GREEN CONSTRUCTION: HOW TO MAXIMIZE YOUR SUSTAINABLE ROI

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OVERVIEW

Sustainability has become a central element in construction projects throughout the U.S. and worldwide. Companies large and small have invested billions to make sustainability a core part of their brand identity, build a corporate vision and establish connections with the community.

But sustainability isn't just about making a statement. Many more owners have invested in energy efficiency to achieve a strong return on investment (ROI). And in our experience, sustainability pays off.

This guide is written to help you maximize the value of your energy-efficiency efforts. We show you how to measure the value of sustainability, provide steps you can take to attain maximum ROI and introduce just some of the most cost-effective energy-efficiency solutions.

PART 1:
MEASURING THE VALUE OF SUSTAINABILITY

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Sustainability and energy efficiency provide both intrinsic and extrinsic benefits. Intrinsic benefits include reducing your carbon footprint, minimizing your energy consumption and helping the world. For many companies, sustainability investments support a corporate vision, build trust with the community and support branding efforts.

Extrinsic benefits are about achieving a better value for your build and reducing your operating costs. A well planned, properly executed project that uses best-value solutions will minimize your up-front costs and provide a range of benefits, including:

- Long-term energy savings and cost reduction
- Reasonable payback periods
- Better work conditions, worker happiness and productivity
- Improved building and property value

That said, not all sustainability solutions are created equal. Some increase project costs beyond what you can recoup in energy savings. Others provide long-term savings but deliver a negative ROI when accounting for the time value of money. Bottom line, some are better than others. But many sustainable solutions actually reduce costs. We'll show you how to evaluate different solutions to select the ones that deliver the best bang for the buck.

SUSTAINABILITY SAVES MONEY

Some energy-efficiency solutions, such as additional building insulation, maximize available resources and reduce the need for other building investments, such as rooftop HVAC units. These solutions can provide up-front project savings. Other solutions, such as passive solar thermal heating and daylighting, require a significant up-front investment but reduce long-term costs and can provide strong ROI — even after accounting for the time value of money.

When evaluating longer-term investments, it's crucial to consider building operating costs, which have increased rapidly in recent years. Building systems

have grown more complex, and facilities must meet more demands than ever before, requiring more energy. Depending on how long you use your facility, your long-term operating costs can exceed your up-front construction costs.

TOOLS TO MEASURE THE VALUE OF SUSTAINABILITY

You can use many tools and measures to put a number on the value of sustainability. Some of the most important include:

- Life cycle cost analysis
- Sustainability return on investment (SROI) report
- Payback period

These tools allow you to consider the long-term value of sustainable solutions vs. the up-front costs of investing in sustainability.

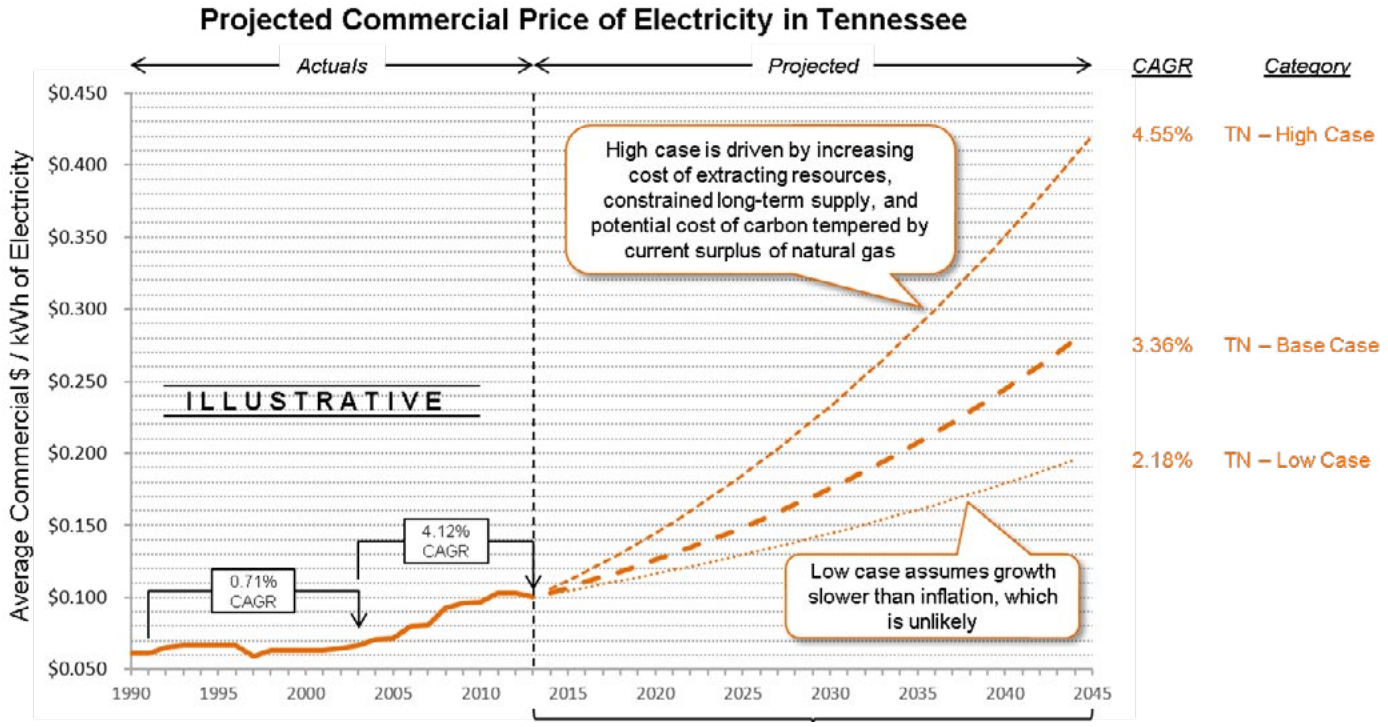

Figure 1, Projected commercial electricity costs ($ / kWh)

Since 2003, electricity prices have been growing at about double the broad rate of inflation over the same time period. This may imply that in an unregulated state, there's a risk that electricity prices continue to increase, and that rate might even accelerate as states impose carbon caps, as resources become more expensive to procure, and as utilities move to maintain their profit margins without the risk of customers moving to other providers. (Tennessee Case Study)

Whichever tools you use, you'll want to start by analyzing the current cost of energy and projecting the cost of energy over the life of your facility. It's best to minimize risk by evaluating energy costs across a price range, as costs are somewhat unpredictable. But you can safely assume energy costs will continue to rise. Using the projected cost of energy as a baseline, you can then use these tools to measure the cost impact of energy savings afforded by various green solutions.

LIFE CYCLE COST ANALYSIS

A life cycle cost analysis (LCCA) is the formal process of calculating the ROI you can expect from building investments, accounting for all factors of cost and payoff. The LCCA provides long-term cost projections for a particular building investment over its useful life cycle, accounting for the time value of money.

In the LCCA, the costs of two or more alternative investments are calculated and compared to determine which has the lowest long-term cost and better long-term value — e.g. which is most economical over the life of your facility.

The LCCA puts solid numbers behind decision-making and allows you to evaluate where you can best spend project dollars. To reap maximum benefits from an LCCA, make it part of your project from the earliest stages of design and continuously update it throughout your project as you evaluate solutions for various project elements.

SUSTAINABILITY RETURN ON INVESTMENT (SROI) REPORT

A sustainability return on investment (SROI) goes beyond the traditional LCCA to determine the full value of a project by assigning monetary values to all costs and benefits — economic, social and environmental. It reveals the hidden value of a project.

SROI project decisions require more inclusive forecasting of future costs and benefits. These elements are subject to uncertainty and are not typically captured in the conventional ROI calculations. The additional factors (direct, non-cash and externalities) are relevant to responsible decision-making. SROI

uses evidence-based business case/cost-benefit analysis to demonstrate functional, economic, social and environmental value. Developing an SROI report follows several steps:

- Developing the structure and logic
- Quantifying input data assumptions
- Completing a risk analysis
- Quantifying benefits

The final output of an SROI report includes:

- A summary of direct financial ROI (FROI)
- List of benefits associated with various project solutions
- Non-cash metrics — e.g. data on expected increases in employee retention and productivity, energy reduction, water conservation and elimination of CO2 emissions
- The difference in total value between FROI and SROI (value of sustainability benefits)
- Risk analysis of the key inputs and outputs of the model

PAYBACK PERIOD

To properly evaluate sustainability solutions, you'll need to determine how long you'll use your facility and the property value that sustainable investments will add to it. One of the key considerations for evaluating investments is the payback period, which shows how long it takes to recoup the cash cost of a particular investment and achieve ROI. Knowing how long it takes to see ROI will help you evaluate the opportunity cost of sustainability investments.

PAINTING AN ACCURATE PICTURE OF ROI

To give you an accurate picture of the true value, these calculations must take several elements into account.

First, you'll need to know your cost of capital, which will be used to calculate net present value of money (NPV), so you can calculate the true cost of a sustainability investment.

Second, you'll need to know how much energy you expect to use, how much you can save with energy-efficient solutions and the cost of energy in your local area. Nailing down these numbers takes significant effort in some cases. For example, most facilities use electricity and natural gas, but their use is measured differently by utilities, and their prices aren't directly related. We recommend you convert electricity and natural gas consumption into a common unit (BTUs) to compare them. Then, evaluate the cost of each type of energy, and you'll get an accurate picture of how much you can save. Ultimately, this analysis tells you which source of energy gives you less bang for the buck, so you can prioritize reducing its consumption.

Third, your ROI from sustainability investments depends largely on the use type of your facility. Some buildings, such as large distribution centers, manufacturing plants or hospitals, realize more savings from energy efficiency than others can achieve because they use more energy and generally operate for longer periods of time.

Ultimately, savings can range anywhere from about 25 percent of initial construction costs to many times the initial construction budget. But in our experience, most owners can and will achieve significant savings with the right sustainability solutions.

PART II:
5 THINGS OWNERS CAN DO TO REALIZE SUSTAINABILITY SAVINGS

5 THINGS OWNERS CAN DO TO REALIZE SUSTAINABILITY SAVINGS

To help you make the most of your sustainability efforts, we're showing you a winning project approach. The steps in this section have been proven time and again to deliver ROI and set projects on course for success. Follow these steps, and you'll be on your way to building smart.

1. GET AN EARLY JUMP ON SUSTAINABILITY

To earn maximum ROI, consider sustainability and energy efficiency early in your project. In the majority of projects, particularly large, complex projects, the best opportunity to capture savings is in the early stages of design. The decisions made at this stage have a waterfall effect on the rest of your project, putting you down a set path.

Your project team will require complete, accurate information to make appropriate assumptions when evaluating sustainability solutions and projecting their value. And only with robust energy use and savings models can you be assured of selecting the sustainability solutions that deliver the strongest ROI.

Because gathering they key information takes time, the earlier you can start the better.

2. TAKE ADVANTAGE OF DESIGN-BUILD

Your choice of construction delivery method influences every aspect of your project. Before you simply follow the traditional general contracting method, hire an architect and bid out your construction work, we recommend you take a look at Design-Build.

The Design-Build construction delivery method affords unmatched flexibility to incorporate best-value solutions and energy-efficiency savings into your project. In this method, one entity (the Design-Builder) takes single-source responsibility for all aspects of a project, from pre-construction, estimation

and design to construction. The Design-Builder forms a complete, hand-selected team with precisely the expertise needed for your project.

Design-Build brings construction professionals, specialty contractors and sustainability experts into the design process to advise on cost, schedule, constructability — and yes, energy savings. Remember, the design phase provides the best opportunity to capture savings.

With the Design-Build method, you can have certified LEED APs, experts in green construction, involved from the start of your project. Design decisions will take into account energy use and savings. You will be afforded the opportunity to make value-based design decisions and receive estimates early in your process.

Your project team will work with you up front to get a feel for all the other elements that affect your decision-making, such as your cost of capital and your long-term capital plans. Your team will determine how construction and sustainability should be prioritized and place sustainability recommendations within the big picture.

3. TAKE STOCK OF HOW YOU USE YOUR FACILITY

A major element of providing accurate information to your project team is having a clear picture of how you use your facility. Take stock of how many people you'll have in your facility, how they'll work, when doors and windows will be open, how energy will be consumed and how your workflow, well, works. Look at the energy consumption of facilities similar to your proposed structure. Or, if you're planning a renovation or expansion, evaluate the energy consumption of your current facility. You may choose to have green construction professionals conduct an energy audit of your facility to gather this information.

At The Korte Company, we make it standard practice in our projects to have our own energy-efficiency experts perform facility walk-throughs when possible. This practice helps us gauge how you use your facility and how much energy you consume.

4. ENSURE PROPER LONG-TERM OPERATION OF YOUR FACILITY

The biggest factor affecting your long-term energy and sustainability savings is the way you use your facility. With proper operation of building systems, you'll realize maximum savings. That means clearly communicating your procedures and the proper use of your building systems to your team.

It could mean anything from turning lights off when you're not using them to opening windows only when sensors determine it's the best time to do so. The little things add up.

With full information on what you need out of your facility, your project team should be able to create a comfortable environment for your team and make it easy to follow best practices. Depending on the type of facility you operate, having a dedicated, expert facility manager on staff can help you maximize your ROI.

At The Korte Company, we provide a full post-construction handoff, complete with training on how to properly operate and maintain all building systems. We believe this is a key element of any project.

5. CAREFULLY SITE YOUR FACILITY

Your location heavily influences both your costs and your savings. The cost of energy varies greatly in different regions and localities. Specific locations may provide advantages, such as optimal conditions for passive design, abundant sunlight for PV solar panels or the availability of wind energy. But it's imperative to design buildings for their region. For instance, you're less likely to see strong returns on a structure using passive ventilation in the frozen tundra.

If possible, carefully select not only your building site, but also how you will orient your building to minimize in-flows of cold and hot air and maximize the natural resources of your area.

PART III:
SUSTAINABLE SOLUTIONS THAT DELIVER STRONG ROI

SUSTAINABLE SOLUTIONS THAT DELIVER STRONG ROI

Earning sustainability savings means finding the best-value solutions for your facility. While the right solutions vary from building to building, we've found some sustainable options that consistently provide energy-efficiency savings in most projects. These solutions range from how you think about and approach your project to specific technologies and materials.

CONSIDER ALTERNATIVES TO LEED

Many owners aim for a project that earns U.S. Green Building Council (USGBC) LEED Certification. LEED is based on a points system. Each sustainable building element you incorporate into your project earns you points. Building elements that earn points range from a location near a subway stop to the utilization of renewable energy. The more points you earn, the higher your LEED certification (there are four levels of certification).

Owners use LEED because it's widely recognized as an industry standard for sustainability. For some, it's part of an effort to show the public a corporate dedication to environmental responsibility. LEED is a great tool, but its focus extends far beyond simply achieving ROI. Not every project has to attain LEED Certification. If your primary aim is to achieve a strong ROI from energy efficiency, consider some other ratings systems as guidelines or simply use an SROI.

Great alternatives include simply following the IECC or ASHRAE 189.1. These guidelines and codes focus more heavily on solutions that save energy and deliver an ROI. And they're not nearly as constraining as LEED, so efforts can be focused on maximizing value rather than filling out forms about bike racks.

If you do decide to pursue LEED Certification, there are ways to achieve it with minimal cost growth. Many projects can gain points with solutions that would already be implemented. At The Korte Company, we've delivered more than 85 LEED-Certified projects and can advise you on the most cost-effective solutions for earning certification.

ELIMINATE THERMAL BRIDGES

Aside from occupant use patterns, thermal bridges are the single largest contributor to poor building performance. And they can be almost completely eliminated. A thermal bridge occurs where a material with high thermal conductivity (e.g. steel, aluminum, etc.) provides a path for heat to flow from the interior of a building to the exterior or vice versa. It's more pronounced in different seasons, depending on the location, as the speed of conduction is driven by temperature differential. Vigilant detailing and modeling of heat flow through building assemblies is the best way to understand how a wall section performs (see Figure 2 on page 18). With the right information, your design team can specify the materials in the right building locations to eliminate thermal bridges and save money.

PHOTOVOLTAIC (PV) SOLAR CELLS

Though it doesn't seem to be common knowledge yet, solar energy presents a strong opportunity for many businesses. You may be able to harness the sun for back-up power and your primary electrical power load. You can avoid electricity payments, earn tax rebates and, in some cases, even sell energy back to your utility at a higher rate than you'd pay for it, thereby earning a profit. For many owners, the financial viability of solar panels depends greatly on the incentives available, such as federal tax refunds. It's taken off in several states where incentives are similar. We can help you capture all the ways a PV panel setup would recoup cost, breaking down the tax ramifications and finding other ways to save money.

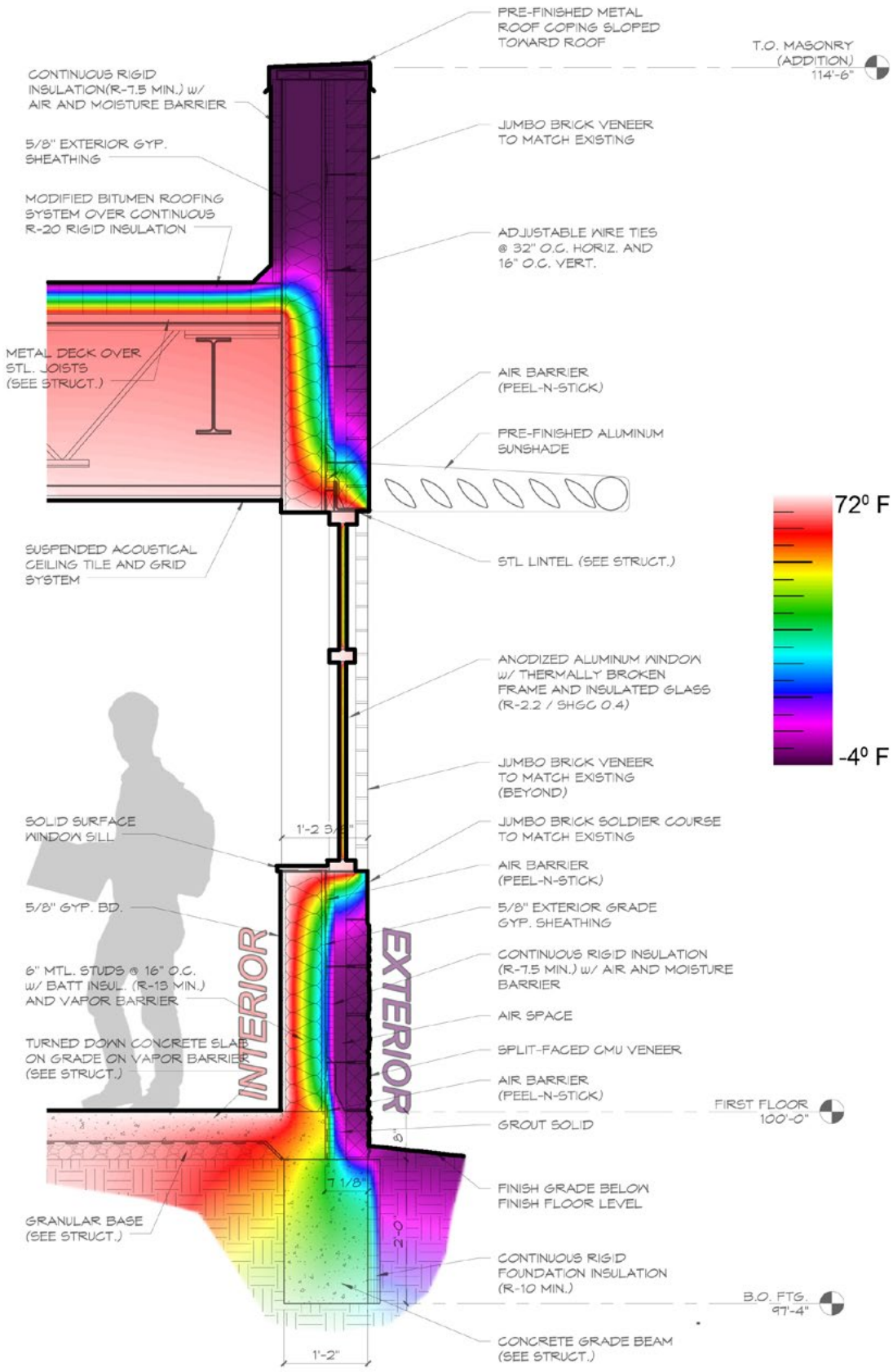

Figure 2, Conduction model false color, steady state temperature curves (0F)

In this example from a proposed project, we show how a building enclosure system uses specific solutions to minimize heat flow and eliminate thermal bridges.

DAYLIGHTING

Daylighting is the practice of maximizing natural sunlight to illuminate a facility. And in our experience, it doesn't have to be expensive, with giant glass panels. Even providing only some of the necessary light to a given room will minimize electricity consumption and the associated costs.

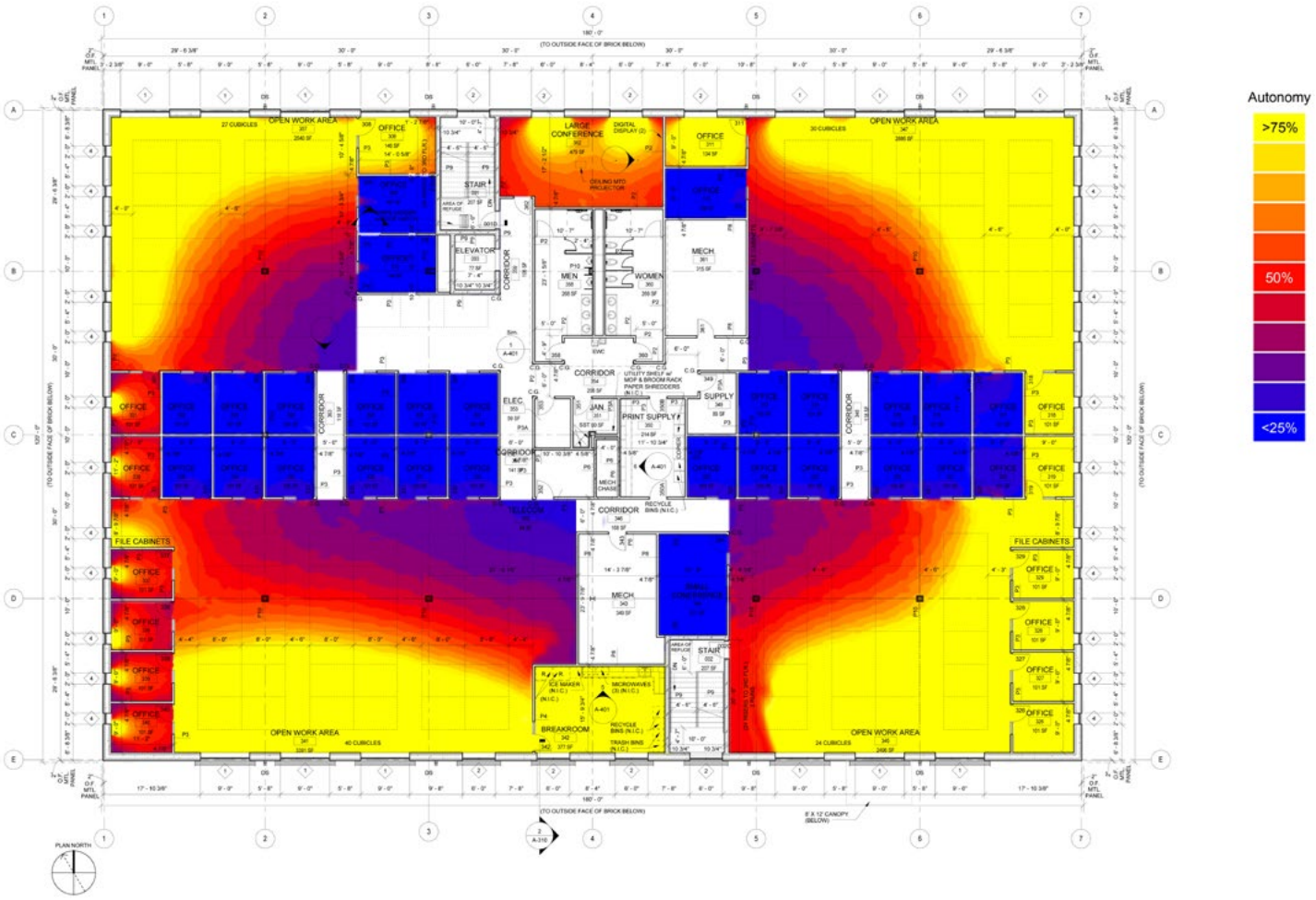

Figure 3, Autonomy analysis (percentage of time 30 FC reached without electric light)

The best way to gauge the effectiveness of a daylighting solution is actually by measuring a space's daylight autonomy. Autonomy is a measure of the percentage of time a room receives enough light from the sun to operate without electricity. The higher the autonomy percentage is, the less electricity the room needs throughout the year to reach the desired illumination level when occupied. In this example, we show the lighting coverage provided by 30 foot candles in an office facility. Designing with autonomy in mind often delivers higher quality spaces than would otherwise be achieved and earns LEED Certification points.

The best way to measure the effectiveness of daylighting is to measure a space's daylight autonomy, which is a measure of the percentage of time a room receives enough sunlight to operate without electricity. The more autonomy, the more energy savings you realize.

Savings can often be attained with minimal investment and a smart design. Some cost-effective daylighting solutions include:

- Strategically placed skylights, particularly in rooms with high ceilings
- Tall, narrow windows that project daylight back into a room
- Optimizing rooms to use only the minimal amount of glazing required to light primary spaces
- Off-the-shelf materials for skylights that avoid costly, custom lighting designs

In conjunction with evidence-based design, daylighting has been put to great effect in many environments, particularly offices, schools and healthcare settings. It's been shown to increase productivity, reduce the number of sick days taken, increase attention spans, improve student and worker performance and even aid in patient recovery.

BUILDING INSULATION SYSTEMS

Adding building insulation provides great ROI in a short payback period. The best part? Energy savings from building insulation are highly predictable. More insulation means less energy usage, with an easily predictable point of diminishing returns, depending on the cost of energy for a given facility. In many cases, it pays significant dividends to add more insulation than the minimum dictated in building codes. But be careful. Over-insulating a facility is also common, and at some point adding more insulation will make it impossible to recoup insulation costs.

EFFICIENT HVAC SYSTEMS

Heating, lighting, ventilation and cooling (HVAC) make up the largest energy consumption for many buildings. For many building owners, natural gas is far cheaper than electricity, so reducing electricity consumption is more cost-effective than reducing natural gas heating. Ventilation and cooling, which typically run on electricity, often make up the largest electrical loads in a facility and are crucial to energy savings. You'll likely find that by investing in an energy-saving HVAC system and complementing it with a cool roof and strategically placed ceiling fans, you can significantly reduce your energy costs. Even though a premier HVAC system may cost more up front, it can be worth it over the life of your facility and provide a rapid payback.

JUST SOME OF MANY SOLUTIONS

The solutions we've highlighted are just a few of the many cost-effective options available. From efficient lighting, cool roofs and passive solar design to water conservation, geothermal energy and everything in between, there are countless ways to save on energy usage and cost.

At The Korte Company, we've completed more than 4,000 projects nationwide for companies large and small. Our energy-efficiency experts can identify the right solutions for your facility and help you get the best bang for your buck.

THE FUTURE OF SUSTAINABILITY

Energy costs are increasing at a faster and faster rate. Despite a crash in oil prices, traditional energy comes from finite resources, so consumer energy prices will continue to rise. As their prices go up, operational costs will continue to climb as well. So, sustainability solutions will become increasingly cost efficient and will mitigate more and more future risk. But given that potential, there's the more prevalent risk of "green washing," or the coat of "green paint" manufacturers and resellers can put on products with advertising simply to sell them. At The Korte Company, we don't just recommend green items that fit the sustainability hype, we help you cut through the noise and select solutions that move the needle.

MORE ABOUT THE KORTE COMPANY

Through the years, we've delivered more than 85 LEED-Certified projects. In the process, we've identified many sustainable building solutions that not only reduce energy usage but also provide excellent cost savings.

At The Korte Company, we specialize in the Design-Build approach, in which we build the best team for the job — an all-star cast hand selected for the task at hand. Working in total team collaboration, our multi-disciplined project teams identify and implement best-value solutions. Through this process, we provide a seamless project from start to finish, with innovative design, fast-track delivery and a smooth customer experience. The end result is not only an energy-efficient structure that provides ROI, but also reduced owner risk, rapid delivery and cost savings.

But don't take our word for it. See our best work or read client testimonials. If you're getting ready to build or update your facility, let's talk. Give us a call at 618-654-8611 or contact us about your project here.

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