Xcel Energy®

BUSINESS NEW CONSTRUCTION

Energy Design Assistance | Technical Overview

in partnership with The Weidt Group®

THE WEIDT GROUP®

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BUSINESS NEW CONSTRUCTION

Energy Design Assistance

This free, comprehensive approach to energy savings for your planned building, includes personalized computer energy modeling, which predicts energy use, suggests energy-saving strategies and projects energy-cost savings.

Our project site verifications help ensure that selected strategies are installed and working to save on energy bills. Recommended strategies also qualify for construction rebates, which decrease out-of-pocket costs and improve return on investment.

All Energy Design Assistance projects have energy savings measured against the EDA program baseline. Rebates are calculated based on summer (June - September) peak demand (kilowatt) reduction of a version of the building, as compared to a building of the same basic design that would just meet the EDA program baseline.

EDA Offers Energy Expertise and Design Assistance

The Business New Construction - Energy Design Assistance (EDA) program from Xcel Energy offers energy expertise to encourage energy efficiency in building design and construction practices. EDA offers design assistance in support of an integrated design process by providing whole-building energy modeling, funding to offset the cost of design time associated with energy analysis, financial incentives to improve cost effectiveness of choosing energy-efficient measures, and field verification to ensure that strategies are implemented. Best of all, the entire process is free to Xcel Energy customers.

Energy Design Assistance is our core program offering under Business New Construction. It is ideal for projects with energy savings goals in mind and enough time to integrate new ideas and strategies into their design as they merit economical benefit.

- → **Minimum Project Size:** 20,000 square feet (new construction, major renovations or additions)
- → **Timing:** Schematic or Early Design Development
- → **Energy Savings Required:** Five percent energy demand savings over the Minnesota State Energy Code
- → **Rebates:** $400 per kW and $0.04 per kWh plus $5 per Dth
- → **Basic Services:** Energy modeling results for efficiency strategies as selected by owner and design team, review of construction documents for inclusion of strategies, site verification and monitoring of select installed strategies

Energy Consultant Leads Planning Process

Energy Design Assistance is typically a simple, three meeting process lead by Xcel Energy's Energy Consultant, The Weidt Group®.

An **Introductory Meeting** is used to establish performance simulation and modeling parameters for the project. Both the baseline design and possible strategies for architectural, electrical, and mechanical systems are established.

The Weidt Group then builds a detailed thermodynamic computer model (DOE-2) of the building and its systems. At the second meeting, our **Strategy Meeting**, we look at basic building performance with each of the independent energy strategies added or subtracted. Then, using an interactive tool, we help the design team and owner build "bundled" sets of improvements to the base design. Typically, teams build three to four "bundles." The Weidt Group then simulates the performance of the three "alternative" buildings to fine-tune the performance predictions. At the third and final meeting, or **Bundle Meeting**, the design team and owner are presented with rebate offers and asked to select a high performance alternative.

Once the project decisions have been made, The Weidt Group team helps track them though construction documents and field verify the results.

The design team will be compensated for its time, and control over all of the design decisions remains in the hands of the owner and design team.

Planning Optimizes Energy Options

All Energy Design Assistance projects benefit from Energy Optimization Assistance, a three-meeting planning process. The basic objectives of each meeting are provided as follows.

Introductory Meeting

The introductory meeting is the official "kick-off" of the process. The meeting includes representatives of the owner, architects, engineers, utility and sometimes the developer and contractor(s), along with the Energy Consultant. At this meeting, the schedule is established, the schematic design of the building is reviewed, the forms required for input into the computer model are distributed and explained, and a list of potential strategies to be reviewed during the process is discussed.

Strategy Meeting

Upon completion of the initial computer modeling, the design team is presented with detailed results of the energy savings for a number of viable energy savings strategies. Typically, about 70 different strategies are analyzed. Simple payback information for each of the individual strategies (using costs developed by the design team) is presented as a means of helping to prioritize the most cost-effective strategies. At that meeting, the design team is asked to develop a series of "bundles" (typically three to four) of potential strategies for further review. The net result of a combination of strategies will usually be different than if the results each of the individual contributions towards savings are added together.

Bundle Meeting

Finally, the team meets to review the results of the bundles, and selects one for incorporation into the final design. This meeting also includes the presentation of the rebate offers to the owner. The next steps, which include submittal of completed construction documents, are outlined as well.

Construction Document Review

Once the strategies have been selected for incorporation into the construction documents, the Energy Consultant reviews the documents as they are completed to ensure the strategies are incorporated as modeled. This is done prior to the measurement and verification activities, which begin after construction completion.

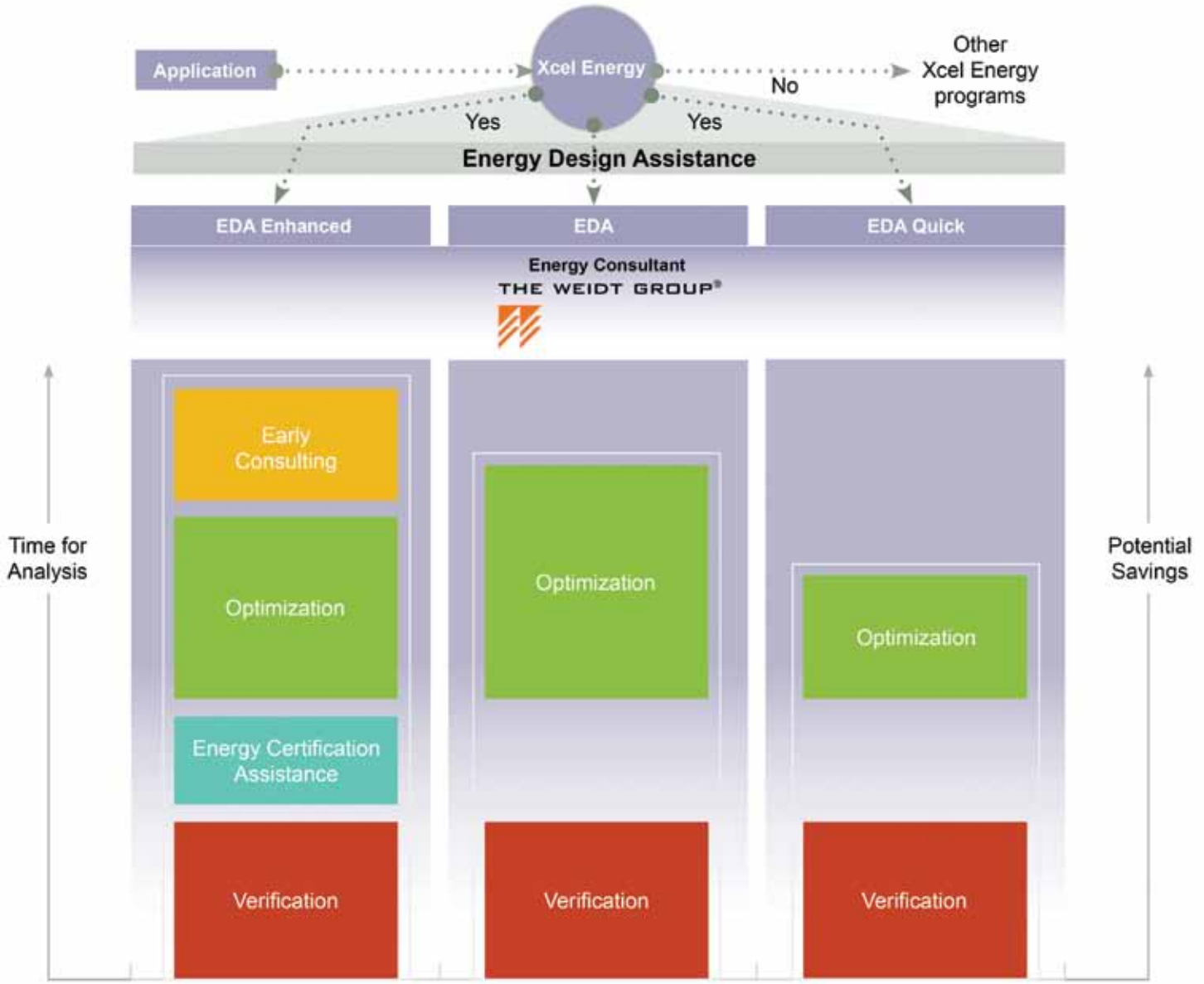
Field Measurement and Verification (M&V) Procedures

Once the building construction has progressed to the point that the selected strategies have been installed and their operation can be reviewed, the Energy Consultant conducts a series of on-site tests to determine if the functionality matches the predicted response. The table below outlines the potential scope of measurement and verification tests.

Potential Measurement and Verification Tasks for Selected Strategies

Strategy Type	Examples of Related Tasks
Glazing	Review construction shop submittals, Visually inspect glazing on site, Measure visible light transmittance of glazing
Envelope Insulation	Review construction shop submittals
Daylighting Controls	Field test each photosensor system to determine if system is capable of dimming through the described range. Datalog selected daylighting lighting circuits in combination with interior photosensor log to determine system is dimming as expected
Occupancy Sensor Controls	Visually inspect that all sensors are installed and control lights as expected. Datalog selected circuits to identify lighting use operation
Lighting Design	Visually inspect Lamp and Ballast type for selected space areas. Make fixture count, spot fixture measurements
Chiller Efficiency	Visually inspect nameplate rating, Datalog amp draw
Variable Frequency Drives	Visually identify installation, Datalog amp draw
Heat Recovery	Visually identify installation, Datalog RA, VA, EA
CO_2 Control	Visually identify installation, Datalog CO_2 at measurement point

Variations found for each strategy as compared to the strategy's expected functionality, characteristics, and/or scope of installation are documented. If variations are found for specific strategies, results are revised to match the functionality, characteristics and/or scope of the verified strategies. A final report of M&V findings is issued to the design team and the building owner.



EDA Supports Long-Range Energy Conservation

Energy Design Assistance is unique in its features and approach to long-range energy conservation. Key features of the program:

- → The design team and owner drive the process. We believe you have the capability to design buildings that are 20 – 30% better than those that would just meet the Minnesota State Energy Code, with specialized support at key points in the process.
- → The process—proven for almost 20 years and hundreds of buildings—does not impede the design or construction schedule.
- → Xcel Energy compensates the design team of record for participating in the process.
- → The building owner receives annual savings and a one-time rebate.
- → The analysis will define how the whole building performs compared to the program's baseline—roughly ASHRAE 90.1-2004. If the building's energy outcomes are at least 5% better than the baseline, the owner will get a rebate.
- → LEED® Energy & Atmosphere (EA) Prerequisite 2 and Credit 1 points will be calculated for projects that are registered with USGBC and accepted into EDA Enhanced.
- → Documentation towards Minnesota B3 program

Rules and Regulations

- The EDA program is for commercial new construction projects in Xcel Energy's retail electric territory in Minnesota. In other words, it is for owners who will get an electric bill from Xcel Energy.*
- Additions and major renovations to existing buildings may also qualify.
- The program rolls all analysis and incentives into a "whole building" number. Savings are a result of the net effect of decisions made in areas of lighting, envelope, cooling, heating, motors, etc. As such, customers cannot apply for the other Xcel Energy program incentives that promote efficient decisions for the same end-uses. Overall EDA program rebate levels are comparable to other Xcel Energy programs, but EDA participants benefit from the consulting services, provided free-of-change. There is only one application, and after that, the paperwork is largely handled by Xcel Energy and The Weidt Group. Where there are requests for input details and other documentation, the EDA program provides compensation for the time associated with fulfilling these requests.
- The goal of the program is to provide information and rebate dollars that can influence decisions during the design stage of a building project. The analysis must be completed before such decisions have been finalized. Therefore, applications must have details on the status of design, and eligibility will be affected by overall project schedule.
- Projects must have an inherent level of energy savings potential to be accepted. The easiest guideline to consider is building size. Buildings as small as 20,000 square feet may be eligible.

* Natural Gas only customers will be reviewed on a case-by-case basis.

EDA Enhanced Helps Meet Greater Energy Savings Goals

In 2009, Xcel Energy launched an Enhanced option for EDA projects that meet certain criteria. The incentive and design team reimbursement levels are the same as other EDA projects, but projects receive additional consulting assistance to help in the achievement of both greater energy efficiency and third-party recognition of project achievements by entities such as the U.S. Green Building Council (USGBC).

What is EDA Enhanced?

- For projects striving for greater than 30 percent energy demand savings
- Projects receive assistance with goal stretching—yet towards plausible energy performance goals—based on advanced knowledge of energy-saving strategies from similar projects that have been modeled in the EDA program
- Successive, detailed custom analyses is provided as design phases progress
- Provides services to help make informed design decisions earlier in the design process in order to maximize the opportunity for energy savings decisions
- Three "early" analysis modules may be included in the Predesign and Schematic Design phases. Specific plans will be customized for each project during the goal-setting process and will take place prior to our three regular energy optimization meetings.

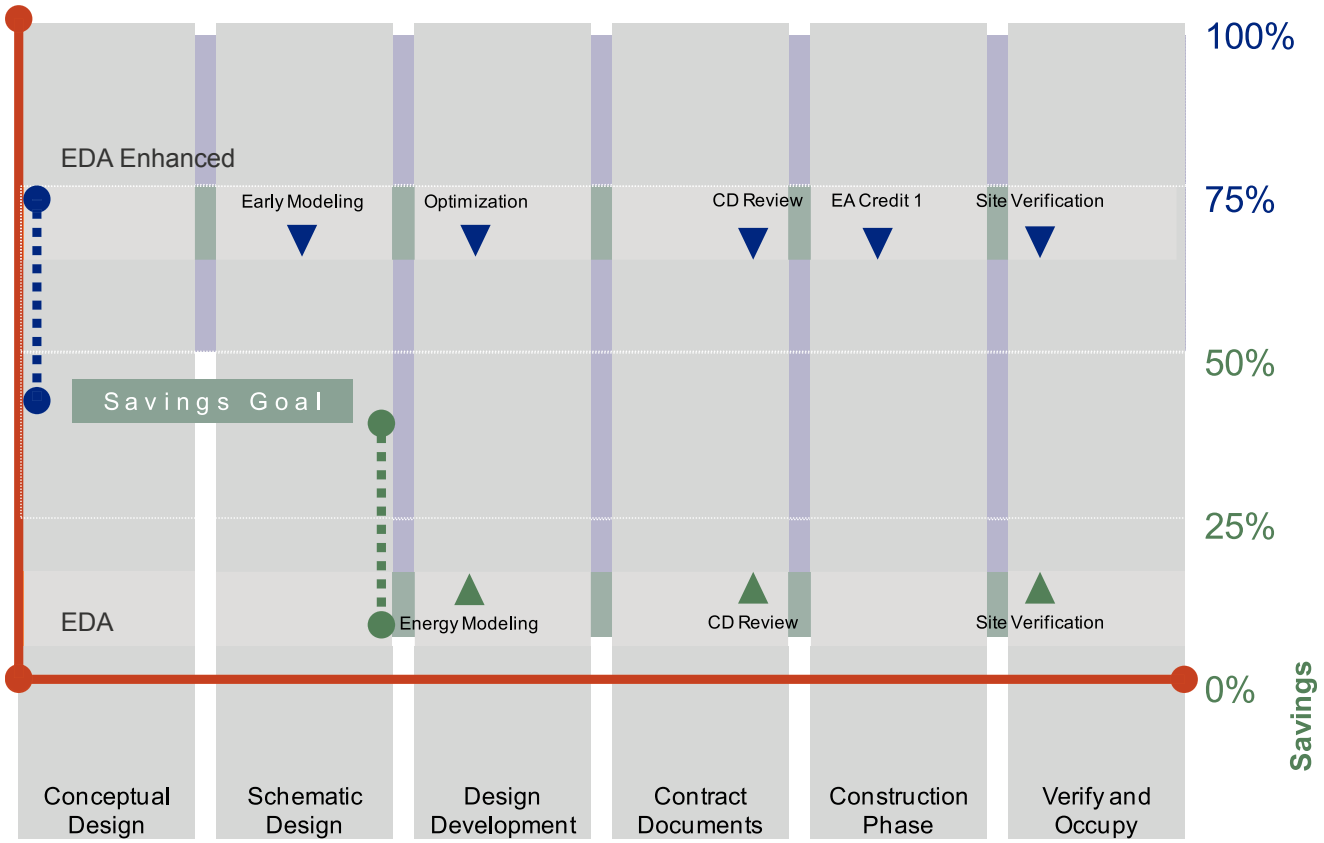
Enhanced EDA requires:

- Energy Savings: 30 percent energy demand (kilowatt) savings reduction over EDA program baseline requirements (roughly ASHRAE 90.1-2004)
- Registration/Intention: Must be registered for LEED certification with the Green Building Certification Institute (GBCI) following Minnesota B3 guidelines, or equivalent intentions declared

- Sufficient time in the design schedule to allow for additional analysis to enhance the potential to achieve higher energy efficiency performance
- Because EDA Enhanced provides more services, the program has higher requirements for minimum energy savings in order to receive the full complement of rebates and services. If the 30 percent target is not met, the incentive will be reduced to offset additional program expenses

Energy Design Assistance Program

EDA Enhanced Track Overview



GOAL SETTING

Create and compare alternative energy-efficiency pathways during the predesign phase

Learn

→ How to reach 30 percent or more savings
→ Which strategies have the biggest impact
→ What it takes to reach net zero

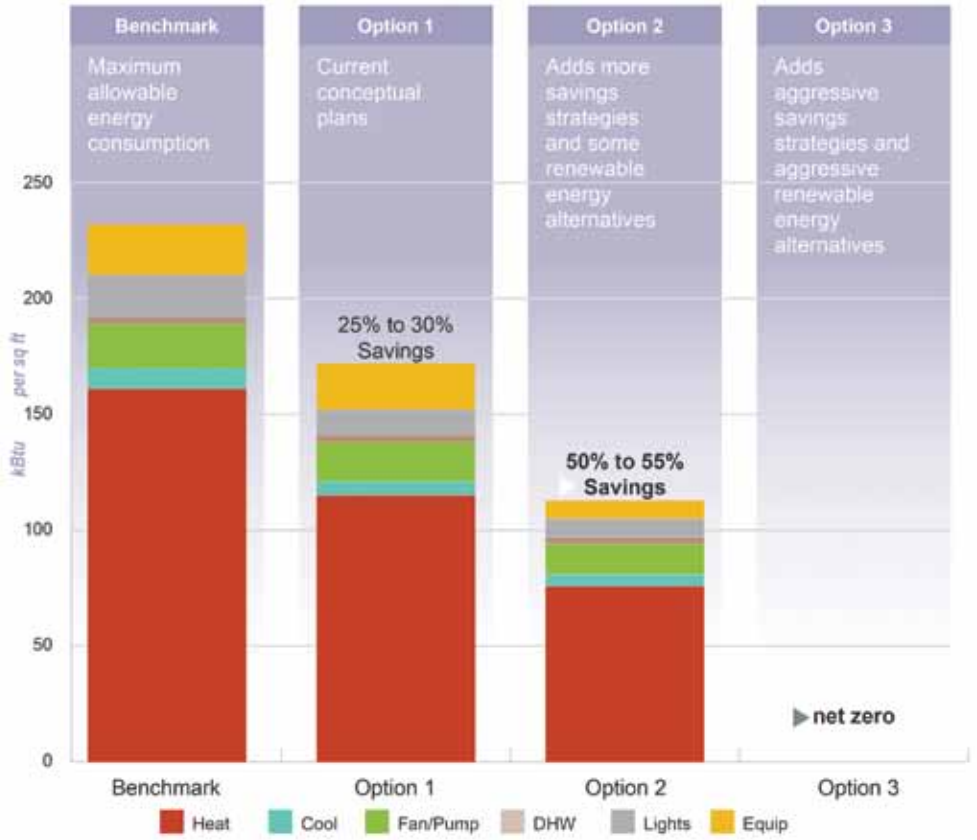
Timing

→ Two-hour meeting with the design team and owner during pre-design phase

GOAL SETTING

Create and compare alternative energy efficiency pathways during predesign

Example A benchmark building is created from a conceptual building energy model



MASSING ANALYSIS

Create and compare alternative building massing and orientation to maximize energy efficiency

Learn

→ Which building shape uses the least amount of energy
→ How the decision to daylight affects your choice of building shape
→ How building form affects choice of mechanical system

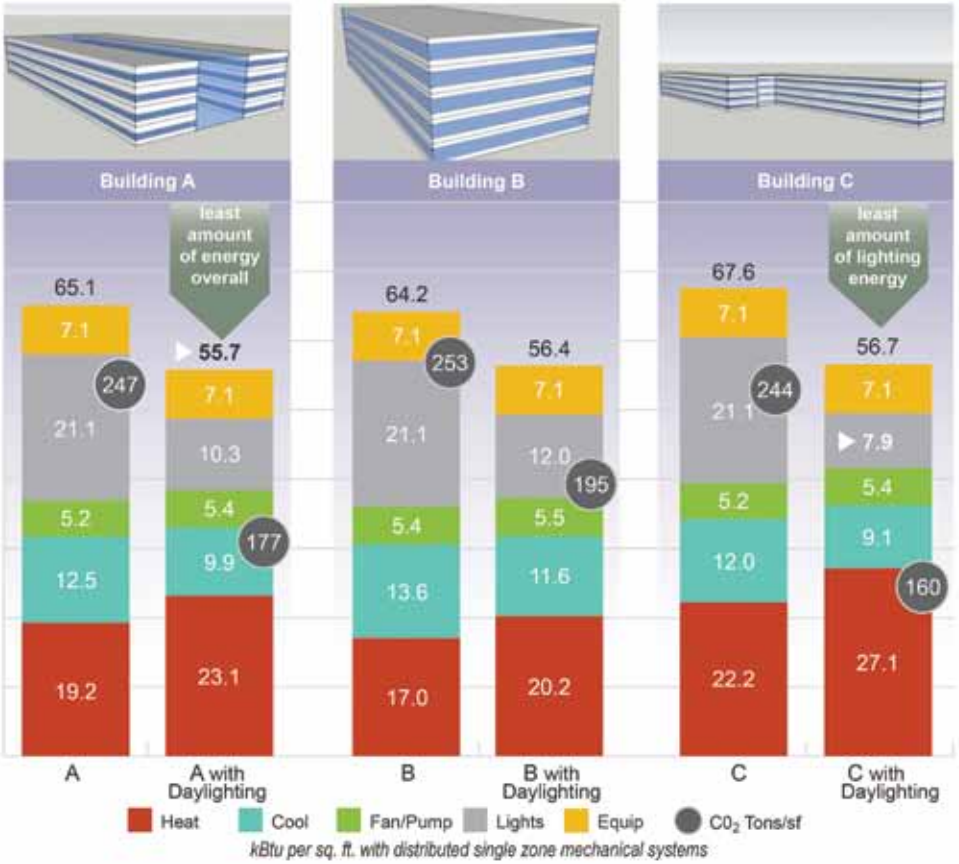
Timing

→ Available when the design team is considering alternate building shapes
→ Two weeks to consider massing analysis results

MASSING ANALYSIS

Create and compare alternate massing and orientation to maximize energy efficiency

Example Graph of energy results with daylighting kBtu per sq. ft.



DAYLIGHTING ANALYSIS

Create and compare alternative window sizes and placement for daylighting harvesting and sun shading options

Learn

→ Optimal window placement and sizes
→ How to reduce the need for electric lights
→ Sun control options

Timing

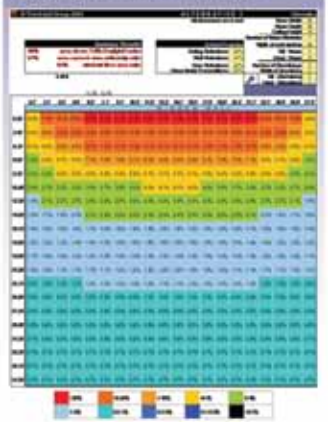
→ Available when building mass and orientation have been chosen and window openings are being designed
→ Three weeks available to consider daylighting analysis results

DAYLIGHTING ANALYSIS

Create and compare alternate window size and placement for daylighting harvesting and sun shading options

Example Daylighting study results

Daylight Factor Analysis

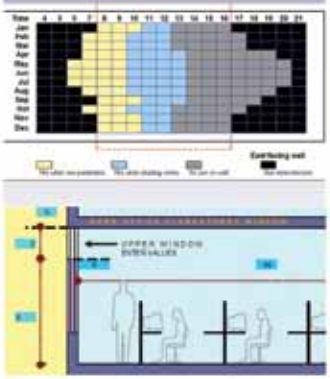


A very early schematic design tool

Distribution and quantity of light in a space as determined by:

- Size and location of openings
- Size of room
- Reflectance of surfaces
- Visual transmittance of glazing

Sun Control Analysis

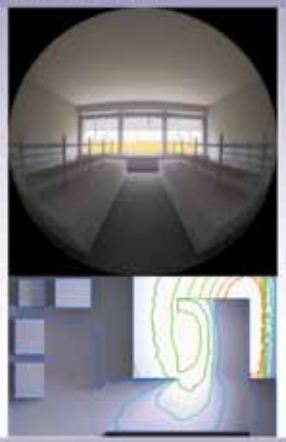


A very early schematic design tool

Direct penetration of sunlight into a space as determined by:

- Size and location of the openings
- Orientation of the openings
- Exterior screening
- Interior screening
- Placement and orientation of furnishings

Radiance Analysis



Surface modeling of the space, fenestration, and furnishings provides:

- Accurate quality of light in the space
- Accurate quantity of light available for daylight harvesting
- A schematic design refinement tool

HVAC ANALYSIS

Create and compare alternative HVAC system types and zoning options to maximize energy efficiency

Learn

→ Which mechanical system will likely use the least amount of energy?
→ Carbon impact of each system
→ Preliminary life-cycle cost analysis

Timing

→ Available when building mass and orientation have been chosen and window openings are being designed
→ Three weeks to consider HVAC analysis results

HVAC ANALYSIS

Create and compare alternative HVAC system types and zoning options to maximize energy efficiency

Example Annual energy cost for HVAC options by end use

EDA Enhanced can help you meet sustainability goals

By participating in our Enhanced option, you can be assured you'll focus on energy-efficiency in your building prior to breaking ground. The Enhanced option offers:

- Guidance to help you choose the energy-efficiency measures that work best for your building type and which strategies have the most resource-savings potential
- Additional baseline modeling
- Partial documentation for LEED EA Prerequisite and Minnesota SB 2030 guidelines

While EDA offers the opportunity to utilize our services as you go through the LEED process, we recommend you work with an Accredited Professional and/or your design team to focus on your sustainability goals in site, water, energy, materials and indoor air quality as well as provide submittal documentation to GBCI or the state of Minnesota.

The EDA Enhanced program provides the opportunity for our Consultant to help you through the online template process for the Minnesota SB2030 guidelines. The process has the following as part of Xcel Energy's funding:

- Entering building simulations outputs for energy usage into tracker at Schematic Design
- Updating energy outputs and tracker website as necessary through the Construction Document stage
- Providing supporting documentation to verify energy analysis as defined by SB 2030 model verification requirements
- Providing supporting documentation for variance submittals if applicable

LEED Analysis

The EDA Enhanced program provides for one round of submittals for Energy & Atmosphere Prerequisite 2 and Credit 1 to be provided by Xcel Energy. In the project's LEED Online website, you can designate the modeler from The Weidt Group as the party responsible for submitting the credit. No other credits are supported by the EDA program without previous agreement with Xcel Energy.

The submittal process follows these sequential tasks:

- Design team provides construction documents (CDs) and submittals documenting energy savings features identified in the Energy Design Assistance process to date.
- The Weidt Group revises the energy model to reflect changes from the previously run bundles and sends to Xcel Energy for approval.
- The Weidt Group receives Xcel Energy approval of revised results and associated rebates.
- The Weidt Group develops an energy model that follows LEED EA Prerequisite 2 and Credit 1 protocol. *This takes approximately 4-6 weeks from completion of the previous steps.*
- The Weidt Group sets a meeting time and location to review the draft results with the design team.
- If necessary, the appropriate team members will be informed before this meeting regarding critical details that may affect LEED results or that will need to be discussed at this meeting.
- If needed, The Weidt Group revises the model based on feedback from the draft results meeting and sets another review meeting with the design team.
- The Weidt Group completes LEED-Online templates and associated documentation (2-3 weeks from completion and acceptance by the design team of the LEED -compliant energy model).

The Weidt Group will confirm its intention to post results with the design team's designated LEED coordinator prior to actual posting.

The scope of work sponsored by Xcel Energy for this effort includes one submittal and one response to GBCI questions. The work is developed to reduce the likelihood of questions in the GBCI review process, but we cannot guarantee their review response.

EDA Quick—Offers Condensed Analysis Process

EDA Quick provides a condensed version of analysis. This path allows a broader range of projects to receive some level of assistance from the EDA program. Savings expectations are not as high as the other EDA options, but the process can work well for tighter project schedules.

→ **Minimum Project Size**: Larger than 20,000 square feet and smaller than 50,000 square feet, larger projects will typically fall under other options

How is it different then the regular EDA option?

The Quick option can be completed in a three-week time frame from when we receive electronic plans, evaluations, etc. from the design team. The following outlines the other differences seen within this option.

→ Brief building characteristics requested at introductory meeting

→ No cost estimates required, historical costs will be used for payback calculations

→ The bundle and strategy meeting are combined

→ No bundle runs are completed prior to the combined meeting, but rather completed afterwards to be included in meeting minutes

→ Formal rebate levels will be provided after the in-person meeting

→ No formal CD Review

Xcel Energy will review each application and determine if one of the alternate EDA options (Enhanced or Quick) will fit your project scope.

*Timing: early design development stage
*Savings committment 5% energy demand
*Customers must have selected mechanical systems prior to application

Design Team Incentive—Process

All Energy Design Assistance projects also qualify for a one time reimbursement incentive for the time invested by design professionals in helping their clients qualify for the incentives.

Design incentives are based on size and follow the following scale:

Total Building Square Feet	20,000 – 49,999	50,000 – 99,999	100,000 – 399,999	400,000+
Incentive Amount	$4,000	$8,000	$10,000	$12,000

This reimbursement is expected to offset expenses for efforts incurred by the design team for participation in the program, which may include, but is not limited to, the following:

→ Attending design assistance meetings

→ Reviewing conservation measures

→ Calculating costs of conservation measures

→ Submitting construction documents for review

→ Completing other tasks directly related to the program

Actual costs incurred for the above tasks and any others related to the program by the design team and the customer during participation in the program may be greater or less than the reimbursement.

It is important to note the amount of reimbursement to design team is independent of the energy savings forecast or achieved, to avoid potential conflict-of-interest concerns.

In order to participate in the incentive funding please fill out a design team incentive form and submit invoices and form to Xcel Energy.

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