficult to

	work stations next to windows and turning off the lights when it's sunny	estimate impact
31	Replace fluorescent lamps with blackened ends	Not included: GHG-reducing impact likely low and difficult to estimate
32	Ensure security/outdoor lighting levels stay within adequate boundaries	Not included: GHG-reducing impact likely low and difficult to estimate
33	Control direct sun through windows depending on the season and local climate	Not included: difficult to estimate impact
34	Repaint dark walls with light colors to reduce lighting needs	Not included: GHG-reducing impact likely low and difficult to estimate
35	Make sure that refrigerator/freezer condensers or coils are clean, unclogged and functional	Not included: low GHG-reducing impact
36	Replace refrigerator door gaskets if a dollar bill easily slips out when closed between the door's seals	Not included: difficult to estimate impact
37	Make sure that the refrigerator is set to be adequately cool, but no colder than necessary	Not included: GHG-reducing impact likely to be low and difficult to estimate
38	Retrofit existing refrigerators and display cases with anti-sweat door heater controls and variable speed evaporator fan motors and controls	Not included: GHG-reducing impact likely to be low and difficult to estimate
39	Use your kitchen efficiently (another place for signs): cook with lids on, only preheat ovens for baked goods, provide ovens and fryers with loads all of the time they are heated and on, shut down exhaust hood fans when not required, and use microwave ovens to heat small quantities of food	Not included: GHG-reducing impact likely to be low (given small percentage of energy used for cooking) and difficult to estimate
40	Replace inefficient clothes washers with Energy Star appliances	Not included: Few worship buildings have clothes washers
41	Wash loads of clothes on warm/cold cycle	Not included: Few worship buildings have clothes washers
42	Wash only full loads of clothes	Not included: Few worship buildings have clothes washers
43	Hang laundry to dry at least 5 months out of the year	Not included: Few worship buildings have clothes washers
44	Replace refrigerators more than 10 years old and other old appliances with Energy Star ones	Included: moderate GHG-reducing impact
45	If there is a lot of extra space in your refrigerator or freezer, fill it up with jugs of water	Not included: GHG-reducing impact likely to be low and difficult to estimate
46	Cut your phantom load by turning off computers, chargers and other standby electronics by	Included: high GHG-reducing impact

	unplugging or using a power strip	
47	Use LED lights for any holiday lights	Included: though GHG-reducing impact is low, its impact is quantifiable, and implementation does not require building ownership
48	Encourage carpooling by organizing a carpooling system for your congregation	Included: high GHG-reducing impact
49	For congregation vehicles, conduct regular tune-ups, including changing the air filter, checking the oxygen sensor, and removing excess weight from the vehicle	Not included: many faith communities do not have vehicles
50	For congregation vehicles, maintain correct tire pressure	Not included: many faith communities do not have vehicles
51	For congregation vehicles, purchase more fuel efficient models	Not included: many faith communities do not have vehicles
52	For congregation vehicles, purchase low-rolling resistance tires	Not included: many faith communities do not have vehicles
53	Build a culture of biking by installing bike racks on your church property and holding promotional "bike to worship" days	Not included: activity was included in education action item list instead
54	Use manual landscape tools	Not included: GHG-reducing impact likely to be low and difficult to estimate
55	Use water-saving faucets and showerheads	Not included: GHG-reducing impact difficult to estimate and likely to be low given low percentage of energy used for water-heating in religious buildings
56	Check and fix leaky faucets in restrooms and kitchens	Not included: GHG-reducing impact difficult to estimate and likely to be low given low percentage of energy used for water-heating in religious buildings
57	Schedule special events (such as choir practice or worship groups) and cleaning duties on the days just prior and after major services so that the building is warmed/cooled on consecutive days	Not included: GHG-reducing impact difficult to estimate
58	Install ceiling fans, which can help with both cooling and heating by keeping the air circulating,	Not included: GHG-reducing impact difficult to estimate

	preventing hot and cold spots, and keeping the air fresh	
59	Install solar panels	Included: high GHG-reducing impact, high-visibility; existing momentum within many faith communities

APPENDIX IX

Worship-Related Actions with Energy Savings Expressed as a Percentage Reduction of End-Use Consumption

Action	End-Use	Reduction	Source	Assumptions/Calculations
Seal drafts	Space heating, cooling, and ventilation	10%	Dietz *et al*. 2009**	
Install efficient windows	Space heating, cooling, and ventilation	15%	Dietz *et al*. 2009**	Single-paned windows replaced by multi-paned windows with low-emissivity coatings.
Replace air filters monthly	Space heating, cooling, and ventilation	15%	Dietz *et al*. 2009**	Air filters checked or replaced monthly compared to twice a year.
Upgrade insulation	Space heating, cooling, and ventilation	25%	Dietz *et al*. 2009**	Insulation in attic upgraded.
Use curtains / blinds efficiently	Space heating, cooling, and ventilation	3% of space heating, 4.5% of cooling, 3% of ventilation	Calculations based on Department of Energy (DOE), and California Energy Commission data	30% of heat is lost through windows[237] * 10% of heat loss can be prevented through closing drapes or blinds on winter nights[238] = 3% space heating savings. 30% of cooling requirements are for solar heat gain * 15% of heat gain can be prevented through closing drapes or blinds on summer days = 4.5% cooling savings. Ventilation can be used for either cooling or heating systems. To be conservative, for ventilation we took the minimum savings (between heating and cooling), which was 3%.
Install a programmable thermostat and setback temperatures during unoccupied periods	Space heating, cooling, and ventilation	26% of space heating, 28% of cooling, 26% of ventilation	Calculations based on DOE data	Programmable thermostat increased temperatures from 78°F to 85°F when building unoccupied during the summer. Building unoccupied 16 out of 24 hours a day. 6% savings per degree of summer setback[239] * 16/24 * 7°F setback = 28% cooling savings. Programmable thermostat decreased temperatures from 68°F to 55°F when building unoccupied during the winter. 3% savings per degree of winter setback[240] * 16/24 * 13°F setback = 26% cooling savings.

				To be conservative, for ventilation we took the minimum savings (between heating and cooling), which was 26%.
Replace inefficient gas furnace	Space heating*	15%	Dietz *et al*. 2009**	15-year-old 78% efficient gas or LPG furnace replaced with a 92% efficient Energy Star furnace (basic electric furnaces are already 95% efficient).
Set winter thermostat temperatures lower	Space heating*	12%	Calculations based on DOE data	Thermostat temperature set back from 72°F to 68°F. 3% savings per degree of winter setback[241] * 4°F setback = 12%.
Maintain A/C	Cooling*	17%	Dietz *et al*. 2009**	
Replace A/C	Cooling*	35%	Dietz *et al*. 2009**	Non–Energy Star central AC unit with an average seasonal energy efficiency ratio (SEER) of 10.4 and a 3-ton size replaced by an Energy Star SEER 16 unit.
Set summer thermostat temperatures higher	Cooling*	30%	Calculations based on DOE data	Thermostat temperature increased from 73°F to 78°F. 6% savings per degree of summer setback[242] * 5°F setback = 30%.
Reduce water heater temperature	Water heating	8%	Dietz *et al*. 2009**	Hot water temperature reduced from 140°F to 120°F.
Install water heater blanket	Water heating	4%	Dietz *et al*. 2009**	Blanket installed on older electric water heater (blankets not recommended for gas heaters).
Replace inefficient water heater	Water heating	29% for natural gas, 8.7% for electric	Dietz *et al*. 2009**	Typical gas water heater replaced with gas tankless or gas-condensing heater meeting January 2009 Energy Star specifications, or typical electric water heater with a tankless one.
Replace incandescent light bulbs	Lighting	75%	Dietz *et al*. 2009**	Conventional incandescent bulbs replaced by Energy Star compact fluorescent light bulbs of the same brightness.
Install motion-detecting sensors for lights	Lighting	15.83%	Self-estimated	Lights not needed 16 out of 24 hours a day. Assumed that 25% of the time unneeded lights do not get turned off. Assumed that sensors would have 95% effectiveness. 16/24 * 25% * 95% = 15.83%.
Post signs to turn off lights	Lighting	8.33%	Self-estimated	Lights not needed 16 out of 24 hours a day. Assumed that 25% of the time unneeded lights do not get turned off. Assumed that signs would have

				50% effectiveness. 16/24 * 25% * 50% = 8.33%.
Cut phantom power	All electricity	3.6%	Calculations based on Dietz *et al*. 2009**	4% of electricity usage goes to phantom power.[243] Assumed that 90% of phantom power could be cut. 4% * 90% = 3.6%.
Create a carpooling system for congregation members	Congregation transportation to worship events	10%	Self-estimated	Carpool board would eliminate 10% of car trips.

* Because ventilation is part of the heating and cooling system, reductions in heating and cooling produce commensurate reductions in ventilation. The EIA data, however, did not separate energy used for heating ventilation from energy used for cooling ventilation. Therefore, to be conservative, we omitted ventilation savings for actions that only pertained to heating or cooling but not both.

** We leveraged the sources and assumptions in the Dietz *et al*. paper[244] for estimates of energy savings that each energy efficiency action could achieve. The authors conducted a thorough search through both government and academic sources. Though the article describes savings from household actions, we assumed that the actions would achieve similar savings in worship buildings.

APPENDIX X

Worship-Related Actions with Energy Savings from Specific Appliances or Devices

Action	Reduction	Source	Assumptions/Calculations
Replace T12 fluorescent lights with T8 or T5	8 W per bulb	National Lighting Product Information Program	Lights would be on 8 hours everyday, or 2,920 hours a year. 8 W saved per bulb[245] * 2,920 hours a year = 374 kWh saved a year.
Replace inefficient refrigerator	40% per refrigerator	Dietz *et al*. 2009	Conventional refrigerator purchased in 2001 replaced with Energy Star model. Conventional 2001 refrigerator uses 1,239 kWh of energy a year[246] * 40% savings = 496 kWh saved a year.
Replace conventional holiday lights with LEDs	0.36 W per bulb	Calculations based on DOE data	Lights would be on 12 hours a day, 40 days a year, for a total of 480 hours a year.[247] 6 strings of 70 mini-incandescent bulbs (420 bulbs) replaced with mini-LEDs. 420 bulbs * 480 hours * 0.36 W saved per bulb[248] = 73 kWh.
Install solar panels	7,500 kWh per system	FindSolar	A 4.5 kW system produces 7,500 kWh a year in Santa Barbara.[249]

APPENDIX XI

ECOFaith Pilot Project Grace Lutheran's Inputs into the Cost-Benefit Tool

Question	Response
What was your electricity usage (in kWh) for the most recent one-year period for which you have data? [This data can be found in your 08_Utilities_Form.xls spreadsheet from when you conducted the energy audit.]	17,160 kWh
What was your natural gas usage (in therms) for the most recent one-year period for which you have data? [This data can be found in your 08_Utilities_Form.xls spreadsheet from when you conducted the energy audit.]	2,270 therms
Do you use natural gas or electricity for your space heating? [See your answer to question 8 of the energy audit.]	Natural gas
Do you use natural gas or electricity for your water heating? [See your answer to question 15 of the energy audit.]	Natural gas
Does your building have air conditioning? [See your answer to question 9 of the energy audit.]	No
Does your building have a refrigerator? [See your answer to question 21 of the energy audit.]	Yes
Does your building have a stove or oven?	Yes
If your building has a stove or oven, do you use natural gas or electricity for cooking?	Natural gas
What is the area of your worship building (in square feet)?	11,640
How many windows are you in your worship building? [See your answer to question 16 o the energy audit.]	Blank
How many incandescent light bulbs are in your worship building? [See your answer to question 1 of the energy audit.]	Blank
How many T12 light fixtures and bulbs are in your worship building? [See your answer to question 1 of the energy audit.]	Blank
On average, how many cars are driven to worship events each week?	Blank
Would you like this tool to display average or low-end costs for retrofitting and other environmental actions?	Low-end

APPENDIX XII

Cost-Benefit Tool Output Based on Inputs from ECOFaith Pilot Project Grace Lutheran

Actions with Upfront Cost	Annual GHG Reduction (lb CO_2e)	Low-End Upfront Cost ($)	Annual $ Saved on Utility Bill	Payback Period (years)	Annual GHG Reduction/$ of Upfront Cost (lb CO_2e/$)
Install programmable thermostat to: increase thermostat temperature in the summer from 78 to 85°F when building is unoccupied and decrease thermostat temperature in the winter from 68 to 55°F	6216	$25	$457	0	248.6
Upgrade insulation in attic, ceiling, and other areas	5977	$8,730	$439	20	0.7
Replace incandescent light bulbs with CFLs or LEDs	3202	$120	$656	0	26.7
When it's time to replace the windows, install efficient double-paned, low-emissivity windows *Note: Cost estimates are for increased cost of efficient windows over non-efficient ones and do not reflect overall cost of replacing windows.*	3586	$300	$264	1	12.0
Seal drafts (ensure windows and doors are properly aligned and operational; caulk, weatherstrip and foam seal around doors, windows and other spaces to plug air leaks)	2391	$50	$176	0	47.8
Replace old inefficient gas furnace with new Energy Star furnace (92% efficient or better)	3398	$1,790	$225	8	1.9
Replace old A/C unit with new Energy Star A/C unit (SEER 16 or better)	0	$3,300	$0	N/A	0.0
Install motion sensors to turn off lights when spaces are unoccupied	676	$150	$138	1	4.5

Replace energy inefficient refrigerator with Energy Star model	360	$405	$74	5	0.9
Replace T12 fluorescent light ballasts and bulbs with T8 or T5 fluorescent bulbs and electronic ballasts	272	$49	$56	1	5.5
Replace conventional holiday lights with LED holiday lights (assuming ~420 total bulbs)	53	$60	$11	6	0.9
Replace typical inefficient water heater	253	$990	$17	59	0.3
Wrap electric water heater with an insulating blanket if heater is hot to the touch	0	$12	$0	N/A	0.0
Install solar panels	5455	$28,735	$1,117	26	212.0

APPENDIX XIII

Household Building and Appliance Energy Savings Expressed as a Percentage Reduction of End-Use Consumption

Action	End-Use	Reduction	Source	Assumptions/Calculations
Seal drafts	Space heating and cooling	10%	Dietz *et al*. 2009*	
Install efficient windows	Space heating and cooling	15%	Dietz *et al*. 2009*	Single-paned windows replaced by multi-paned windows with low-emissivity coatings.
Replace air filters monthly	Space heating and cooling	15%	Dietz *et al*. 2009*	Air filters checked or replaced monthly compared to twice a year.
Upgrade insulation	Space heating and cooling	25%	Dietz *et al*. 2009*	Insulation in attic upgraded.
Replace inefficient gas furnace	Space heating	15%	Dietz *et al*. 2009*	15-year-old 78% efficient gas or LPG furnace replaced with a 92% efficient Energy Star furnace (basic electric furnaces are already 95% efficient).
Set winter thermostat temperatures lower	Space heating	12%	Calculations based on DOE data	Thermostat temperature set back from 72°F to 68°F during occupied periods and down to 55°F during unoccupied periods. 3% savings per degree of winter setback[250] * 4°F setback + 1/3 of the day unoccupied * 3% savings per degree of winter setback * additional 13°F setback during unoccupied periods = 25%.
Reduce water heater temperature	Water heating	8%	Dietz *et al*. 2009*	Hot water temperature reduced from 140°F to 120°F.
Wash clothes in warm water and rinse in cold	Water heating	18.5%	Gardner and Stern 2008	1.2% of total household energy reduced by washing clothes in warm water and rinsing in cold / 6.5% of total household energy consumed by warming water[251] = 18.5%.
Replace inefficient water heater	Water heating	29% for natural gas, 8.7%	Dietz *et al*. 2009*	Typical gas water heater replaced by gas tankless or gas-condensing heater meeting January 2009

		for electric		Energy Star specifications, or typical electric water heater replaced by a tankless one.
Install solar water heater	Water heating	80%	DOE[252]	Energy savings range is from 50%-80%. We assumed 75% because Santa Barbara has above-average solar resources.
Replace incandescent light bulbs	Lighting	75%	Dietz *et al*. 2009*	Conventional incandescent bulbs replaced by EnergyStar compact fluorescent light bulbs of the same brightness.
Turn off lights when leaving room	Lighting	15%	Self-estimated	Lights not needed 16 out of 24 hours a day. 25% of the time unneeded lights do not get turned off. Pledge would have 90% effectiveness. 16/24 * 25% * 90% = 15%.
Cut phantom power	All electricity	3.6%	Calculations based on Dietz *et al*. 2009*	4% of electricity usage goes to phantom power.[253] Assumed that 90% of phantom power could be cut. 4% * 90% = 3.6%.

* We leveraged the sources and assumptions in the Dietz *et al*. paper[254] for estimates of energy savings that each energy efficiency action could achieve. The authors conducted a through search through both government and academic sources.

APPENDIX XIV

Household Energy Savings from Device- or Appliance-Based Actions

Action	Device	UEC	Energy Savings	Assumptions
Insulate electric water heater	Electric water heater	2113 kWh[255]	4%[256]	Blanket installed on older electric water heater (blankets not recommended for gas heaters).
Replace old refrigerator with efficient one	Refrigerator	1239 kWh[257]	40%[258]	Conventional refrigerator purchased in 2001 replaced with Energy Star model.
Unplug unused refrigerator/freezer	Second refrigerator	1174 kWh[259]	100%	
Air dry clothes half the year	Dryer	693 kWh, 27 therms[260]	50%	Same number of loads dried throughout the year.
Set summer thermostat temperatures higher	A/C	316 kWh	44%	Weighted average of central A/C and room A/C UECs based on saturation: central A/C UEC in forecast zone 8 of 382 kWh * (zone 8 central A/C saturation of 44% / zone 8 total A/C saturation of 59%) + room A/C UEC in zone 8 of 122 kWh * (zone 8 central A/C saturation of 15% / 59%) = 316 kWh.[261] Thermostat temperature increased from 73°F to 78°F during occupied periods and up to 85°F during unoccupied periods. 6% savings per degree of summer setback[262] * 5°F setback + 1/3 of the day unoccupied * 6% savings per degree of summer setback * additional 7°F setback during unoccupied periods = 44%.
Replace old central A/C with efficient unit	A/C	382 kWh[263]	35%[264]	Non-Energy Star central A/C unit with an average seasonal energy efficiency ratio (SEER) of 10.4 and a 3-ton size replaced by an Energy Star

				SEER 16 unit.
Regularly tune-up A/C system	A/C	316 kWh	17%[265]	(see summer thermostat action)
Install a 3 kW solar PV system	Solar PV	-4968 kWh	N/A	3 kW PV system in Santa Barbara generates 414 kWh of energy per month[266] * 12 months a year = 4968 kWh.

APPENDIX XV

Household Energy Savings from Actions Related to Driving

Action	Reduction	Source	Calculations
Drive 30 fewer miles a week by carpooling or taking public transportation	7.1%	N/A	(30 miles a week * 52 weeks a year) / 22,100 miles traveled annually.
Drive 10 fewer miles a week by combining trips, walking, or biking	2.4%	N/A	(10 miles a week * 52 weeks a year) / 22,100 miles traveled annually.
Keep car maintained	5.5%	Dietz et al. 2009	
Purchase low-rolling resistance tires	4.5%	Dietz et al. 2009	
Alter driving habits	16.9%	Dietz et al. 2009	10% from reducing acceleration and deceleration + 3.2% from maintaining 55 MPH highway mileage + 3.7% from reducing idling time.
Keep tires properly inflated	3.3%	Dietz et al. 2009	
Regularly remove excess weight from car	1%	Dietz et al. 2009	
Purchase a car that gets 30 MPG or better	32.4%		Gallons of gas consumed with fuel efficient car: 22,100 VMT / 30 MPG = 737 gallons. (1,090 gallons with inefficient car – 737 gallons with efficient car) / 1,090 gallons = 32.4%.

APPENDIX XVI

Household Energy and Water Savings from Actions to Reduce Water Consumption

Action	% of Water That Is Hot	Water Reduction	Assumptions/Calculations
Install WaterSense faucets	73%[267]	219 gallons	0.6 gallons saved per person per day[268] * 365 days a year.
Install WaterSense showerheads	73%[269]	896 gallons	2.4554 gallons saved per person per day[270] * 365 days a year.
Shorten showers to 5 minutes	73%[271]	1,939 gallons	0.82 showers per person per day * 365 days a year * (average shower length of 7.7 minutes – 5 minutes) * average shower flow rate of 2.4 gallons per minute.[272]
Wash only full loads of laundry	28%[273]	3,400 gallons[274]*	Assumed water reduction was for household, not individual.
Replace dishwasher with more efficient unit	100%[275]	1,935 gallons*	Conventional unit from the 1990s was replaced by a 2009 Energy Star unit. 215 loads per year * 9 gallons saved per load.[276] Dishwashers also have a non-water heating electricity usage component. We could not find mechanical operations electricity consumption for a 1990s conventional unit, so we estimated the electricity savings by comparing an average modern conventional unit that uses 0.735 kWh/load with an average Energy Star unit that uses 0.584 kWh/load. The annual electricity savings from mechanical operations is 215 loads/year * (0.735 – 0.584 kWh/load).
Implement xeriscaping	0%	18,812 gallons	171.8 gallons total water consumption per person per day[277] * 365 days a year * 30% of total water saved with xeriscaping.[278]
Install rotating nozzles and sprinklers	0%	7,358 gallons	Assumed all landscaping water is through sprinklers. 171.8 gallons total water consumption per person per day[279] * 365 days a year * 30% of total water used for landscaping[280] * 20% of irrigation water saved with rotating nozzles.[281]

Replace old toilet with a high-efficiency one	0%	4,092 gallons	Toilet with a 3.5 gallon tank replaced by one with a 1.3 gallon tank. 11.211 gallons saved per person per day[282] * 365 days per year.
Fix household leaks	0%	3,468 gallons	9.5 gallons leaked per person per day[283] * 365 days.
Replace old washing machine with an efficient unit	Not used in calculations	10,043 gallons*	392 loads per year * (40 gallons per load in a conventional washing machine – 14.38 gallons per load in an Energy Star washing machine). Washing machines also require energy for water-heating and mechanical operation. A conventional washing machine from before 1999 uses four times the energy of a modern Energy Star unit.[284] An Energy Star unit uses 56.9 kWh a year for mechanical operation, and 192 kWh a year if electric water heating or 8 therms if gas.[285]

APPENDIX XVII

Household Actions to Reduce Indirect Emissions from Food and Consumer Goods, with GHG Reductions Estimated through CEDA4

Action	Reduction
Reduce consumption of beef and pork to once per week and fish, poultry and eggs to 2 or fewer per day	10% of food emissions[286]
Cut intake of sugary sweets by half	50% of sugary sweets emissions
Reduce purchases of clothing and shoes by 25%	25% of clothing and shoe emissions
Reduce purchases of cleaning products by 25%	25% of cleaning product emissions
Quit smoking	100% of tobacco product and smoking supply emissions

APPENDIX XVIII

Calculations of GHG Emissions from Purchases of Selected Products

Action	CES Category	CEDA4 Category	Expense	CEDA4 Category Code	kg CO_2e/$	Price Conversion Factor	Price Deflator	kg CO_2e	Ave. kg CO_2e
Reduce consumption of beef and pork to once per week and fish, poultry and eggs to 2 or fewer per day	Cereals and cereal products	Breakfast cereal manufacturing	$90.12	311230	0.9755	1	0.8434	74.2	77.7
		Flour milling and malt manufacturing	$90.12	311210	2.4064	0.6219	0.6023	81.2	
	Bakery products	Bread and bakery product manufacturing	$330.76	311810	0.7639	1	0.7574	191.4	191.4
	Beef	Animal (except poultry) slaughtering, rendering, and processing	$268.64	31161A	3.1489	1	0.8242	697.2	697.2
	Pork	Animal (except poultry) slaughtering, rendering, and processing	$185.54	31161A	3.1489	1	0.8242	481.6	481.6
	Other meats	Animal (except poultry) slaughtering, rendering, and processing	$122.93	31161A	3.1489	1	0.8242	319.1	319.1
	Poultry	Poultry processing	$192.37	311615	1.5025	1	0.7884	227.9	227.9
	Fish and seafood	Seafood product preparation and packaging	$170.74	311700	1.0510	1	0.7723	138.6	138.6
	Eggs	Poultry and egg production	$56.91	112300	2.3812	1	0.6566	89.0	89.0
	Fresh milk and cream	Fluid milk and butter manufacturing	$150.06	31151A	2.2120	1	0.8393	278.6	278.6
	Other dairy products	Cheese manufacturing	$71.99	311513	2.4827	1	0.8990	160.7	118.1
		Dry, condensed, and evaporated dairy product manufacturing	$71.99	311514	2.1067	1	0.8676	131.6	
		Fluid milk and butter manufacturing	$71.99	31151A	2.2120	1	0.8393	133.7	
		Ice cream and frozen dessert manufacturing	$71.99	311520	1.227	0.6121	0.8580	46.4	
	Fresh fruits	Fruit farming	$305.90	1113A0	1.555	1	0.9523	453.1	453.1
	Fresh vegetables	Vegetable and melon farming	$290.72	111200	1.7484	1	0.8133	413.4	413.4
	Processed fruits	Fruit and vegetable canning, pickling, and drying	$147.11	311420	1.1275	1	0.7702	127.8	127.8
	Processed vegetables	Fruit and vegetable canning, pickling, and drying	$120.26	311420	1.1275	1	0.7702	104.4	104.4

Reduce consumption of beef and pork to once per week and fish, poultry and eggs to 2 or fewer per day AND Cut intake of sugary sweets by half	Sugar and other sweets	Sugar cane mills and refining	$37.74	31131A	2.2816	0.6359	0.7519	41.2	30.5
		Chocolate and confectionery manufacturing from cacao beans	$37.74	311320	1.2245	0.6336	0.7962	23.3	
		Confectionery manufacturing from purchased chocolate	$37.74	311330	0.9718	1	0.7523	27.6	
		Nonchocolate confectionery manufacturing	$37.74	311340	1.0625	1	0.7410	29.7	
Reduce consumption of beef and pork to once per week and fish, poultry and eggs to 2 or fewer per day	Fats and oils	Fats and oils refining and blending	$100.31	311225	1.8701	0.7000	0.6011	78.9	78.9
	Misc. foods	All other food manufacturing	$776.65	311990	1.2012	1	0.8337	777.8	777.8
	Non-alcoholic beverages	Soft drink and ice manufacturing	$181.25	312110	1.0432	1	0.8415	159.1	144.6
		Coffee and tea manufacturing	$181.25	311920	1.0138	1	0.7074	130.0	
Reduce purchases of cleaning supplies by 25%	Laundry and cleaning supplies	Soap and cleaning compound manufacturing	$156.21	325610	0.7698	1	0.7658	92.1	92.1
Reduce purchases of clothing and shoes by 25%	Men and boys apparel	Men’s and boys’ cut and sew apparel manufacturing	$489.74	315220	0.5160	1	0.9863	249.2	249.2
	Women and girls apparel	Women’s and girls’ cut and sew apparel manufacturing	$814.69	315230	0.5873	1	0.9674	462.9	462.9
	Children under 2 apparel	Men’s and boys’ cut and sew apparel manufacturing	$67.89	315220	0.5160	1	0.9863	34.6	36.6
		Women’s and girls’ cut and sew apparel manufacturing	$67.89	315230	0.5873	1	0.9674	38.6	
	Footwear	Footwear manufacturing	$389.93	316200	0.7447	1	0.9226	267.9	267.9
Quit smoking	Tobacco products and smoking supplies	Tobacco product manufacturing	$202.00	3122A0	0.3241	1	0.6907	45.2	45.2

APPENDIX XIX

Hypothetical Input into Pledge Tally Form after Several Years' Participation in Path of Sustainability

Community Environmental Council Pledges	
Faith Community Name	Second Baptist
Estimated # of Congregation Members	38
Total # of Pledge Sheets Collected	24
Date Pledges Taken	1/3/2011

ECOFaith Pledge Categories	Subcategory	# People Already Taking Action (Count "I Already" column)	# Pledgers (Count "I Will" column)	CO_2e Reduction (lb) per Action Annually	Amount of CO_2e Pledged to Save Annually (lb)	Water Reduction (gal) per Action Annually	Amount of Water Pledged to Save Annually (gal)
Appliances	Unplug unused fridge/freezer	2	5	298	1,488		
	Replace old washing machine with efficient unit	1	2	141	283	3,499	6,999
	Replace old fridge/freezer with efficient unit	1	1	126	126		
	Replace old dishwasher with efficient unit	2	5	79	393	674	3,371
	Air dry clothes at least half the year	2	9	69	621		
	Plug electronics/TV into a Smart Strip or unplug when not in use	1	3	55	165		
Appliance Total		**9**	**25**		**3,076**		**10,370**
Food	Reduce consumption of beef and pork to only once per week, and fish, poultry and eggs to 2 or fewer times per day	3	2	427	853		
	Cut intake of sugary sweets by half	2	5	48	240		
	Purchase > 25% of food a week from farmer's market or local source						
Food Total		**0**	**0**		**1,093**		
Waste							
	Familiarize myself with Santa Barbara's recycling practices and recycle all recyclable waste	10	10	156	1,557		
	Compost kitchen and lawn scraps						
Waste Total		**10**	**10**		**1,557**		

Heating and Cooling	Install higher-performing insulation in attic and around ducts		1	100	100		
	Turn furnace thermostat down to 68 degrees in the winter when at home and 55 degrees when not at home	5	2	73	146		
	Change single pane windows to Energy Star qualified windows	1	4	60	239		
	Check air filters monthly and replace them if necessary	2	5	60	299		
	Replace old furnance with efficient unit	1	2	44	87		
	Caulk and weatherstrip all windows and doors	1	5	40	199		
	Turn A/C thermostat up to 78 degrees in the summer when at home and 85 degrees when not at home	5	2	35	70		
	Replace old central A/C with efficient unit	2	1	34	34		
	Professionally tune-up A/C system at least once a year	1	3	14	41		
H/C Total		**18**	**24**		**1,215**		
Lighting	Replace most or all incandescent bulbs with CFL bulbs	7	13	253	3,286		
	Consistently turn off lights when leaving the room	8	4	51	202		
Lighting Total		**8**	**4**		**3,489**		
Transportation	Replace car with one that gets at least 30 miles per gallon	2	5	4,642	23,209		
	Alter driving habits by accelerating more slowly, reducing unnecessary braking, reducing idling	6	9	2,420	21,780		
	Reduce air travel by 5,000 miles	1	1	2,138	2,138		
	Drive at least 30 fewer miles by carpooling or taking public transportation 2 days/week	2	6	1,890	11,341		
	Get regular oil changes and tune-ups for car, making sure to change the air filter and check the oxygen sensor	7	10	788	7,876		

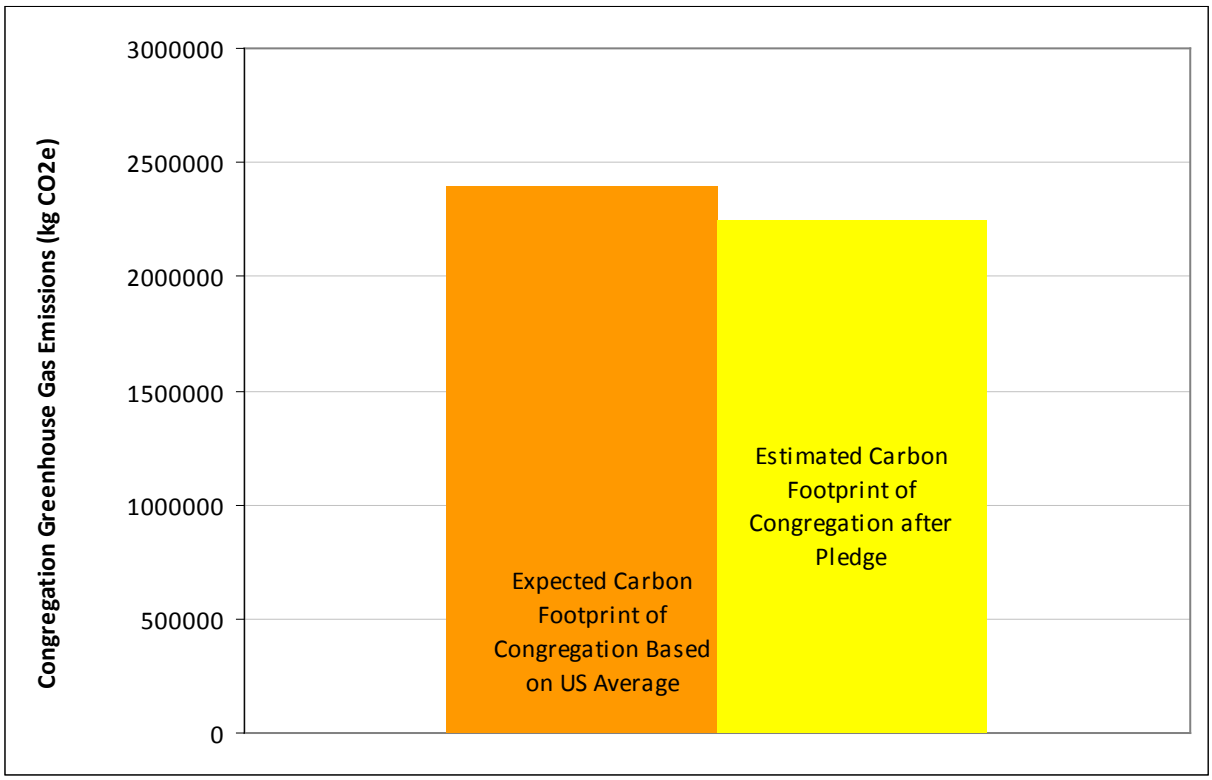
	Purchase low-rolling resistance tires for car		4	644	2,578		
	Drive at least 10 fewer miles per week by combining trips, walking, or biking	3	11	630	6,931		
	Keep tires properly inflated	2	4	473	1,890		
	Regularly remove excess weight from car	3	14	143	2,005		
Transportation Total		**8**	**29**		**79,747**		
Water Heating	Install a tankless or more efficient water heater	1	6	204	1,226		
	Limit showers to 5 min.	2	4	148	592	1,939	7,758
	Wash clothes in warm water and rinse in cold water	3	6	136	816		
	Install a low flow showerhead	2	4	68	273	896	3,585
	Turn water heater to no higher than 120 degrees	1	2	59	118		
	Wash only full loads of laundry			25	0	1,185	0
	Insulate an old inefficient water heater	1	2	21	43		
	Install faucet aerators or EPA WaterSense faucets	1	2	17	33	219	438
Water Heating Total		**8**	**16**		**3,101**		**11,781**
Water Conservation	Implement xeriscaping (using water-wise plants instead of lawns)					18,812	0
	Install a high efficiency toilet with a 1.3 gallon tank instead of a 3.5 gallon tank					4,092	0
	Adjust irrigation schedule as weather changes					3,815	0
	Install rotating nozzles on spray head sprinklers					3,762	0
	Check for household leaks in faucets and toilets					3,468	0
	Use mulch throughout garden						0
Water Conservation Total		**0**	**0**				**0**
Solar Power	Install a 3 kW solar PV system		2	1,259	2,518		
	Install a solar water heating system			552	0		
Solar Total		**0**	**0**		**2,518**		
Consumer Goods	Reduce purchases of clothing and shoes by 25%	4	2	207	415		
	Quit smoking	1	1	36	36		
	Reduce purchases of cleaning supplies by 25%	2	1	18	18		

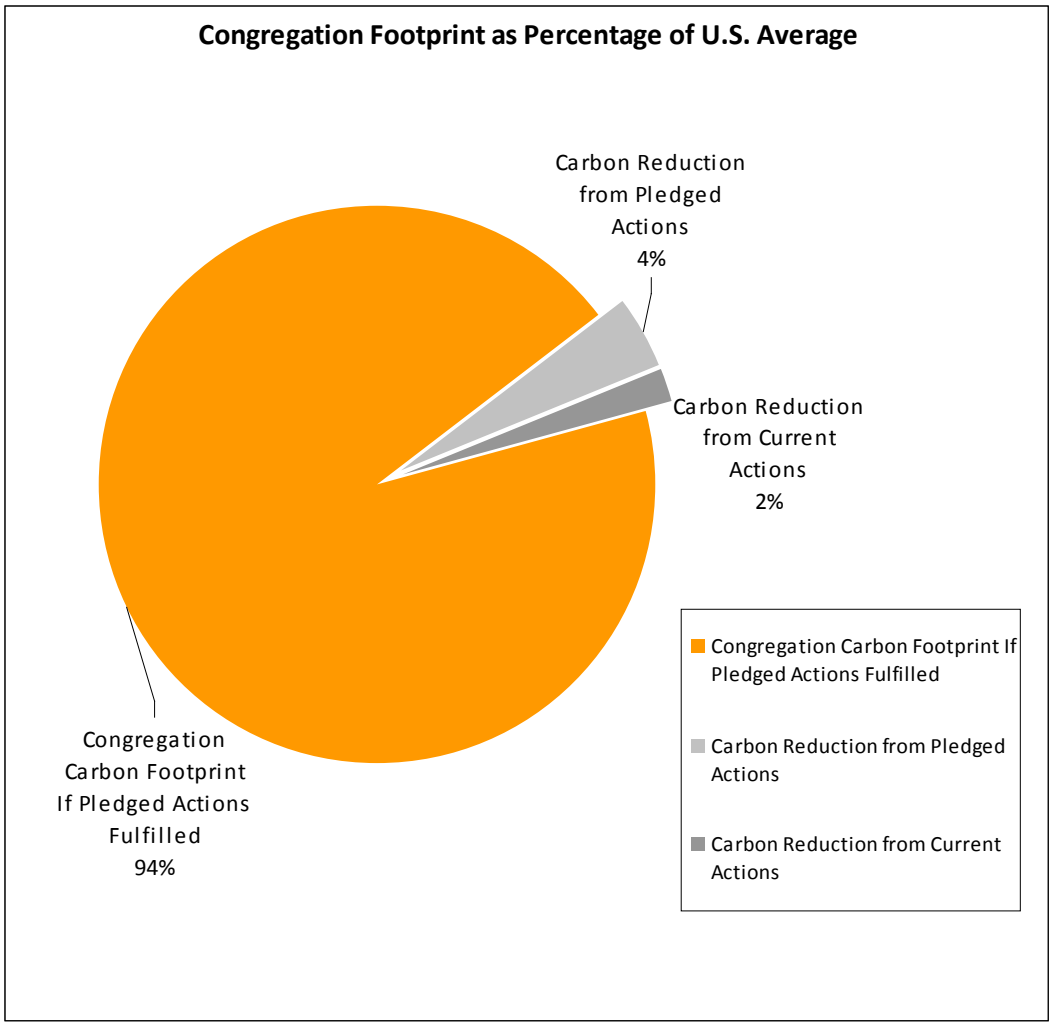
Consumer Goods Total	**2**	**1**		**468**		
Total benefit of pledged actions				**96,263** lb CO_2e		**22,150** gallons

Disclaimer: This worksheet provides very rough estimates of cumulative GHG and water reductions. **Actual emission and water reductions may be less than stated above** because these estimates may double-count savings. For example, if a congregation member upgrades the insulation in her attic and also installs a more efficient furnace, the combined emissions reduction will not be as great as if one person upgrades her attic insulation and another person installs a more efficient furnace. To explain further, once a home is insulated, it will not require as much heat from the furnace. Therefore, the furnace's efficiency would have less impact in a well-insulated home than in a poorly-insulated home.

APPENDIX XX

Pledge Tally Form's Visual Representation of the Congregation Compared to Baseline "Average American," Example of Hypothetical Congregation after Several Years' Participation in Path of Sustainability




Congregation Footprint as Percentage of U.S. Average
Carbon Reduction from Pledged Actions 4%
Carbon Reduction from Current Actions 2%
Congregation Carbon Footprint If Pledged Actions Fulfilled 94%
Congregation Carbon Footprint If Pledged Actions Fulfilled
Carbon Reduction from Pledged Actions
Carbon Reduction from Current Actions

APPENDIX XXI

Pledge Tally Form Goal-Setting Sheet, Example of Hypothetical Congregation after Several Years' Participation in Path of Sustainability

Filling out the pledge form is an important first step in demonstrating commitment to reduce environmental impact.
Encourage more of your congregation members to take the pledge!
Currently, 63% of your congregation has taken the pledge.

Enter a goal for the percentage of your congregation you would like to have taken the pledge by this time next year:
80% <-- *Enter goal here*

In order to reach your goal (based on your current congregation size),
6 more people need to take the pledge.

Not all actions are equal. Some actions have more impact than others. Currently, the cumulative impact of your congregation's current and pledged actions will reduce its greenhouse gas emissions by 6.0% .

Enter a goal for the percentage carbon footprint reduction you would like the congregation to have enacted or pledged by this time next year:
10% <-- *Enter goal here*

In order to reach your goal (based on your current congregation size), the congregation needs to pledge to reduce
95,586 more pounds of CO_2e.

Pledging is an important first step, but environmental benefits are not realized until congregation members act.
Currently, the cumulative impact of the actions your congregation is already doing will reduce its greenhouse gas emissions by 2.0% .

Enter a goal for the percentage carbon footprint reduction you would like the congregation to have enacted by this time next year:
3% <-- *Enter goal here*

In order to reach your goal (based on your current congregation size), the congregation needs to act to reduce
24,132 more pounds of CO_2e.

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