Green Theology
Energy Efficiency and Historic Sacred Sites
The New York Landmarks Conservancy’s Sacred Sites Program offers congregations throughout New York State financial and technical assistance to maintain, repair, and restore their buildings. In addition to providing hundreds of thousands of dollars in matching grants each year, the Conservancy offers technical help, workshops for building caretakers, and publications.

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Contributors

Andrew Rudin has studied changes in energy use in more than 3,000 buildings belonging to congregations in Philadelphia, New York, Phoenix, Chicago, Boston, Cleveland, Houston and other cities since 1976. For the past twenty-seven years, Rudin has been the project coordinator for the Interfaith Coalition on Energy (ICE) in Philadelphia whose mission is to inspire congregations to reduce the costs of operating their facilities. He has presented more than 300 energy management workshops and has written over 140 articles about energy for national periodicals. He has also published one hundred and three newsletters, called Comfort and Light, for the Interfaith Coalition on Energy.

Ian Dull is a 2009 graduate of Yale and was a Conservancy staff intern.

Nicola Coddington is former Executive Director of New York Interfaith Power & Light (www.nyipl.org), a statewide nonprofit organization whose mission is to support congregations of all faiths in their actions to curb global warming and protect the sacredness of the Earth. She also served on Governor Paterson’s Renewable Energy Task Force, as well as on the Westchester County Global Warming Task Force.

Page Ayres Cowley is the founder and a principal of Page Ayres Cowley Architects, LLC established in 1992. The architectural practice focuses on building conservation, adaptive re-use and new construction in historic landscape settings. Recently, her firm worked on the exterior masonry and spire restoration at Ephesus Seventh-Day Adventist Church in Harlem, New York, funded in part by the New York Landmarks Conservancy’s Upper Manhattan Historic Preservation Fund and Sacred Sites programs.

Sister Catherine Grace has been a member of the Community since 1990. Before joining the convent she worked as an electrical consultant. In 2001 she was selected to be a member of the Community Council, and shortly thereafter moved to the Community’s Melrose Convent in Brewster. There she helped found the Bluestone Farm and Living Arts Center, where the sisters focus their lives and worship to model and celebrate sustainable living, social justice, spiritual fulfillment, resilience and local community. Sr. Catherine Grace speaks to groups about the sacredness of Creation; passionate about environmental and ecological issues, she feels strongly that conservation and preservation are first and foremost spiritual concerns.

Photography

All photos pages 3-8 by Andrew Rudin; pages 18 - 23 by Page Cowley Architects; page 24 by Sister Catherine Grace
ENERGY COSTS: NOT A BURDEN TO BEAR

By Andrew Rudin

Since 1976, Andrew Rudin has studied changes in energy use in more than 3,000 buildings belonging to congregations in Philadelphia, New York, Phoenix, Chicago, Boston, Cleveland, Houston and other cities. He has also worked extensively with other non-profit community service agencies, such as YMCAs and day care centers, to reduce their energy costs.

For the past twenty-seven years, Rudin has been the project coordinator for the Interfaith Coalition on Energy (ICE) in Philadelphia whose mission is to inspire congregations to reduce the costs of operating their facilities. He has presented more than 300 energy management workshops and has written over 140 articles about energy for national periodicals. He has also published one hundred and three newsletters, called Comfort and Light, for the Interfaith Coalition on Energy.

This article is a summary of Rudin’s methodology as he and CE staff conduct energy audits for religious building throughout the U.S.
This article will explain how to lower energy costs for your congregation. To do that, I want to start with three distinctions.

First, houses of worship are not houses. Insulation, replacement windows and high efficiency boilers have a better return on investment when applied to the houses we live in because the occupancy is usually constant, 24/7. We live there. Options to purchase less expensive energy are relatively simple because residences typically have one type of electric, gas and water meter, and comparatively simple utility rates.

In contrast, houses of worship are usually not occupied overnight, and for much of most days. Since they are not occupied most of the time, their vacant conditions are much more important than occupied conditions.

Turning cooling, heat, appliances and fixtures off creates savings because systems, appliances and equipment can be off longer hours. If the building is empty, no spouse or child can object to cooler, darker conditions. Utility options are more complicated than with our homes. Non-residential buildings have many more choices of utility rates. Rates are more complicated by electric demand, off-peak rates, interruptible gas rates, varied water meter sizes, and possible sales tax, to list just a few. Plus the monthly energy costs in houses of worship are typically much higher than those for our homes.

There are far fewer houses of worship in the U.S. (about 330,000) than homes (about 129,000,000 or 400 times more than houses of worship). So, homes dominate the market. When we see ads on TV or in print about ways to save energy, they usually apply to our homes, not our houses of worship. Worse, vendors, contractors, utility reps and government officials often misapply residential technology to our houses of worship.

Second, all of our buildings (our houses, and our houses of worship) have more public, enhanced, accessible passages that lead us into spaces of which we are proud. In our homes, those spaces would be our foyers, living rooms, maybe dining rooms, even bedrooms. In our houses of worship and in our homes, we, sort of hide certain other spaces. In our homes, we don’t welcome visitors to our basements or attics. We don’t say, “Let’s go look at our boiler.” Or, “Come, let’s look at our attic insulation.”

My point is, right near sacred spaces are profane spaces. A congregation welcomes participation in the worship space, the social hall, classrooms, rest rooms, hallways, but never to a mechanical equipment room, attic or rooftop. In sacred space, a table or statue does not cost the congregation a penny in operating costs. Yet, we clean them, highlight them, describe and care for them.

In profane spaces, a boiler or air conditioning system may cost the congregation tens of thousands of dollars. And yet, we ignore them, until they cause an emergency. “What! No heat! It’s Christmas!” That is when they draw our attention. Otherwise, they don’t exist in our every day consideration.

Can you imagine a congregation brochure describing their heating system? I can. “Our worship space is heated by an elegant low-pressure, 11-section cast iron, steam boiler. Its steady-state combustion efficiency is 84 percent. We have six heating zones, each with its own steam valve and 7-day programmable thermostat set to the lowest temperatures when no one is each the heating zone. We like our boiler so much, we have a spotlight on its name——Irv ing. When you put money in our collection plate, less of it will go up the chimney. We care for the gifts we receive.”

My profession is to help congregations care for profane spaces with methods that are appropriate for our types of buildings. A great beginning for most congregations, for example, is to have bright lighting in our boiler rooms, with well-labeled pipes, ducts and circuit breakers. A great, but rare, occurrence.

Third, older buildings may have lower energy cost than new ones. The following table shows data for 435 houses of worship in New York, New Jersey and Pennsylvania. Note that the energy cost per square foot is highest in newer buildings.
Summary: The summary is a list of my recommendations, their estimated first cost, and the estimated annual savings. The recommendations are ordered by simple payback, with the actions giving the greatest benefit at the lowest cost listed first. Simple payback is the crudest way to evaluate my recommendations because the environmental cost of using energy, such as contamination of our air and water, is not included in the calculations.

Recommendations: For each recommendation, I provide you a description of what should be done to reduce energy use, and the approximate cost to implement the recommendation.

Energy Data: In this section, I provide you with the basic energy data I gathered from your utilities and fuel suppliers.

Supplements: For each recommendation, I may include instructions for installation, actual proposals from qualified contractors, price lists from qualified vendors, and other information to help you implement the recommendations. If I take photographs, copies of some of them may be included in this section.

Who is going to pay, and how much?

Shortly after the Interfaith Coalition on Energy, or ICE, started in 1982, the organization went through a long-range planning process in Philadelphia. Unlike government and utility energy programs, we learned early on that the full cost of our work had to be born by either congregations or denominations. And we needed to be able to recommend specific products, contractors and vendors, which utility and government programs prohibit for political reasons. In 2009, for example, the least we charged was about...

### Energy Use by Building Age

#### Houses of Worship

<table>
<thead>
<tr>
<th>Age</th>
<th># of bldgs.</th>
<th>Avg. age</th>
<th>Ave. size</th>
<th>Energy/SF/Year kWh</th>
<th>Therms</th>
<th>Per square foot Watts Fuel input</th>
<th>Hours use</th>
<th>Annual energy cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 to 20</td>
<td>42</td>
<td>12</td>
<td>17,848</td>
<td>5.3</td>
<td>0.49</td>
<td>4.17</td>
<td>80</td>
<td>143</td>
</tr>
<tr>
<td>21 to 30</td>
<td>38</td>
<td>25</td>
<td>15,871</td>
<td>3.2</td>
<td>0.53</td>
<td>3.20</td>
<td>81</td>
<td>124</td>
</tr>
<tr>
<td>31 to 50</td>
<td>72</td>
<td>39</td>
<td>21,115</td>
<td>3.4</td>
<td>0.56</td>
<td>2.71</td>
<td>78</td>
<td>154</td>
</tr>
<tr>
<td>51 to 70</td>
<td>59</td>
<td>61</td>
<td>17,951</td>
<td>1.9</td>
<td>0.60</td>
<td>1.69</td>
<td>88</td>
<td>119</td>
</tr>
<tr>
<td>71 to 90</td>
<td>82</td>
<td>79</td>
<td>20,295</td>
<td>1.6</td>
<td>0.58</td>
<td>1.53</td>
<td>83</td>
<td>125</td>
</tr>
<tr>
<td>90 to 120</td>
<td>84</td>
<td>104</td>
<td>19,756</td>
<td>2.0</td>
<td>0.57</td>
<td>1.72</td>
<td>87</td>
<td>139</td>
</tr>
<tr>
<td>Over 120</td>
<td>84</td>
<td>167</td>
<td>18,628</td>
<td>2.8</td>
<td>0.57</td>
<td>3.90</td>
<td>84</td>
<td>136</td>
</tr>
</tbody>
</table>

**Totals** 435  
**Averages** 70 18,543 2.9 0.56 2.56 83 134 $1.30

Notes: Age is year of construction before the site visit. Average size includes only intentionally-heated floor area. Watts are the peak kilowatts of demand for the year. Fuel input divides the boilerplate fuel input by heated area. Hours use averages the monthly kWh/kW for one year. Annual energy cost is based on $0.20 per kWh and $1.30 per therm.

### Useful Conversions

- **Electricity** - 3,413 Btus per kWh
- **Natural gas** - 100,000 Btus per therm or CCF
- **#2 fuel oil** - 138,000 Btus per gallon
- **Propane** - 91,500 Btus per gallon

### How to understand energy use

In my consulting practice, specializing in energy conservation for religious buildings, congregations consult me for help with their energy costs every few days. If the caller wanted advice about weight loss, I would ask for a photo. But, unlike excessive food intake, you can’t see excessive electric and fuel use in buildings. So, I go online and get aerial photos of their building and visit the congregation website, often for more photos. I ask the congregation to fax me a recent invoice for each electric, gas and water utility that serves their building. Some invoices have information about the annual consumption on that account. Some utilities, like ConEd, provide two years of their data on monthly consumption and cost (only for ConEd, not the deregulated suppliers).

I ask how they heat and cool their buildings, and what problems they are experiencing. Do they have blueprints, particularly heating and cooling prints? With that information, I can usually create and send to them a proposal.

Summarizing what my firm typically includes in a 6-part energy audit and report, the following components should be included for a typical religious facility:

Your report will be packaged in a three-ring binder. There are six dividers in the report. We intend to make the report easy to understand. Before you receive it, one other person will examine it to make sure it is meaningful for you.

### Description

This section describes your facility and how it is used. The information comes primarily from the information submitted to me, plus further details I learn on-site. We measure your building from the outside and round off the floor area to the nearest 100 square feet, including heated basements.

### Evaluation

This section compares the energy your facility uses annually per square foot of floor area. I compare this rating with similar ratings for hundreds of buildings just like yours in this climate. This comparison is fundamental to my approach. I do not estimate savings in energy use or cost that are not reasonable, given the relative amounts of electricity and fuel you use per square foot. If I record temperatures at your facility during the “heating” season (December through mid March), this section will contain the temperature graphs and my analysis.

### Summary

The summary is a list of my recommendations, their estimated first cost, and the estimated annual savings. The recommendations are ordered by simple payback, with the actions giving the greatest benefit at the lowest cost listed first. Simple payback is the crudest way to evaluate my recommendations because the environmental cost of using energy, such as contamination of our air and water, is not included in the calculations.

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$1,500 in Philadelphia, and the maximum was close to $5,000. Often, we file away the information and wait for any sticker shock to subside. After all, our fees might be just one January’s electric and fuel bill.

When they say ‘yes’

If the congregation accepts the proposal, the survey process begins. I send them an email:

The order of activities is to first discuss the buildings — how they are used, when they were built and renovated, and so on.

Then I install small electric meters on as many 110-volt appliances as we can—refrigerators, freezers, ice machines, vending machines, dehumidifiers, etc. Often, congregations forget about the small refrigerators here and there, perhaps in child care rooms.

I look at all the blueprints you have, which takes typically a half hour. You don’t have to sort through them, but a large table would be helpful to spread them out. Some congregations have floor maps that show people how to get out of the building in an emergency. If you have a set of these, can you make two copies of each page for me?

When we start looking at your buildings, I like to look at the boiler rooms first. Each boiler room can take a half hour or longer.

If possible, I like to get into the attics, inside enclosures for ground-mounted air conditioning equipment, and on any flat roofs. If this is too difficult, we can skip that. I would like to look inside all your rooms, even storage closets.

Other helpful items include, a schedule of normal activities by heating zone, a list of heating and cooling equipment, any heating and cooling maintenance contracts you have, and any previous surveys you have had of lighting, HVAC equipment, energy audit reports, etc.

I would also like to look at one recent water bill for each water meter you have.

I will place temperature recorders around your facility. One goes outside on the north side of the building where the sun can’t warm it. Others go in major heating zones, such as the sanctuary, parish hall, education wing, office section and so on. How many inside recorders should I bring? They will stay in place for just over one week, at which time I hope you can collect and return them. I will bring a postage paid return envelope.

Recommendations Energy Audits Include To Help Congregations:

1. compare their energy use to similar buildings
2. determine energy cost per square foot of space
3. note the safety of electrical/mechanical systems
4. reduce energy costs
5. confirm application of maintenance contracts
6. understand how energy systems function
7. support proper stewardship
8. educate maintenance staff
9. inform about investments with reliable return
10. qualify information from vendors
11. assist function of property committees
12. understand energy billing procedures
13. show changes in energy use and cost over time
14. increase comfort, and
15. inform facility operators on mechanical/electrical systems
My site visit usually takes 2½ to 5 hours.

**What changes can readily lower electricity and fuel use?**

Turn things off, because nothing is more effective than turning something off. It doesn’t matter how small or efficient a lamp, appliance, boiler, air conditioner or motor is—the greatest savings comes from turning it off and keeping it off. The more inefficient an appliance is, the greater the savings from keeping it off. Since religious buildings are used intermittently, there is less need to keep thing on. Keeping things off matters even more in houses of worship than in more heavily used buildings.

In the northeast, more than 95 percent of congregation fuel costs are for space heating. The biggest controversy is how low to set the interior temperature during unoccupied periods. The American Institute of Organbuilders recommends: “If the worship space is unoccupied for most of the week, lowering the winter midweek heat setting to around 40°F (or slightly higher in mild climates) will naturally keep the relative humidity high enough that a humidifier may be unnecessary.”

**Buy the least expensive energy** There are many forms of energy—green electricity (renewable sourced electricity like hydrogen), brown electricity (energy from burning coal or other fossil fuels), natural gas, propane, fuel oil, gasoline, and so on. Once a congregation has chosen the type of energy they want, they should continually seek to purchase the least expensive energy. Factors continually change. Electric suppliers change their terms in a deregulated market. Each utility offers different types of rates; for example, congregations generally save money with time-of-use electric rates. Congregations can purchase contracts or fixed-price fuel oil. They can purchase transportation gas through marketers. Other factors are how energy costs are included in leasing space, whether or not a congregation needs to pay state sales tax or federal excise tax. Whatever choice they make in the type of energy purchased, they need to continually shop for better deals.

**Tune systems to optimal performance** Building operators should continually adjust water temperatures, air temperatures, dampers, the height of pilot light flames, and so on. Hire a qualified heating contractor to tune oil and gas burners. Use natural ventilation instead of compressor air conditioning on appropriate days.

**Purchase efficient replacements** Everything is crumbling into dust. Congregations will eventually replace motors, air conditioners, heating systems, lamps, ballasts, and so on. The premium cost of more efficient equipment is usually justified when purchasing replacement equipment. Be very wary of cutting-edge technology without a track record of measured performance. In the northeast, at least three quarters of congregations’ electric use is for lighting. So, replacing inefficient lights and ballasts with more efficient ones makes sense.

**NYSERDA can help:** http://www.nyserva.org/programs/Existing_Facilities/default.html

**How to create interest in energy?** Energy management is not something that we do once and for all. Instead, these activities are a series of repeated rituals. But how do you keep members of property committees and the congregation interested in energy? Several suggestions follow:

**Keep records** You can’t play any game without keeping score comparing energy use day to day, month to month or year to year.

**Read meters morning and evening** By reading your electric, gas and water meters first thing in the morning and last thing in the evening, you can determine how much electricity, water and fuel is used overnight. High water use may be due to leaks. High electric use may be due to outside lighting, refrigeration, lights in vending machines and other controllable loads. High gas use may be due to warmer than necessary interior temperatures. Your clock thermostat may not be saving you as much money as it could.

**Install data loggers to track energy use** iButtons from Dallas Semiconductor can record temperatures for up to a year inside your building. Hobos from Onset Computers not only record temperatures, but light, relative humidity and amperage. Data from these loggers can show you if you are using energy when the buildings are actually occupied.

**Visit your buildings at 3 am** Early morning visits, when no one is supposed to be in your building, can reveal many interesting ways to reduce energy use. Space temperatures may be unnecessarily warm, or lights may have been left on by mistake. Sounds and sights can tell you how to reduce overnight energy use.

**Publicly display utility invoices** Sometimes, members of the congregation think that worship and education spaces use about the same amount of electricity, fuel and water as their homes. If you post your utility bills each month on a public bulletin board, you can stimulate interest in reducing costs.
Visit other religious buildings knowing their consumption
If you know that a similar building uses less fuel and electricity than yours does, you can learn a lot by visiting with the people who operate it. Such visits without utility data in hand, however, are not valuable.

Read energy management literature Corporations, government agencies, utilities, environmental groups and many other places have free or low-cost literature that can perk up interest in energy.

Go to expositions and conferences In the New York City area, there are yearly expos and conferences specializing in commercial lighting, building maintenance and electric use. There are home shows, too. And occasionally, a national professional association holds their convention at a nearby convention center, often with free admission.

For example, see: http://www.javitscenter.com/

Hire an energy consultant Hiring an energy consultant to conduct an energy audit is a great first step. A good consultant will inspire the congregation to implement the audit.

Simple measures such as installing bright lighting in boiler rooms, labeling pipes, ducts and circuit breakers is an excellent way to begin caring for profane spaces in religious buildings, above, according to Rudin. Rudin advises exit signs should be lit with light-emitting diodes.

Online Resources

Weather
weatherchannel.com

Data Loggers
onsetcomputer.com
www.ibuttonlink.com

Submeters
Electric meters www.electricalconnector.com
P3 Kill A Watt Meters www.supermediastore.com
Water submeters plumbingworld.com/wameters.html

Equipment
Office equipment ratings aceee.org
Heating systems (Holohan) heatinghelp.com
Lighting specifications www.newbuildings.org
Lighting research lrc.rpi.edu

Energy
Electric and fuel prices www.bloomberg.com/energy/
Forecasting end of fossil fuels www.dieoff.com/

Major Clock Thermostat Manufacturers
Honeywell www.honeywell-thermostat.com/
Lux www.luxproducts.com/
Common Bond asks congregational leaders and representatives from denominational building services departments about energy audits and advice for going ‘green’
For this “Green” issue, Common Bond interviewed congregational leaders and representatives from the building services departments of different denominational bodies about energy audits and advice for going green more generally.

The first two interviews are with the leaders of two different churches, Cadman Memorial Congregational Church, and St. Matthew and St. Timothy Episcopal Church, which undertook a New York State Energy Research & Development Authority (NYSERDA) audit and a private audit, respectively. The other interviews tackle green issues more generally, and are a treasure trove for resources and ideas about how to lead your congregation, or your denomination, toward a more sustainable future.

Further information and links to websites and sample energy audits can be found on the New York Landmarks Conservancy website, nylandmarks.org.

The Reverend Lezlie Austin-Kennedy, Cadman Memorial Congregational Church, Clinton Hill, Brooklyn

The Reverend Lezlie Austin-Kennedy is currently pastor of Cadman Memorial Congregational Church in Brooklyn, New York, where she engages in life coaching, counseling and education of the congregation and others—all a part of the many facets of pastoral care in an urban setting. The Reverend is an Itinerant Elder in the African Methodist Episcopal Church and has served as Director of Development for ten years at the Greater Allen A.M.E. Cathedral of New York, Jamaica, New York. Her leadership abilities were honed in 17 years with the Xerox Corporation where she climbed the corporate ladder and became a confidential level manager. Cadman Memorial Congregational Church underwent a NYSERDA energy audit in December of 2005 (click here to download the audit).

Common Bond: Why did you decide to undergo an institutional energy audit in the first place?

Rev. Lezlie Austin-Kennedy: We decided to have the audit firstly to save money, because we thought we would get a better indication as to how to economize, if we did the audit. But also we did it to conserve energy in the more abstract sense. We went with the NYSERDA audit because it was available. We didn’t have to look for it or search it out, interview people for the work. It was just an easy conduit. They contacted us, and were very responsive when we let them know we were interested. They made the whole process very easy. They scheduled the appointment; they came, they did the audit—I believe in two visits; and then we got the report.

CB: With the report that you received, how quickly were you able to put the findings into effect?

LAK: That took a while because one of the things we did was to install a computerized thermostat. It was costly, and we have a small congregation, so we had to wait until we raised the money before we could go through with it. Some of the things we were able to do right away: starting to change bulbs and those kinds of things. So there were things that could happen right off the bat, and others that we really had to save up before we could do it.

CB: Did the report that the auditors gave you clearly break down short-term and long-term initiatives?

LAK: Yes it did. Plus they went over it with us, explaining the findings, highlighting the return on our investment if we were to make the changes.

CB: Other than fundraising which is always an issue, did you find it difficult to implement the findings that they gave you?

LAK: No—we prioritized the ones right away that we could do as easily as possible. There are some things that we still can’t get to. So for instance, the bulbs up in the gym in the church—it’s not easy to change those bulbs. Those kinds of things we have not been able to do, so there are still some things that we have not done in the report. But down the line, we’re hoping to put the rest of the findings of the audit into effect. We’ve just got to wait until the timing is reasonable.

CB: When you decided to put in the computerized thermostat for your heating system, how did you go about selecting the contractor to perform that work?

LAK: We actually called the people who put in our furnace, and they made a recommendation of who to use. Then we sat down with the contractor and the audit, and decided on what equipment we would use to implement the things that the audit recommended.

CB: Have you already seen the return on investment?

LAK: We have, but it’s kind of hard to actually say, ‘This is specifically associated with the furnace.’ Because a lot of things have changed: we had a tenant; we had someone who was doing space sharing. We did notice a difference because they no longer had access (to the thermostat). So it’s probably a combination of things that helped us to realize the savings.

CB: Of the recommendations, the major investments that you’ve made so far, what percentage of budget does that constitute?

LAK: Probably anywhere from 3 – 5 percent. It was sizeable. What we had before you could control the heat manually, but it wasn’t flexible. Say for instance, if someone was there from 8 – 10 they could adjust the thermostat at will, but if the building was unoccupied, there was no ability to adjust the thermostat. This thermostat gives us a lot more flexibility during the day, each and every day. The regular thermostats you can do for the week, but not necessarily every single day. This one allows us to program daily, and we can even do multiple settings within a day, which means that we can make it work with our schedule.

CB: Since the changes were a sizable investment, did you work out with the congregation how long you expected things to take, when they could expect these things to pay off? What was the experience like, selling the audit to the congregation?

LAK: It really wasn’t a difficult sell, because it just makes sense. If we could control the thermostat, if we could use less energy with new light bulbs; it really, was not a difficult sell. In terms of recouping the investment, I would say we will recoup it in anywhere from 24 to 36 months.
The Reverend Carla E. Roland Guzmán, Priest-In-Charge/Sacerdote-A-Cargo, Church of Saint Matthew and Saint Timothy, New York, New York

The Reverend Carla E. Roland Guzmán has been at the Church of Saint Matthew and Saint Timothy since 2004, as Priest-in-Charge since February 2007. In addition to being Priest-in-Charge, she is President of the Board of the Saint Matthew and Saint Timothy’s Housing Corporation, and a Board member of the St. Matthew and St. Timothy’s Neighborhood Center. On occasion she serves as an adjunct faculty member at the General Theological Seminary, where she teaches courses in Church History. The Reverend has an undergraduate degree in Operations Research and Industrial Engineering from Cornell University. She received her M.Div. from the Church Divinity School of the Pacific and an M.A. in Church History from the Graduate Theological Union.

The church of Sts. Matthew and Timothy underwent a private, Interfaith Coalition on Energy (I.C.E.) energy audit in March, 2009 (click here to see the audit).

Common Bond: So why did you, at St. Matthew and St. Timothy, decide to undergo an institutional energy audit in the first place? What was the reasoning behind it?

Rev. Carla E. Roland Guzmán: Property Support from the Episcopal Diocese offered us the energy audit in exchange for hosting the conference (Green Theology Workshop). We knew that St. Matthew and St. Timothy was going to be a place that would be a good example in that the auditors were going to have a lot to work with, even though the church was not as old as many of the other buildings in the Diocese. The cherry on top was that then we would get it underwritten, and then we would host this conference.

CB: Property Support at the Diocese then set you up with a private audit?

RG: That’s correct. They set us up with Andrew Rudin, and then I worked with Andy on the entire process. In terms of getting him the measurements he needed and the data that he needed—he needed some bills and things like that. Then he did some temperature measurements about a year ago in March. It was very easy to arrange, and took very little time on my end.

At the very most, it was probably a couple of hours. At the very most.

CB: You said that he first took measurements about a year ago, how long did it take him to complete the survey and take all of the data to complete the audit?

CB: And once you had the report, how immediately could you put the findings into effect?

RG: The smaller changes we’re doing as they come up. So we immediately turned off the boiler pilot light, we lowered the steam pressure, we changed ballasts and tubes from T12s to T8s (from standard to higher efficiency ballasts and fluorescent tubes); we did those things immediately. The boiler was just one complication after another. We wanted our contractor to bid on what Andy proposed, and they wanted to bid on what they wanted to do. So we had these bids that didn’t talk the same language as the energy audit, and so we kept going back-and-forth, back-and-forth, back-and-forth on this. And it wasn’t until we sat down and said, ‘As a client, I want you to bid on this, even if you don’t agree with the findings. You can also give your own recommendation, and we can compare and probably fall somewhere in the middle.’ By the time we got that information, we’re not in the heating season. So we’ll deal with it before October.

The other issue is that there are some codes that are changing between 2009 and 2010, so that adds another level of things that we have to do to the boilers to bring them up to current code. So they were trying to bid with that as a response to this. So it was all just very complicated, we were not on the same page.

CB: Now that you have all of the numbers, are you planning on going with that contractor?

RG: We need to do a little bit of investigating, because the numbers are not what Andy estimated. They’re not even close. Andy estimated about $8,700, but these guys are saying $17,000.

CB: So the audit that you received, did it break everything down easily in terms of short-term and long-term changes that you could make? It sounds as though it was very comprehensive.

RG: Yes—he had first costs, energy costs avoided, payback years. The investment, according to him, was around $8,700, with a little over $17,000 in costs avoided, which—given that we pay about $63,000 per year in energy costs—is about a 27 percent reduction in costs.

CB: So it pays for itself quickly?

RG: In about half a year if we implement it. So far this year—even though at times it was a harsh winter—we’re about 10-15 percent lower than last year. Just with the basic things that we’ve implemented. And we’re in the process of doing the NYSERDA rebates, which Andy didn’t account for, although he gave us the information in his report. So with the rebates, we’ll save even more.

CB: Are you pleased with how things went overall?

RG: Absolutely. The audit was a very useful tool in giving us direction, and it’s so comprehensive that it’s not just trendy. It’s not just about compact fluorescents; it’s not just about one thing; it’s about everything that you can do, from changing a refrigerator to changing ballasts, changing light bulbs, using timers, programming [our thermostat] as robustly as possible.

Michael Rebic, Building & Property Support, Episcopal Diocese of New York

CB: Is there any general advice you give to congregations within your diocese?

MR: Turn things off and lower temperatures when buildings are unoccupied. Unfortunately most people—and most congregations—have been led to believe that expensive, high tech solutions such as solar panels and geo-thermal are the answers while the opposite is generally true: simple conservation measures can result in far greater savings. Recycling, reusing and reducing—especially, reducing—are the fundamentals of good energy management as well as good stewardship of the earth’s limited resources.

CB: You generally recommend energy audits to the congregations of the Diocese. What inspired you to recommend them over a whole building analysis, or another analysis?

MR: Existing conditions surveys can be very helpful to congregations in formulating long-term plans for the management of their built resources, however, they are extremely expensive and generally do not address issues of energy management. Energy audits target a specific issue and will often pay for themselves within a year or two if recommended measures are implemented. The savings realized through an energy audit can then be used to address other capital problems.

CB: If so, do you recommend that all congregations in the Diocese do it? Or just a select few?

MR: Property’s Support Energy Stewardship Grants which help underwrite the costs of energy audits are available to all congregations that make up the Episcopal Diocese of New York. The decision to undertake an energy audit is the parish’s, however, our experience since we started the grant program is that generally all congregations can benefit from an audit.

CB: If I’m not mistaken, for St. Matthew and St. Timothy’s you recommended an energy audit from Andy Rudin. Is there a reason you chose a private auditor over the NYSERDA audit?

MR: Property Support exclusively underwrites audits undertaken by the Interfaith Coalition on Energy (I.C.E.) [Andrew Rudin is the head of Phil-
New York City contractors.

ment installation costs of identify the best Timothy’s experience shows an out-of-town ties issues. However, Sts. Matthew and Saint Timothy, New York on Church of St. Matthew and St. Timothy energy audit

Editor’s note: Andrew’s practice is focused on religious properties, which makes his audits particularly attuned to their facilities issues. However, Sts. Matthew and Timothy’s experience shows an out-of-town consultant may not accurately predict equipment installation costs of identify the best New York City contractors.

CB: Do you provide funding to your constituencies to support audits?

MR: As part of its Energy Stewardship Grant Program, Property Support provides grants of up to $1,500 to congregations seeking to reduce utility costs and usage. Eligible projects include replacing incandescent bulbs with compact fluorescents, purchasing Energy Star appliances and undertaking energy audits. Congregations that undertake audits are eligible for a second grant to underwrite the costs of implementing energy saving recommendations. Generally, it is recommended that a congregation commence with an energy audit in order to identify projects that would be most cost-effective.

CB: What recommendations do you give to congregations looking to ‘go green’?

MR: There is a considerable difference between “going green” and managing energy consumption, although the two are interrelated. Most congregations seek to more efficiently manage energy consumption to reduce expenditures on utility bills; “going green” on the other hand, involves a more philosophical view that seeks to foster responsible use of the earth’s limited resources. “Going green” does not necessarily reduce the costs associated with energy consumption and often involves a considerable capital investment and sometimes higher immediate costs. The efficient use of energy is one aspect of “going green”; however, a “greener” presence requires a more comprehensive view of the use of all resources by a parish—from the choice of cleaning supplies to whether to use paper or ceramic coffee mugs.

CB: Have the audits been a valuable tool?

MR: The energy audits conducted by I.C.E. have been an extremely relevant tool for parishes that have chosen to conduct an audit as they examine actual consumption based upon existing usage and conditions. Although recommendations are often similar from parish to parish, the I.C.E. audits are specifically tailored to how each individual congregation uses its own buildings.

“It’s not just about compact fluorescents; it’s not just about one thing; it’s about everything that you can do, from changing a refrigerator to changing ballasts, changing light bulbs, using timers, programming (our thermostat) as robustly as possible.”

The Rev. Carla E. Roland Guzmán
Priest-In-Charge/Sacerdote-A-Cargo, Church of Saint Matthew and Saint Timothy, New York on Church of St. Matthew and St. Timothy energy audit

CB: For a Reform congregation looking to conserve energy and become more sustainable, what do you suggest?

JE: In terms of the resources we provide, probably the largest and the most often used is the Union for Reform Judaism website, where we have a ‘Greening Reform Judaism’ website (www.urj.org/green) and it really is very broad-based in terms of definitions, information about Judaism, Judaism’s traditional point of view and text about the environment, different kinds of programs, advocacy issues, resources and building-related issues. How we use our buildings, how we can adapt our buildings, and resources that are available for our congregations who are lucky enough to even have buildings. In addition, we have sponsored several webinar training or learning sessions, specifically about environmental awareness. With 900 congregations (throughout the U.S., Canada, the Bahamas, Puerto Rico and the Virgin Islands), you can imagine, it really spans the continuum.

CB: Do you recommend energy audits?

JE: We definitely recommend energy audits as a first step towards greening the congregation. It’s a way of engaging everyone within the congregation—including youth—in eco-friendly behaviors and also having a baseline for change, where change is needed. Being an educational rather than a directive organization, we cannot really suggest providers. What we can do is to direct our congregations to resources. Many of the resources that we have used are on our website: Energy Star, the Regeneration Project from IPL, and COEJL (the Coalition on Environment in Jewish Life), so there are many points of entry. We’re very much supportive of starting your greening process with an energy audit.

CB: Does the Union for Reform Judaism provide financial resources for Judith Erger, Governance, Leadership Development and Architecture Specialist, Union for Reform Judaism

Judith Erger is the lead Governance, Leadership Development and Architecture Specialist for the Union for Reform Judaism. As the former Assistant Director of the Department of Synagogue Management, Judith has extensive experience providing support to congregations in all areas pertaining to leadership; long-range and strategic planning; transition; and “managing the sacred.” Judith joined the Union for Reform Judaism staff in 1999 as Outreach Director and subsequent Assistant Regional Director for the Pennsylvania Council, and is delighted to assume her role as Congregational Specialist in the newly reorganized Union.

In addition to her work with congregational leadership, contributions to the Union’s resources include the development of an extensive portfolio of architectural resources; serving as staff liaison to the Congregational Heritage Preservation Committee; and spearheading “Greening Reform Judaism” in collaboration with the RAC (Religious Action Center).

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its member congregations?

**JE:** It is within our ability to direct congregations towards organizations and alternative sources of funding. That too is something that we have on the website: the foundations that we’re aware of, Energy Star, the EPA, the database of State Incentives for Renewable Energy and Efficiency. Because we cannot provide congregations with finances, I do spend a fair amount of timing speaking with congregations about how they use their buildings—so it’s sort of a self-audit. Ways to look at your own purchasing, ways to look at your own building usage and calculate usage to dollars.

**CB:** What sort of recommendations do you give congregations when they call you and ask you how they might be able to save money or become more environmentally friendly?

**JE:** One of the first things that I will suggest to a congregation is to compile their energy usage for the last few years to determine where the major expenses are in terms of heating, cooling. Also look at how the building is utilized, and again, where the major expenses are. If we keep our buildings open 7 days a week, we need to maintain staffing. Some of the suggestions are to use your building differently: have all committee meetings on the same day if your building can accommodate it, or try to introduce a blackout day like in the theater, so that there is a day when the energy usage is less, the maintenance staff is not required, the costs for staffing the building are less to the extent that congregations are able to do that.

It’s not uncommon with synagogues to have religious school wings that are dormant for a substantial part of the day, week, and month. If you’re going to use it, use it all the time. If you’re not going to use it, control the temperature, introduce zoning even if it has to be done manually, as ways of being more energy efficient.

I also talk to congregations a lot to the administrative staff, about how they purchase products, what kind of products they purchase, recycling and literally recycling where municipalities will allow. On our website are several different measures of how you can calculate your own carbon footprint: if the thought is, well my town doesn’t recycle plastic, but we can gather it all up and put it in cars and drive it somewhere—figure out the carbon foot print in that, because even though it’s the right message, it really may not be environmentally friendly.

**CB:** You mentioned that you have programs on the website that a congregation can use to train their congregation about the environment?

**JE:** We do. We have program banks, where congregations who have had successful programs will give us information about how they’ve run their program, and make themselves available as a contact. So there are program banks—both on our website and the RAC website—of actual congregational programs and events that can be replicated. We also share programming for holidays, both Jewish and secular. Earth Day was a big one for us. Every opportunity—Sukkot, the High Holy Days, and again there’s information on the website that will be specifically targeted around a holiday or event, or even a lifecycle event to be green.

**The energy audits conducted by I.C.E. have been an extremely relevant tool for parishes that have chosen to conduct an audit as they examine actual consumption based upon existing usage and conditions.”**

Michael Rebic
Building & Property Support, Episcopal Diocese of New York

We just partnered with GreenFaith (an interfaith, national energy conservation advocacy organization headquartered in New Jersey, www.greenfaith.org) and will be launching a New Jersey-based pilot program, where 8 of our congregations in New Jersey are being underwritten to participate in GreenFaith’s certification program. This was a partnership that we developed with GreenFaith because they have a 2-year certification program. They’ve done a great job to develop a curriculum that works across the denominations, and we were able to underwrite 8 of our congregations. We’re hoping to be able to grow what is starting as a pilot into a full-blown airplane!

**Walter Kroner, Architecture and Building Commission, Roman Catholic Diocese of Albany**

Walter Kroner serves as an architect on the Diocese of Albany’s Architecture and Building Commission. He is a Member Emeritus of the American Institute of Architects. Mr. Kroner is also a Distinguished Professor Emeritus at Rensselaer Polytechnic Institute, whose expertise lies in building science and sustainability. He has been teaching sustainable design since 1972.

**CB:** What are your first recommendations to parishes in the Diocese who are hoping to adapt their buildings to be more sustainable?

**WK:** In many cases, we insist that the first question we ask is, has a complete physical facility analysis been done? As part of our expectations of a complete physical facility analysis, is to look at all aspects of a building, foundation, site, structure, energy, mechanical, including energy analysis. That tells us, not only what the nature of the problem is, but also the costs you can expect over the next 5 to 10 years.

**CB:** And with that knowledge, what recommendations do you frequently make with regards to energy and sustainability?

If a project is being designed, whether it’s an addition, renovation or something new, because of our expertise, we look for ‘sustainability features’, related to the use of natural resources. Use of natural resources that come from nearby rather than from across the ocean; use of energy savings; as well as use of renewable forms of energy; so when those opportunities exist—either because of location or configuration—we basically expect that will explored, if not incorporated into the scope of work, or we expect an answer as to why something was not explored if it appears to us that there was an opportunity.

**CB:** Are there general tips which you give to parishes about energy and sustainability?

**WK:** We offer workshops for parishes considering any changes to their building, free of charge. The context for these workshops is the Commission’s belief that a project can only be a success if the client—and that includes not just the priest, but the parishioners too—is thoroughly involved in the decision-making process. That’s a nice philosophy and a nice theory, but if the client is not informed up to a certain level
where we could discuss why we have certain sustainability features or not, then it doesn’t work. That said, the three workshops deal with 1) religious buildings in history, 2) liturgical design in architecture, in terms of reflecting the liturgy and the belief system, and 3) then the final workshop is about the spectrum of sustainability. We start off by saying that what your building does, what your building looks like, how well your building is maintained is all a reflection on you, on your parish. But you also have a responsibility to the community at large, of conserving resources, and taking advantage of sustainability opportunities when possible. We use a lot of slides for that, to show them that there’s lots of ways of using daylighting, there’s lots of ways to use natural ventilation cooling. A church building usually has a high- ceiling space, and that presents tremendous opportunity when you’re talking about air circulation, ventilation, and cooling.

CB: Does the Diocese assist parishes with funding for energy-related enhancements?

WK: When a parish wants to engage in a project, like what is wrong with our building, or what can we do with our buildings, the Diocese expects the parish to pay for that. But maybe a project comes out of such an effort, and that project costs $1,000,000. They have to go through a funding drive, but if they achieve their fundraising goal and you’ve actually raised, in cash, 50 percent of the total money needed for the project, the Diocese will loan a parish the rest of the money at a low-interest rate.

Grace Yukich, Chair, Environmental Stewardship Committee, Metro New York Lutheran Synod

Grace Yukich chairs the ELCA Metro New York Synod’s newly-formed Environmental Stewardship Committee. She also serves as a member of the Metro New York Synod Council.

CB: What recommendations do you give to congregations looking to ‘go green’?

GY: Our ten-person committee formed in December 2008, so we are in the beginning stages of our synod-wide greening efforts. Our new blog, http://mnysgreen.wordpress.com, offers advice to congregations on issues ranging from basic steps congregations can take to decrease their environmental footprints to theological underpinnings for environmental care to contact information for energy audits. In addition to our online presence, the committee is working with clergy and laypeople to educate them about environmental issues and to equip them with resources that allow them to make better choices.

CB: Do you recommend energy audits to the congregations in the synod? What inspired that choice?

GY: Our blog includes links to resources that allow congregations to conduct their own green audits, helping them examine basic issues like congregation recycling and replacing standard bulbs with CFLs as well as more complex, energy-related issues like energy sources and insulation. It also contains links to two groups that can assist congregations with obtaining audits- New York Interfaith Power and Light (NYIPL) and NYSERDA. Beyond this, one of our committee members, Odd Sangesland, used to work in the energy field. Now retired, he retains a passion for helping congregations decrease their energy usage. He has already conducted an energy audit of his home congregation and helped them obtain a grant from NYSERDA for green projects. One of the main goals of our committee in coming years is to make Odd’s expertise available to other congregations in the synod.

CB: Do you provide funding to your constituencies to support audits?

GY: The synod does not currently provide grant funding, though the committee has discussed holding future green contests where the winning congregation would receive small funds for green services. As mentioned above, we will soon begin providing energy audits for a few congregations through the services of one of our committee members.

CB: Have any of the synod's congregations participated in Energy Star programs?

GY: Not that we know of. However, many congregations in the synod are already engaged in other green projects, an exciting situation we hope to build on through the committee’s work.

Peter Moore, Property Support Manager, Presbytery of New York City

CB: What sorts of resources do you provide to the churches of the Presbytery in terms of cutting energy costs and sustainability?

PM: We just finished an audit program that included all of our churches, for which the Presbytery paid the entire cost. By advertising the free energy audit—and the hundreds of thousands of dollars it could save all of the congregations put together—and organizing the two professional engineers covering all five boroughs, we were able to get all of our 98 member churches to undergo the audit.

CB: Why did you select the NYSERDA energy audit rather than a different energy audit or building assessment?

PM: The NYSERDA audits were cheaper than private audits, but still had the potential to save our member churches a lot of money in energy costs, if they completed them.

CB: Are you keeping track of the progress and implementation by individual churches of the findings of the audits?

PM: No, we are not tracking implementation or savings of or from the audits. However, many of our congregations applied for grant money to make the changes recommended by the NYSERDA engineers, so we’re confident that they are putting the audits to good use.

CB: What sorts of funding do you provide your churches in terms of energy savings?

PM: For churches in need, the Martinez Matching Grant Committee this year offered of 75 percent of the cost, up to $32,000, to complete the items recommended by the NYSERDA teams. All churches that qualified were eligible, regardless of having received recent grants. This past year we also provided $90,000 in fuel assistance to congregations with under $250,000.
Supporting Congregations, Protecting the Planet

By Nicola Coddington, Former Executive Director, NYIPL

Environmental and energy stewardship by congregations is one of those beautiful areas where the practical and the moral/ethical clearly come together. There is a direct connection between the way we manage our resources, such as conserving energy, and our ability to express the values of whatever religious tradition we’re involved with, for example, to “love our neighbor as ourselves.” More and more in this interconnected world, we understand the social justice impacts of our use of resources, as well as the impacts on the broader Earth community, other species in the living systems that are part of the interconnected whole; more and more congregations are concerned about “care for creation” as well as “care for our neighbor.” And religious leaders including the Pope have explicitly stated the direct connection between our resource use and the issues of justice and peace.

And of course, even on the most practical financial level, the more money a religious institution can save through the careful stewardship of energy and other resources, the more money is freed up for its primary mission.

The following is an introduction to New York Interfaith Power and Light, or NYIPL, and the resources it offers to congregations wanting to green their actions and operations.

NYIPL is a nonprofit organization whose mission is “to support congregations of all faiths in their actions to curb global warming and protect the sacredness of the earth.” We are part of the national Interfaith Power and Light program, helping to mobilize a religious response to the climate crisis by empowering religious leaders and congregations with resources to take action. Every congregation or faith-based organization in New York State is welcome to join the interfaith effort.

NYIPL helps congregations and individuals through workshops, presentations, individual consultation, and through the NYIPL website, a guide to which follows:

RESOURCES ON WWW.NYIPL.ORG
A sampling of the resources on our website, compiled from hundreds of sources and constantly growing:

WHY ACT?
• Faith. Most faiths and denominations have strong statements on stewardship of God’s creation in general and on global warming and energy stewardship in particular.

YOUR BUILDING
• Energy Use, Energy Audit, and Lighting. Information that can help your congregation reduce its energy use.
• Green Energy. Generating your own energy (mainly solar) and purchasing “green power.”
• Green Building. Secular and faith community-specific resources, not just on building or renovating, but also on greening your congregation in general.

CONGREGATIONAL LIFE
• Worship. Resources such as sermons, liturgies, prayers, etc.
• Education and Activities. Resources for adults and children, including curricula, courses, study guides, films, books, etc.
• Through the Year. Resources keyed to specific faith events or periods of the year.
• Mission Projects. Examples of energy stewardship missions.
• Eating Together… with Stewardship. The global warming and social justice impacts of your food choices. Includes large section of resources on community gardens.
Whole Building Approach: Making the Most of What You Have

By Ian Dull
Editor’s note: This article was adapted from a presentation by Page Ayres Cowley, FAIA, RIBA, LEED AP, principal architect of preservation-oriented Page Cowley Architects.

It’s easy for anyone to feel adrift in the sea of sustainability and green technology jargon; as it is today, one can ‘farm’ wind and fuel for automobiles can be ‘grown’ as sugar cane or corn, but the potential of these technologies has yet to be fully understood. New habits and ultramodern technologies seem to grow on trees, but it can be difficult to determine which strategies from among them are worth implementing. For the owners of historic sacred sites, answers are harder still to find, as one seeks to reconcile the promise of new ideas for sustainability with maintaining the celebrated historic character of a sacred building. Yet following the environmental mandate and ‘greening’ of one’s house of worship can be effected without the need to compromise on its historic character.

Since the energy crisis of the 1970s, preservationists have urged building owners and environmental activists to recognize the positive environmental qualities of historic buildings. Many of the largest uses of energy are not only in the course of building operation, but are embodied in the building materials and construction themselves. The extraction, processing, transportation, and construction of materials requires huge sums of energy; demolition of an existing building to make way for construction of a new building requires vast sums of additional energy to be expended. In one early case study on embodied energy, Seattle’s Grand Central Arcade was found to embody 17 billion BTUs of energy, while creating a new building of equivalent size would demand 92 billion additional BTUs, or 730,000 gallons of gasoline. And beyond energy, the demolition of commercial buildings (like sacred sites) results in the creation of 155 lbs of waste per square foot, and pounds of pollution released as dust. Preservation of historic buildings accomplishes many of the key ideas that inspire green technologies: creating energy while minimizing pollution and consumption of non-renewable resources.

Several characteristics of historic buildings help to reduce the energy and waste they produce. The choice of materials used in older construction contributes much of this benefit: traditional materials, like stone, wood, and brick, require much less energy to extract and process than many modern building materials, which are heavily manufactured. As a point of contrast, vinyl and aluminum—which are very commonly used to replace original windows—are associated with some of the...
highest embodied energies of any building material. Modern building materials also demand more complex maintenance, requiring specialized expertise to keep them in proper shape.

Still, historic buildings, having had more time to age, leave plenty of room for improvement. Page Ayres Cowley, FAIA, RIBA, LEED AP—principal architect of preservation-oriented Page Cowley Architects—recommends a laundry list of tactics for ‘greening’ a house of worship. Many of them are quite basic. “Maintaining the exterior of the building—the roof, walls, windows, and doors—is paramount to any attempt at improving the energy efficiency of a church or synagogue,” she says. Consistent care and vigilance with regards to several key issues concerning a building’s envelope can catch problems before they become systemic, compromising potential gains in energy efficiency.

Roofs—as any historic property owner will know—are an endless source of problems. They take a pounding from the elements: they play couch to piles of snow for months at a time, are pulled at by roaring winds (which is especially bad for religious buildings, as they are often taller than their surrounding buildings), and subjected to strong ultraviolet rays. However, roofs don’t need to take a pounding from one’s congregation. Putting too much weight on a roof can cause it to weaken or crack, which might lead to water infiltration or structural weakness. Even ladders and other objects made of soft metals hitting the roof can cause minor damage, which over time could develop into a more serious problem. It’s generally a good idea to avoid tasking too many people to go up on the roof at once. While roofs are meant to carry their own load, snow loads and other weight, the combination of such heavy weight in a small area can cause significant damage. Even seemingly innocuous problems like moss growing under shingles can prove troublesome: moss will spread and introduce moisture underneath the shingles, over time leading to rot and openings in the building envelope. A more tightly sealed roof will be the most energy efficient.

Compatibility of materials is a significant concern in historic buildings, especially with roof work. Materials, specifically metals, used in the original construction—but now concealed beneath layers of tar—might not be the same materials with which one’s local roofer chooses to perform roof repair work. If the metals are not the same between the original and the repair work, unbeknownst to the congregation, they will react with one another, leading to corrosion of the metals and surrounding materials, and sending a congregation down the long road to a leaky roof. Being familiar with the materials of one’s building can avoid otherwise inevitable compatibility issues.

Attics in religious buildings are also frequently over-tasked. They become storage space for building plans, equipment, and anything else that’s needed to keep the congregation functioning properly. But when attics become tight storage spaces, the weight can be too much and leads to strain on the structural timbers that support it, and the roof above, which can compromise the integrity and envelope of the building. Electrical systems in such spaces should be frequently checked as they are among the most common causes of accidental fires which destroy all too many beautiful, historic buildings.

Lightning naturally pose a threat to any building which they encounter. Even small lightning strikes, however, can be the source of significant damage. When lightning strikes occur while the stone is already wet, the huge jolt of energy causes the lime, cement and sand in the mortar to change in composition and fracture, leading to potentially dangerous spalling, and displacement (chipping of stone or brick masonry, which can then fall from the building) and room for
water infiltration. Church towers are especially vulnerable to this type of damage because of their general height in respect to most buildings around them, but the damage often goes unnoticed if it is not catastrophic. As very few people in a congregation tend to operate any machinery that might be placed in a church tower, maintenance to towers are much rarer than maintenance at—say—ground level, despite the much higher risk that the tower will be struck. Thus, spalling and water infiltration through cracks in mortar and masonry can become serious while going unnoticed, and the tower becomes a channel for water throughout the building. More consistent monitoring of the conditions throughout the building can catch similar problems before they become serious.

In addition, Vaisala STRIKEnet (http://www.vaisala.com/weather/products/strikenetfax.html) offers a service that will verify whether or not a building was indeed struck by lightning, informing the congregation of a need to act, as well as providing a level of certainty for insurance purposes. Other roof elements, like chimneys, can suffer from rarer inspections. If mortar in chimneys deteriorates—caused by any number of ailments—and gaps begin to form in the masonry, bricks may fall, often subtly, and unnoticeably damaging the roof in the process. The pinholes created can seep water into the building and grow into full-on leaks in no time.

Almost every church or synagogue has at least one stained-glass window, although the condition of the window(s), its framing and window sash, can vary greatly. Often times, stained glass windows are in dire need of restoration to avoid deterioration or destruction. If one were to replace the original window, the replacement chosen would conduct heat the least (corresponding to the greatest insulating properties, or highest R-factor, as it is known), which would be the most energy-conscious solution. Even so, the masonry or frame supporting the window would almost certainly not have as high of an R-value as the new window, and heat could escape through those materials or more certainly, through the cracks where they intersect with the window. In that case, replacing the window is insignificant, but an initiative like replacing weather stripping between the frame and the glass of the window can make all of the difference.
Backer rod and non-acidic (neutral cure) silicone caulk at perimeter lead helps weather seal stained glass more durably than original oil-based putty or masonry mortar.

Along with these recommendations for care, there are a number of quick fixes to further improve the energy efficiency of one's house of worship and improve one's sustainable practices more generally. Insulating water heaters and pipes and replacing worn weather stripping can work wonders too, as can very simple fixes to leaky pipes, toilets of faucets. Other methods involve small investments into new technologies, but can be done with ease. Although installing renewable energy sources into any building is an expensive undertaking, energy produced from these sources by one's local power company is just a phone call away and can frequently be purchased for just cents more on the dollar. Replacing old appliances with new Energy Star equivalents can be a very effective way to reduce energy intake, and the same goes with using efficient bulbs for light fixtures. Buying local reduces fossil fuel usage in transportation; and if construction lies ahead in one's future, considering recycled building products or rapidly renewable materials (like wood, stone, and brick) can save energy with minimal to no impact on natural resources.

In adapting a religious building for energy efficiency, or any repair more generally, one of the most important things is to consider is how any change or renovation—from fixing a leaky pipe to a total roof replacement—affects the building as a whole. “What we’re learning is that you can’t go into a building and just fix one thing without it having an effect on some other system of the building, or affecting your cost of maintenance budget,” Cowley instructs.

Architects all know horror stories about hastily planned work. Cowley narrates a tale of a new drain from a church tower, whose spout discharged onto another portion of the church’s slate roof, causing leakage. The congregation’s immediate response was to coat the slate in asphalt to wick away the water, which had the unexpected result of making the flashing no longer work elsewhere. They reacted with a new fix, and so on and so forth. But within a few months, water was pouring in from all different directions.

She tells another story of a church whose attempt to deter birds from nesting in their tower—using a home-made rigging of live copper wires, ready to zap anything that touched it—but eventually the frequent electric charges cracked the stone (like lightning) and led to the hazardous condition of stone spalling off of the building and down to street level. Walter Kroner, an architect with the Roman Catholic Diocese of Albany’s Architecture and Building Commission, told of...
a parish that added insulation into its walls to better retain heat; but without considering issues of moisture throughout the building, the insulation acted “like a sponge” and water began to seep everywhere. In all of these cases, the analysis of the situation was too narrow in scope, and the results could only be described as catastrophic. Without understanding a structure’s many inter-related building systems, even the best intentions can lead places where no one wanted to go.

As these stories point out, the most pressing needs of a building may not be the most obvious, often hidden from plain sight or the untrained eye. Indeed, what one sees is not always what one gets. Architects offer valuable support in this regard, and many, including Cowley’s firm, prepare existing conditions reports on a building, analyzing current issues, and designing a master plan for work that should be carried out in terms of urgency. As Cowley puts it, “You need to be the generalist before you’re the specialist. Sometimes it’s not really the boiler or the electrical system. Those are effects of something else that has failed or is not working for [a congregation] with they way they use the building.”

While existing conditions reports are not geared specifically toward developing a strategy for energy efficiency, a building assessment and a master plan are valuable tools in terms of finding energy efficient solutions, or locating problems that may be impacting a congregation’s ability to properly conserve energy. Many problems are linked to issues of the enclosure of a building: cracks, moisture and rot, or materials past their prime, pose great threats to the state of a building, and naturally to its energy efficiency. An existing conditions report will identify these issues and strategize for the future of the building. Of the many benefits of this strategy is the financing structure it provides: rather than facing nearly insurmountable costs as the building suffers the catastrophic damage of delayed maintenance, a congregation deals with a potentially smaller scope of work upfront and has more leisure to fundraise for the long term enhancements. And when all of the conditions report’s recommendations have been completed, a congregation should have a new lease of life on their house of worship—a truly sustainable building.
Pr acticing Sustainable L iving

By Sister Catherine Grace

Sr. Catherine Grace has been a member of the Community since 1990. Before joining the convent she worked as an electrical consultant. In 2001 she was selected to be a member of the Community Council, and shortly thereafter moved to the Community’s Melrose Convent in Brewster. There she helped found the Bluestone Farm and Living Arts Center, where the sisters focus their lives and worship to model and celebrate sustainable living, social justice, spiritual fulfillment, resilience and local community.

On the back of our Bluestone Farm and Living Arts Center brochure we have written: “Let us live as if everything matters ... because it does.”

We say this because we have dedicated ourselves to increasing knowledge and awareness of the sacredness of the entire Universe and to the realignment of our lives within that vast context. But simply saying the words is not enough; substantiating this sweeping statement risks a dizzying flip-flop of one’s worldview, but also provides the ground and guidance we need to live well in the twenty-first century.

Once we grasp the significance of the fact that matter matters, and why, we begin to see that not only the created order but that absolutely everything, including structures created by humans, deserves our respect.

On the back of our Bluestone Farm and Living Arts Center brochure we have written: “Let us live as if everything matters ... because it does.”
Whether one is examining the structure of an atom or a galaxy, the content is the same: only 4 percent is occupied by actual physical particles—atoms and all their component parts. We are far from fully understanding what constitutes the other 96 percent, and until we do we struggle to name it. We do know a bit about what happens there, however: particles actually appear and disappear, seemingly from nothing. We have no idea where those particles come from or where they’ve gone after they disappear.

I am not a quantum physicist but I can comprehend that the activity within this strange non-matter is creative in nature. Whether one uses the words of science (dark matter, dark energy), or cosmology (fecund nothingness, seamlessness) or religion (God, the One, Allah), we find ourselves in an essentially creative Universe, which itself seems to be one long, lovely journey of emerging and ever more complex creations.

Thomas Berry, a cosmological theologian who spent his life studying and articulating the sacred nature of the Universe, expands on this creative essence: “Reality is not some infinitely extended homogeneous smudge. Each articulation is unrepeatable and irreplaceable at whatever level, from the subatomic to the galactic, from the iron core of the Earth to the flower, from the eagle in flight to the human persons who walk over the land. Each of these is a unique expression of the total Earth presence.”

Once we make the internal quantum-shift realization that we live in a Universe and on a planet that are steeped in meaning, we have a spiritual imperative to be respectful of everything—not just the people we can be comfortable with, but all people; not just the life-forms we understand or find attractive or feel safe with, but all life-forms; not just those beings and creatures of nature we consider “alive,” but the rocks and the water and the air, too; not just the natural world, but everything created by those beings and creatures, including the built environment of the human.

All of it, every single bit, is sacred in its very substance, and all of it deserves our devoted care at every level. In a sense all space is sacred space; but when we design, build, maintain, use, renovate or tear down a building that has been dedicated for specifically sacred use, we must be committed to this work with conscious, deep respect and thoughtful, intentional care. For these are the places we seek to remind ourselves of our own inherent sacred dimension and to re-orient ourselves to the sacredness of the whole.

“It is often within the walls of sacred space that we can recommit to living as if everything matters. Because it does.”

Sister Catherine Grace speaks about the sacredness of creation at the “Green Theology” workshop, October 22, 2009.

References and resources:
Community of the Holy Spirit: www.chssisters.org
Bluestone Farm Fans on Facebook: http://www.facebook.com/pages/Bluestone-Farm-Fans/118453775039403?ref=ts
The New York Landmarks Conservancy’s Sacred Sites Program is one of the oldest programs in the country dedicated to the preservation of historic religious properties. The program has made more than 1,000 grants totaling almost $6.2 million to nearly 700 institutions since its inception in 1986. The Conservancy awards three kinds of grants: Sacred Sites Grants, Consulting Grants, and Robert W. Wilson Sacred Sites Challenge Grants.

In addition to grants, the program has helped hundreds of landmark-quality religious institutions with hands-on technical assistance, referrals, and workshops on the maintenance and repair of historic religious properties and associated financial issues. For more information and an application form, please visit:

http://www.nylandmarks.org/programs_services/grants/sacred_sites_program/

Sacred Sites and Consulting Grants
The New York Landmarks Conservancy awards Sacred Sites and Consulting Grants to congregations of all denominations that are planning or undertaking the restoration of historic religious properties. To be eligible, properties must be located in New York State, owned by a religious institution and actively used for worship, and listed on the State or National Register of Historic Places or designated pursuant to a local landmarks ordinance by New York State. Eligible properties include, but are not limited to, churches, synagogues, meetinghouses, mosques, and temples.

Albany
St. Andrew’s Episcopal Church, Albany
Roof, Drainage, and Masonry Repairs $4,000

Columbia
North Hillsdale United Methodist Church, Hillsdale
Roof replacement $2,000

Delaware
St. Paul’s Episcopal Church, Franklin
Roof Replacement $5,000

Greene
First United Methodist Church Coxsackie
Conditions Assessment $2,000

Monroe
Church of the Ascension, Rochester
Masonry Restoration at Tower $4,000

Nazareth Academy Convent Chapel, Rochester
Masonry, Drainage, and Protective Glazing Upgrades at Chapel $3,000

Nassau
Manhasset Monthly Meeting, Manhasset
Architectural Fees for Exterior Restoration $1,500
Exterior Restoration $5,000
New York
Church of St. Paul and St. Andrew, United Methodist, Upper West Side
Repairs to South Tile Roof and West Marble Entrance $2,500

Kehila Kedosha Janina Synagogue, Lower East Side
Repointing of Brickwork at Secondary Elevations $5,000

St. Mark’s Church in the Bowery, East Village
Restoration of the 10th Street Entrance to the West Yard $4,000

St. Michael's Episcopal Church, Upper West Side
Engineering and Architectural Services for Church Bell Tower and Masonry Repairs $6,000

Stanton Street Synagogue - Congregation B’nai Jacob Anschei Brzezan, Lower East Side
Structural Engineering Services $2,500

Queens
Astoria Center of Israel, Inc., Astoria
Roof and Decorative Parapet Conditions Assessment $3,500

Kehilath Israel, Corona
Construction Documents for Façade Restoration $7,500

St. George’s Church, Flushing
Architectural Services for Emergency Spire Stabilization $5,000

Niagara
First Baptist Church of Newfane, Newfane
Construction Documents for Roof Replacement at Church and Steeple $2,000

Steeple Roof Replacement and Basement Structural Repairs $6,000

Onondaga
Fabius Christian Church, Fabius
Steeple Residing $4,000

St. Paul Armenian Apostolic Church, Syracuse
Engineering Services to Stabilize Sagging Roof Trusses $2,000

Orleans
Christ Episcopal Church, Albion
Restoration of the Bell Tower $2,000

Otsego
First Baptist Church, Cooperstown
Steeple Slate Roof Repair $4,000

Astoria Center of Israel, Inc., in Astoria, Queens received a grant for a comprehensive Restoration of Decorative Parapet of $30,000.
Wayne
East Palmyra Presbyterian Church, East Palmyra
Entrance and Façade Masonry Restoration  $2,000

Westchester
St. Thomas Episcopal Church, Mamaroneck
Replacement of Tower Louvers, Coping Repairs, and Brownstone Repointing  $9,000
St. John’s Episcopal Church, Wilmot, New Rochelle
Door and Clapboard Replacement and Window Frame Restoration  $2,000
Sisters of Divine Compassion / Chapel of the Divine Compassion, White Plains
Consultant Fees For Restoration of Chapel Roof and Bell Tower  $4,000

Yates
St. Luke’s Episcopal Church, Branchport
Stained Glass Restoration  $2,000

Total Pledged in 2010:  $131,000
Average Pledge in 2010:  $3,750

The Historic Synagogue Fund
The Historic Synagogue Fund allows the Conservancy to make Challenge Grants of between $25,000 and $50,000 to assist major repair and restoration projects in New York City.

Queens
Astoria Center of Israel, Inc., Astoria
Comprehensive Restoration of Decorative Parapet  $30,000
The Free Synagogue of Flushing
Stained Glass Window Restoration  $40,000

Total Historic Synagogue Grants Pledged in 2010  $70,000
Average Pledge in 2010  $35,000

Robert W. Wilson Sacred Sites Challenge Grants
For comprehensive repair and extensive restoration projects, the Robert W. Wilson Sacred Sites Challenge Grant Program offers matching funds to churches. Matching funds must be donated from new sources. Since its launch in 2000, the program has awarded 75 challenge grants totaling $2.2 million, generating over $2.4 million in grant matches that will facilitate the completion of nearly $45 million in restoration of historic religious properties across New York State.

Albany
Cathedral of the Immaculate Conception, Albany
Restoration of East Façade  $25,000

Bronx
St. Stephen’s United Methodist Church, Bronx
Wood Shingle Façade Restoration  $25,000

Chemung
Trinity Episcopal Church, Elmira
Roof Drainage, Steeple Louver, and Masonry Restoration  $25,000

Delaware
Christ Church, Walton
Tower Restoration  $25,000

Herkimer
Emmanuel Episcopal Church, Little Falls
Roof and Bell Tower Repair  $25,000

Kings
Our Lady of Lebanon Cathedral, Brooklyn
Comprehensive Masonry, Roof, and Tower Restoration  $45,000

New York
St. Cecilia’s Church, East Harlem
New Standing Seam Metal Roof and Associated Masonry Restoration  $30,000
St. Nicholas Russian Patriarchal Cathedral, Upper East Side
Repairs To Domes, Masonry, Roof and Steelwork  $25,000

Ulster
Reformed Dutch Protestant Church (Old Dutch Church), Kingston
Structural Stabilization of the East Elevation  $25,000

Westchester
Old St. Peter’s Church at Van Cortlandtville, Peekskill
Replacement of Southern Slope of the Slate Nave Roof, Bell Tower and Parish Hall Roofs  $25,000
Sisters of Divine Compassion / Chapel of the Divine Compassion, White Plains
Restoration of Chapel and Bell Tower Roofs  $25,000

Total Wilson Challenge Grants Pledged in 2010  $300,000
Average Pledge in 2010  $27,273

St. Cecilia’s Church in East Harlem received a $30,000 Wilson Challenge grant for a new standing seam metal roof and associated masonry restoration.