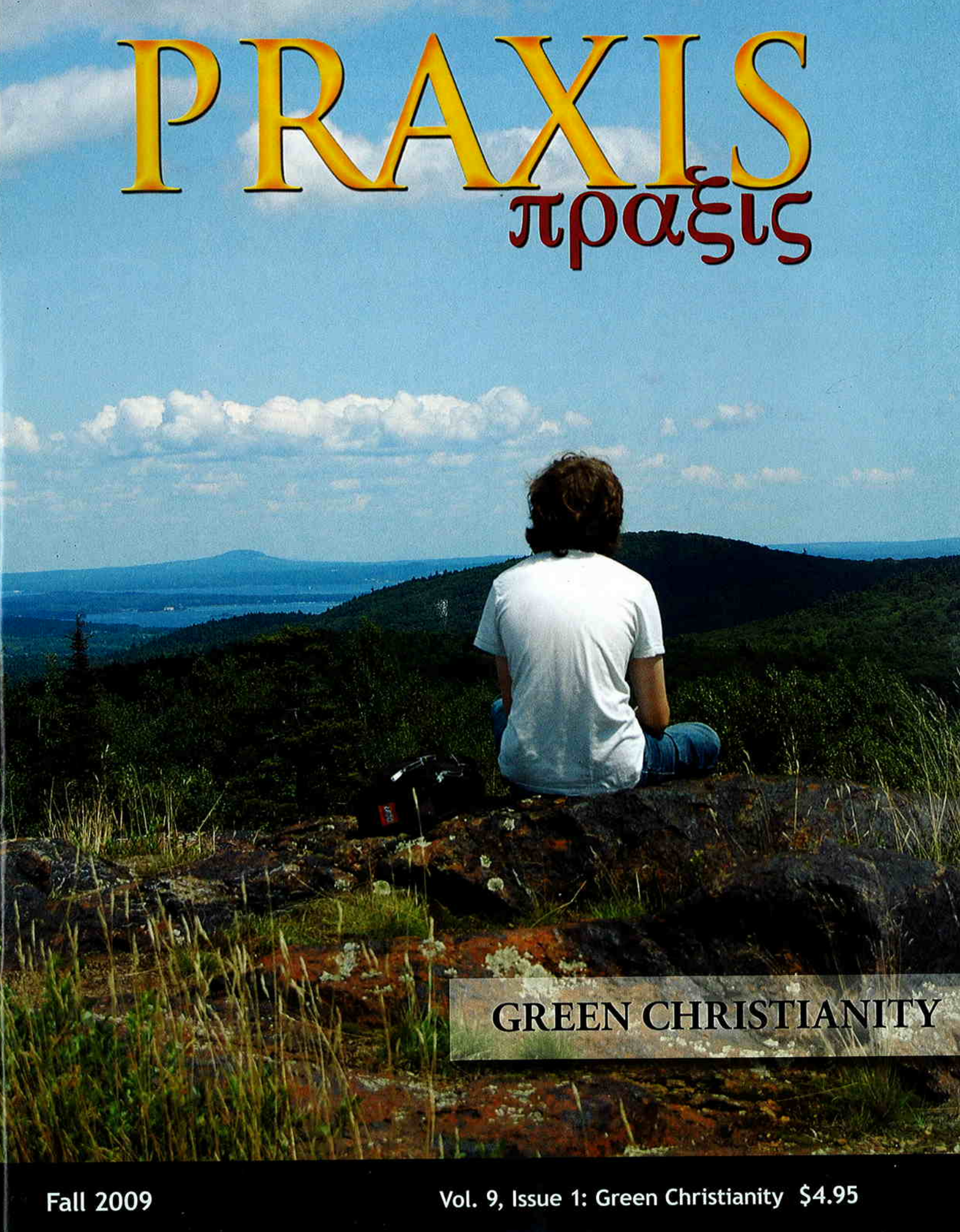


PRAXIS

πραξις



GREEN CHRISTIANITY

Fall 2009

Vol. 9, Issue 1: Green Christianity \$4.95

Tomorrow is Here

Making a Difference Today

While Building for the Future

Christ J. Kamages, AIA

The earth is the Lord's and all that is in it, the world, and those who live in it; for God has founded it on the seas, and established it on the rivers.

—Psalm 24:1–2

His All Holiness Ecumenical Patriarch Bartholomew, in his address to the 20th World Energy Congress, observes that the Earth is “a gift received from above, which it is in turn our obligation to respect and return to future generations.” As Christians, we are called to be good stewards given the inheritance and the resources God has provided. Failing to do this in the past has led to a polluted world where energy is scarce and the threat of global warming is increasing. Patriarch Bartholomew, in his 2008 World Environment Day message charges, “Let us understand, beloved brothers, sisters and children in the Lord, that each of us from our own position must make every effort to confront the environmental crisis.”

In responding to His All Holiness's challenge, we must become sustainable in all our ways. According to the U.S. Green Building Council, to be sustainable simply means to have *minimal negative impact* to the environment in all our actions and to repair, wherever possible, damage that has been done.

How we create and operate our building is a vital component to this challenge. The National Resource Defense Council points out that construction and operation of buildings consumes more than 40 percent of all the energy resources on the

earth; therefore, producing sustainable buildings and making them more efficient will deliver big paybacks in terms of reduced operating costs and overall benefit to the environment.

Our parish buildings, from the worship space to the support buildings, are good places to look for sustainable opportunities. Whether you are constructing new buildings or dealing with existing ones, we offer some strategies for creating a place that is whole, as a beautiful and lasting icon of your parish's commitment to preserving the resources given to us by God for the generations to come.



Fig. 1. Operable windows in the dome and elsewhere allow St. Demetrios in Saco, ME, to naturally “breathe,” saving energy and providing a more comfortable environment for parishioners.

KEY STEPS TO CREATE A SUSTAINABLE VISION & REALITY

Getting Smart

The number one thing you can do to improve your building project is to take time to explore the holistic approach to green building. One way to do this is to review the many articles and

recommendations by the U.S. Green Building Council or the U.S. Department of Energy. Another step is to know where you are with your facilities and practices by conducting an energy audit (often freely provided by your local utility company) and what your goals are for reducing your parish's impact on the environment. Once you know your starting point, you have a way to track progress and to prioritize different technical options.

Gaining “In-site”

When it comes to new construction, many sustainability and energy efficiency concerns are exacerbated or alleviated through the proper selection of a site. Choosing the correct site and building placement will lead to substantial savings down the road while creating a more accessible and friendly building. According to the U.S. Green Building Council, the best sites utilize existing infrastructure, protect greenfields (previously undeveloped land) and preserve habitat and natural resources while encouraging alternative transportation and pedestrian access. Building placement on the site affects things like solar gain, energy efficiency, melting snow, flooding problems, wind and air circulation, and water reuse.

In addition to positioning and site selection, thoughtful and well-placed landscaping can make your parish greener. Trees planted close to the building cut cooling costs with their shade, but be sure to use species that are native to the site. In desert and semiarid locations, this often means xeriscaping—using dry-climate species vs. those accustomed to more plentiful rainfall. Limiting the amount of water needed by the plants around your parish is vital to sustainability. Landscapers can offer many alternatives to water- and pesticide-guzzling lawns. Wise landscaping reduces the need for mowing and trimming, saving maintenance costs and reducing emissions.

Putting Energy Where It Counts

We cannot decide what the weather will be, but we can create a building envelope (the walls, roof and floor) that is energy efficient while controlling the weather’s impact on human beings. This means that it does not allow the heat to escape in the winter or excess heat to infiltrate in the summer.

The most cost-effective step you can take is weatherizing your buildings. This involves insulating accessible attics and uninsulated or unfinished walls, basements and crawlspaces. Ensure that the skin of the building (stucco, brick stone, etc.) is intact, and repair cracks. Wet insulation is not effective, so be sure to fix any leaks in your roof or walls. If building new,

ensuring tighter construction with fewer gaps will help to ward off uncontrolled air movement.

Leaky openings like windows and doors are a major source of infiltration of heat. Seal and weather-strip these or, better yet, replace old windows with operable, low emissivity (low-e) dual-paneled windows (see Fig. 1). This step will reduce heat gain/loss and will be a great investment in thermal comfort and performance. It is important to note that employing day lighting can be tricky because incorrectly placed and sized windows tend to add heat to the space while creating uncomfortable glare. Use window shades and shading devices affixed to the exterior of the building to control direct sunlight and glare through windows, thereby reducing heating and cooling costs. Properly employed day lighting will save energy while enhancing the liturgical environment (Fig. 2).

Another step in creating a more efficient building envelope is to install an appropriately colored roof (sometimes called a cool roof) that will save thousands of dollars a year in heating and cooling costs. It does this by reflecting unwanted energy from the sun and reducing the heat gain/loss through better materials.

These are not new ideas. In the past it was quite common to use thick walls and pale colors to ward off the heat of the day (Fig. 3). We can and should still do the same thing—especially now that we have the advantage of modeling the total proposed system using modern computer programs to judge overall energy efficiency.

Choosing, Using and Recycling Materials

Using rapidly renewable materials (such as bamboo, linoleum or cork) for furniture, cabinets, countertops and flooring and recycled materials (such as cotton batting, various recycled engineered lumber, or reclaimed timber) for insulation and framing will perform as well as traditional materials, with the added benefit of preserving our natural resources.

Low-VOC (volatile organic compound) paints and sealants contribute to a healthier environment for the users of the building (reducing the new paint smell means less fumes and



Fig. 2. Natural light enhances the worship space while reducing lighting costs.

For More Information

toxins to inhale). They also reduce the amount of toxic chemicals that end up in the landfill. Purchase resource-efficient, nontoxic cleaning products and supplies. Using and reusing low-impact materials that can be recycled at the end of their lifecycle is often overlooked but will enhance our stewardship of the earth. Lastly, a lifecycle audit of all the planned materials will tell you if your selections are helping or harming our environment and contributing to a lower bottom line in your construction budget.

Systems Savvy

Whether part of a new building project or a renovation project, thoughtful systems planning is key. Another major area of concern is the heating, ventilation and air conditioning (HVAC) system. Like most buildings, church buildings can use zoning to minimize energy consumption in the worship space, with proper controls and thoughtful design/redesign of the delivery of the tempered air into the space. Because of the complexity of a church, these systems are often poorly planned or implemented. Adjusting these components will add greater efficiency and performance to the system.

Maintenance is also important for efficiency, so clean the filters on furnaces and air conditioners and replace them when needed. Look for filters labeled "MERV 13" for improved air quality. While it can be an expensive undertaking, consider replacing your old, inefficient HVAC system with a new ultra-efficient zoned heating and cooling system to reduce long-term costs and boost performance. Zoning allows you to reduce unnecessary heating and cooling by turning off supply to unused areas. You may also be able to install an economizer on your existing system that could lower operating costs by thousands every year. Finally, install programmable, setback thermostats that automatically reduce heating and cooling when areas are unoccupied, and set your thermostat for optimal HVAC efficiency for your region (Fig. 4).

Lighting is another area that has functional and theological implications. The incorporation of natural light has key benefits of savings and enhanced aesthetics (Fig. 5). Using high-efficiency LED lighting, dimming ballasts or compact fluorescent bulbs, and integrating infrared occupancy sensor lighting are ef-

Resources on the Orthodox Church's environmental status and information about how you can make a difference:

Web Sites

- Greek Orthodox Archdiocese articles on the environment and the Orthodox Christian Church (www.goarch.org/ourfaith/environment)
- U.S. Green Building Council (www.usgbc.org): click on "Learn about green building" for general information
- U.S. Department of Energy (www.energy.gov/forconsumers.htm): lots of research and facts about sustainability
- Green Seal (www.greenseal.org): information on certified green products and environmental standards
- American Chemistry Council's GreenBuildingSolutions (www.greenbuildingsolutions.org): clearinghouse of strategies and general information related to sustainable building
- Elder Aimilianos, The "Story of a Certain Monk" (www.forministry.com/USPAGOARCHGOC/ElderAimilianos/ElderAimilianos.dsp)

DVDs

Orthodox Marketplace (www.orthodoxmarketplace.com/dvd-and-video/#2): several DVDs for sale documenting the Ecumenical Patriarch and his environmental advocacy

- The Green Patriarch
- The Arctic: The Consequences of Human Folly
- The Amazon: The End of Infinity

Books

- Metropolitan Kallistos Ware, *Through the Creation to the Creator* (Friends of the Center, 1996)
- Fr. John Chryssavgis, *Beyond the Shattered Image* (Light and Life, 1999)
- Elizabeth Theokritoff, *Living in God's Creation: Orthodox Perspectives on Ecology* (St. Vladimir's Seminary Press, 2009)
- Fr. Alexander Schmemmann, *For the Life of the World: Sacraments and Orthodoxy* (SVS, 1973)
- Paul Evdokimov, "Nature," *Scottish Journal of Theology* 18 (March 1965): 1-22



Fig. 3. The thick white walls and roofs of Santorini prevent unwanted heat from entering during the hot summers.



Fig. 4. St. John in Las Vegas uses a highly effective underground air transfer duct to cool incoming air without using air conditioning.



Fig. 5. When used properly, natural light can increase visual appeal and reduce costs.

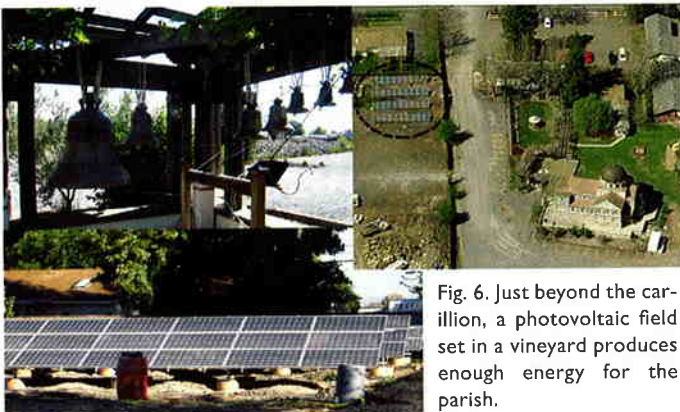


Fig. 6. Just beyond the carillon, a photovoltaic field set in a vineyard produces enough energy for the parish.

fective options that can reduce operating costs while increasing visual appeal. Reduce the operating time of your lights: Turn them off when not in use and utilize available natural lighting. Make sure outdoor light timers are adjusted for daylight savings time. Attention to these details helps reduce energy use. Providing Energy Star qualified exit signs can save \$10 per sign annually in electricity costs while preventing up to 500 pounds of greenhouse gas emissions. Unplug any electronic device that is not in use, and use smart power strips to prevent “phantom” power usage by electronics in standby mode.

Central hot water heaters can use a tremendous amount of energy. Be sure to insulate hot water pipes and tanks. For normal hot water usage, set hot water to 130°F. Consider tankless or on-demand water heaters to avoid constantly keeping water hot for added savings and better performance.

There are other systems you may want to consider. While there is always an opportunity to use solar power or photovoltaic (PV) panels, the use of solar power is something that should be considered on a case-by-case basis. One of our clients developed an entire solar field that produces enough energy for the parish and kicks back additional energy to the grid (Fig. 6). Solar hot water is another option, but in our experience, the costs often outweigh the benefits when compared to instantaneous heaters. Thermal mass systems (storing heat in the day to use at night) will reduce overall operating expenses and add to the sustainability of the buildings. Every parish should consider its budget and allocate resources into measures that will produce the greatest return on investment.

These are all some steps you can take today to help make your parish building a model of good stewardship for the environment and the future. According to the Environmental Protection Agency, congregations that practice environmental responsibility can save up to 30 percent on utility bills while reducing their carbon footprint. We hope that you will consider the many ways you and your parish can make a difference by practicing sustainable, environment-friendly habits every day, with benefits for now and the ages to come.

Christ J. Kamages, AIA, is Archon Architecton of the Ecumenical Patriarch and President of the Patriarch Athenagoras Orthodox Institute (PAOI) at Berkeley. He has written and lectured on Orthodox architecture throughout the USA. Mr. Kamages also heads CJK Design Group, a full-service architectural firm based in San Francisco that works with faith communities to design and build architecture that supports and inspires the spiritual life of the faithful. CJK has three LEED-accredited professionals as integral members of the staff. Find out more at www.cjkdesign.com.