

All about Green Design

The Decision on Green Design

Throughout the education sessions in December, at the Thoughts and Feelings session in January, and in inventories and surveys, questions and comments have been presented by parishioners about using a “Green Design” for our new master plan and worship space. For most, the first thought about green design is geothermal heating and cooling, or southern exposure for natural lighting. However, green design goes far beyond that, and a certified “green designed” building may not even have those components. We have discovered that there is so much to learn about green design!

Familiarity and experience with green design was an important component in the selection of our architectural firm and on April 28, Kevin Monson, of our architecture partner Neumann-Monson, presented an overview of green design to the Steering Committee and the Construction Committee. At the Steering Committee meeting on April 29, the committee committed to a green design for our new facility. The decision had to be made early in the design phase because the green design process calls for a different way of thinking for the architects.

In summary, here is the thinking of the Steering Committee in their decision to support a green design:

We are building a facility to last 100 years. Energy and environmental impacts of the facility (both constructing and sustaining/operating the facility) must be projected over the next century. Even small differences can become huge over time.

We are a pioneer parish, and we have an architectural firm that is a pioneer in green design. Together we can serve as a beacon for our community by modeling faith, foresight and good stewardship of the earth. We can also provide opportunities for young architects to further the cause and can educate parishioners on caring for our planet when construction/renovation is a part of their lives.

We are good stewards of our parish resources. There is an additional 1% architectural fee for green design and there will probably be some additional construction costs, but hopefully these will be offset by more accurate sizing (many traditional designs are overbuilt for light, energy, etc.) and energy and material savings for the next century. Green design models good stewardship by using recycled and recyclable materials and reducing waste as well as using the natural gifts of heat, light and water in an efficient manner.

What is Green Design?

Green design is a way of thinking that takes into consideration the impact of a building on its environment and on those who use the building—the impact both in construction and sustainability or use over time. That impact includes, among other considerations, materials, energy, waste produced, recycle potential, and the effect on those who use the building.

Kevin Monson, president of our architectural partner Neumann Monson of Iowa City, states that the green design method starts with the end goal, and then uses an integrated process that measures effect relationships, cost, and impact of a variety of components considered for the design. Computer modeling is an important tool in the design process, because it can explore and determine both short term and long range effects. It can “measure” different variations in an integrated system and project the measurements into actual effects/demands over time.

Here’s an example from Kevin using a recent project: Research shows that students perform exceedingly better in an environment of natural light rather than artificial light. The goal then would be to design classrooms that use natural lighting. Using computer models, architects can explore different amounts of windows space and natural light quantity. By adding a row of windows in a roofline, more natural lighting is available to the classroom, reducing the amount of artificial light fixtures necessary for the classroom. Since artificial lighting produces heat, less cooling capacity is needed with natural lighting, allowing the facility to utilize a smaller heat pump. A smaller heat pump reduces the number of geothermal wells needed for the heating/cooling system. The model shows that the reduction in the cost of thermal wells is enough to pay for the increase cost of installing the windows.

The considerations do not stop with construction. The natural light cannot be direct, as direct sunlight is too bright and would have to be shaded or baffled, which is costly. Windows facing the north have the right light color, but lose more heat energy. This is where the computer models come in again, and in this particular case, proved that the increased energy cost of northern exposure windows would be paid back 20 fold by the energy savings on natural lighting over artificial lighting.

In this quick example we integrated lighting, heating and cooling concepts to find the best combination to meet the goal of natural lighting for best student performance. We saw how the overall energy demand can be decreased by using the best lighting for a learning environment, thereby reducing the impact of the classrooms on the environment and the cost of operating the facility. These are only a few of the considerations of a green design.

“Green” Certification through LEED

The U. S Green Building Council, a coalition of leaders from all aspects of the building industry, has developed a rating system to assess the level of a building’s performance in meeting sustainable goals. The system is called Leadership in Energy and Environmental Design, or LEED. The system is voluntary and uses consensus-based national standards. There are four levels of certification which can be achieved based on the number of points achieved in the various categories of the design. Documentation is submitted after the project is completed that validates the necessary steps have been taken to achieve the sustainable goals set by the design team. A prerequisite for LEED certification is “commissioning” a process by an independent agent monitoring the design and construction processes of the building. The final product may be awarded a performance level of Certified, Silver, Gold or Platinum based on prerequisites and credits earned in the areas listed below.

Sustainable sites:

Is the site accessible by public transportation? Does it support low-emitting and fuel efficient vehicles? Does it have adequate parking? Does it maximize open space and/or restore habitat? What is the level of quantity and quality control of storm water i.e. does the run-off from the parking lot, which may contain oils and car grime, run directly into the city sewer system? Does the facility create a heat island effect and raise the temperature i.e. does the roof reflect light or generate heat?

Water efficiency:

How much does the landscaping reduce the need for potable water or irrigation? What innovated waster water technologies are used to reduce building water needs (low water use bathroom facilities, etc.)

Energy and atmosphere:

Efficient building energy systems, energy performance and effective energy management are required in this area. Credits may be earned by optimizing energy performance, renewing onsite energy, increasing refrigeration management, measuring and verifying energy use and using green power.

Materials and Resources:

Storage and collection of recyclables is required. How much is the construction waste recycled (50% or 75% recycled instead of being disposed)? How much of the construction is from recycled material? Are the materials processed and manufactured regionally? Are the materials rapidly renewable? Can the materials be recycled upon replacement? An example in this area is carpeting—is it made from recycled material; can it be recycled when it needs replacement?

Indoor Environmental Quality

Minimum indoor air quality and environmental tobacco control are required. How is the air quality protected during construction i.e. ducts sealed upon installation so they do not become contaminated with plaster dust that becomes a part of the building air? Are low-emitting adhesives, sealants, paints, carpets, composite materials and agrifiber products used? What types of cleaning agents are needed for the building materials? What kind of energy saving controls are installed for lighting and thermal comfort i.e. infrared sensors so lights are not on when the room is not occupied, zone temperature control so areas are not over-cooled or over-heated? How much daylight and outdoor view is available to inhabitants?

Innovation & Design Process

Additional credits can be earned by new and creative designs. Our architecture partners believe in going beyond their usual comfort level to try new designs based on computer modeling and exploring new materials and technologies. However, they also have demonstrated the wisdom to verify the sustainability of new products. The facility is planned for 100 years; the goal is for the design to be on the leading edge, but not the “bleeding” edge of the design process.

Green Design is Good Stewardship

Stewardship begins with the recognition of the many gifts God has bestowed on us. Our stewardship is based on gratitude; we are a people grateful for the abundance in our lives. Part of that abundance is the natural gifts of the planet—productive land, energy, light, heat, water, etc. To be good stewards, we must demonstrate gratefulness by using these gifts wisely and without waste.

Our building decisions, both in construction and in sustainability, will affect the use of natural resources for the next 100 years (much longer than those of a commercial or private building project). For green designs, it is important that the building designs minimize the waste of natural resources. This means that all facets of the building must be of the appropriate size to be efficient and make the best use of God’s natural gifts. Over-sizing demands extra energy and, according to American Institute of Architects (AIA) immediate past president, Kate Schwennsen, buildings already consume more energy than anything else on our planet and account for at least half of all greenhouse emissions. Any over-sizing/ inefficiency will generate unnecessary waste over the next century.

Another part of good stewardship is reducing our dependence on non-degradable items, such as plastics and chemicals and using recycled materials, or recyclable materials. We do not create waste from these materials, but rather sustain them as gifts for our generations and those of the future. Green design utilizes the newer technologies that can now provide high-quality materials to support this stewardship.

Stewardship is a part of our Christian mission. We recognize that we have a responsibility to meet everyone’s needs fairly and efficiently. Ralph Copleman, executive director of the Sustainable Lawrence Community in New Jersey, in addressing the AIA, stated that it would take over three planets to support life on earth if everyone lived like many North Americans do. In our mission of service to individuals and hospitality, we must realize that everything is connected, now and in the future, as well as globally, and that our current building philosophies must not damage the ability of future generations to provide for themselves.

When we look at our mission as a Church, we must also be good stewards of our treasure. Good stewardship is reducing operating costs so that our financial resources can extend farther in reaching out to others as is documented in our mission statement. We can only expect that energy costs will continue to increase over time. Designing now to use energy efficiently will conserve financial resources over the next century, and make available precious resources that can be used to support our Christian mission.

We believe in the value of bringing our Christian beliefs to life. If we believe that God has blessed us with abundance, and we are grateful, we can bring to life that gratefulness with good stewardship through green design in Our Building Project.