B3 History in Minnesota



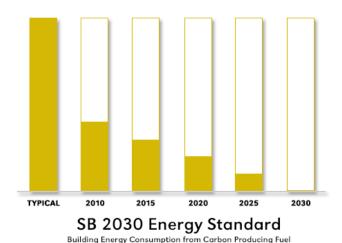
- Hennepin County Sustainable Building Guidelines developed in 1995.
- The B3 Sustainable Building Guidelines were established in 2004 for all new state-bonded projects.
- B3 Benchmarking was established in 2004 to track all public building energy use in Minnesota.
- The B3 Guidelines were updated in 2008 to include all substantial renovations.
- The original energy requirement in the B3 Guidelines was 30 percent below the State Building Code. This was replaced by the Energy Standard from the SB 2030 program in 2009.

B3 History in Minnesota



- The purpose of the program was to make the guidelines "performance based" so each project team could determine the most cost effective method of obtaining the objective
- The guidelines were designed to be connected to real outcomes
- The guidelines were to reflect the environmental issues of Minnesota and attempt to address these issues
 - Energy reduction and bldg. commissioning
 - Water reduction and pollution
 - Indoor Air Quality
 - Project Management/Commissioning

Sustainable Buildings 2030



- The SB2030 initiative was passed by the Minnesota legislature in the 2008 session.
- The purpose is "to establish **cost-effective** energy-efficiency performance standards for new and substantially reconstructed commercial, industrial and institutional buildings that can significantly reduce carbon dioxide emissions by lowering energy use ..."
- These standards have become the energy use requirements for statebonded projects through the B3 Guidelines (formerly Minnesota Sustainable Building Guidelines).

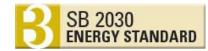
Legislation 2004/2009/2010

The Department of Administration and the Department of Commerce, with the assistance of other agencies, shall develop sustainable building design guidelines for all new state buildings by January 15, 2003, and for all major renovations of state buildings by February 1, 2009.

Center for Sustainable Building Research at the University of Minnesota to coordinate development and implementation of energy-efficiency performance standards, strategic planning, research, data analysis, technology transfer, training, and other activities related to the purpose of Sustainable Building 2030.

Network of B3 Programs







B3 Guidelines

Around 420 projects in B3 Guidelines (including SB2030 projects and older operations-only)

SB2030 Program

Over 100 projects submitting design EUIs Estimated savings of 534 million kBtus/year Estimated savings of \$8.3 million per year

B3 Benchmarking

Over 7,500 buildings representing over 300 million SF in program Identified over 1,500 buildings that would be good candidates for improvement (18% of the population)

Savings of 1,850 million kBtu per year

Potential Savings of 23 million dollars per year

Network of B3 Programs



Energy Efficient Operations

Development of a Building Operations Manual

Required for some B3v3 projects

Development of new software tool modules for managing energy-efficient operations tasks

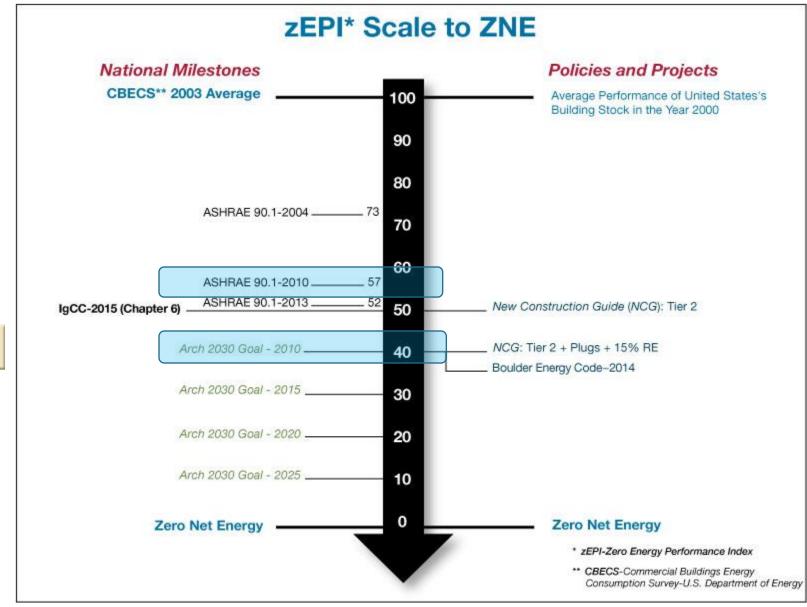


Post-Occupancy Evaluation

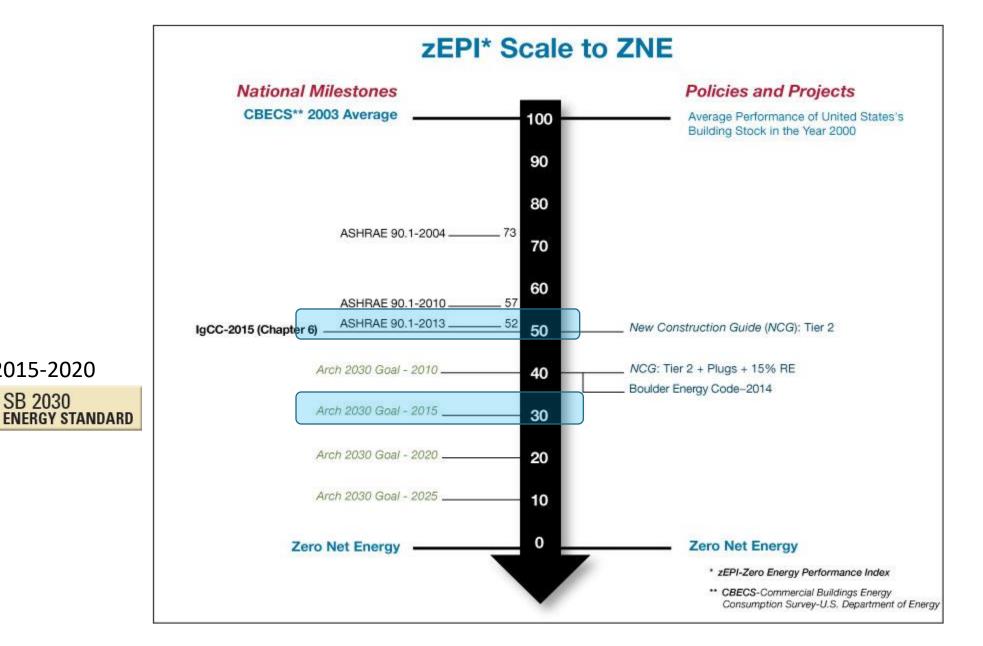
Required on B3 projects (if we support that building type)

Development of an on-line POE Survey

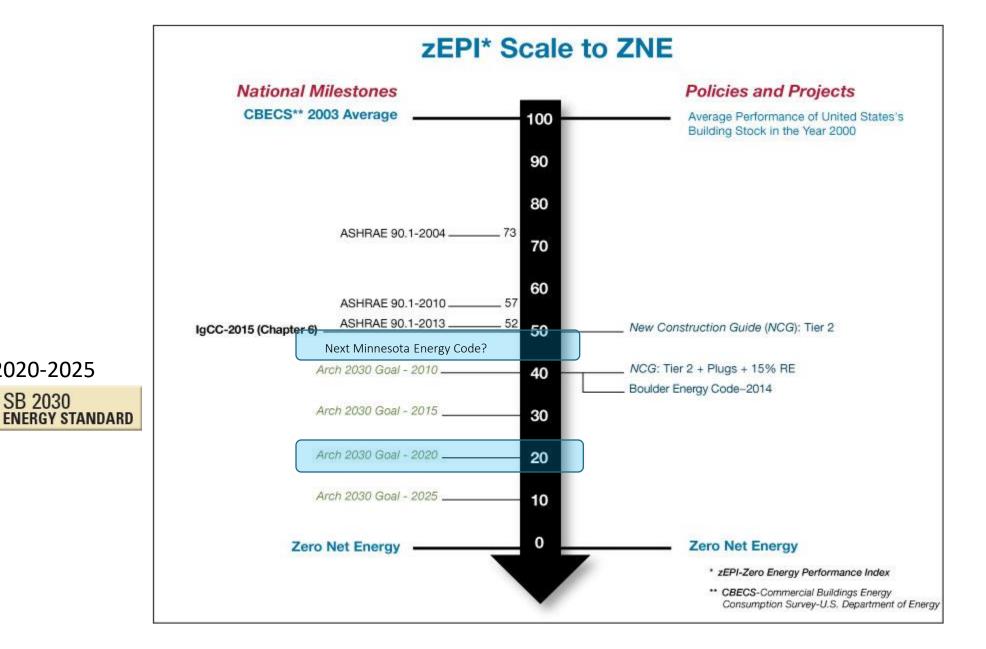
Additional levels available



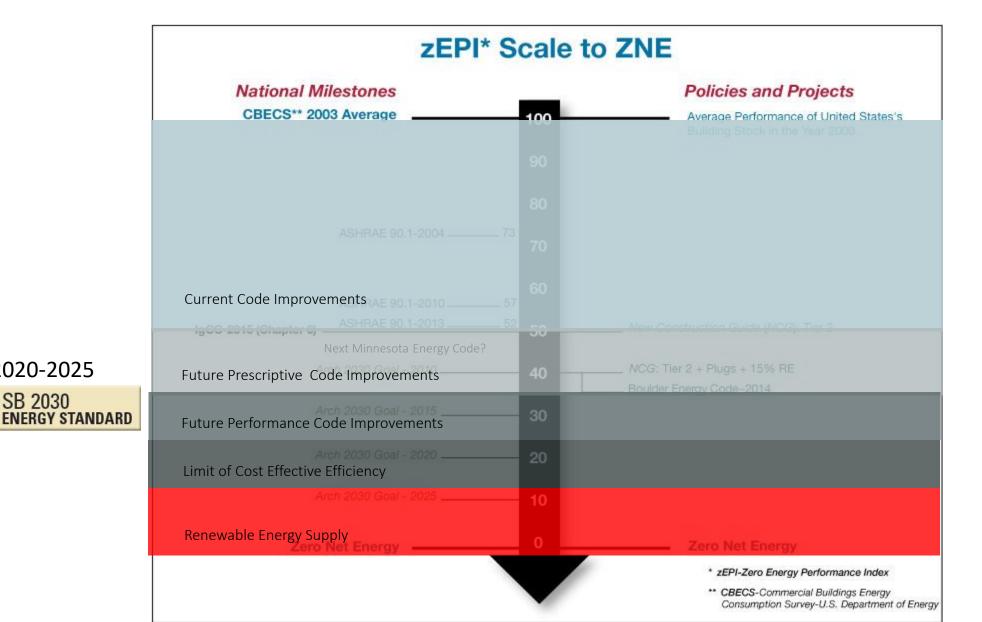
SB 2030 energy standard



SB 2030

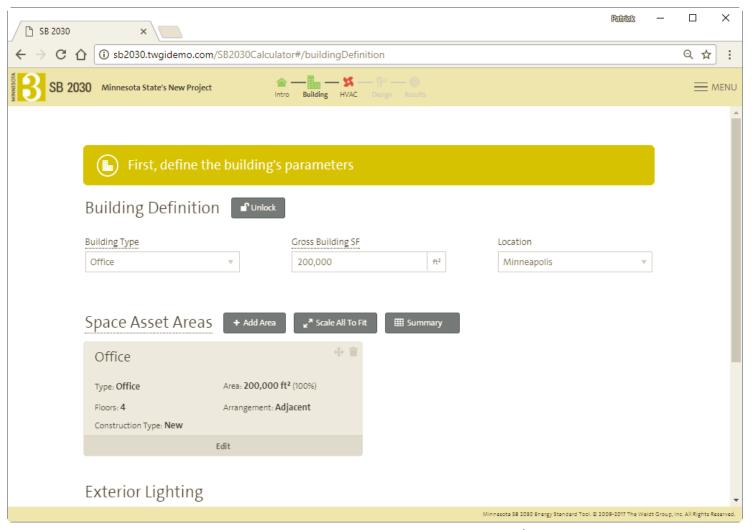


SB 2030



SB 2030

Energy Standard Tool / As-Designed



Demo available: sb2030.twgidemo.com/SB2030Calculator

Network of B3 Programs



15 to 20% of energy use is wasted and is not detectable by normal operation

EEOM - a practical, cost effective easy-to-use early waste detection method

The necessary elements of this approach are:

Knowledge of largest energy wasting systems

A simple task to detect waste

A calendar to perform the task

The capability to correct the problem

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Post Occupancy Evaluation

On-line survey sent to employees

Questions related to their satisfaction with the Interior Environmental Quality (IEQ) of overall building and in-depth questions about their workspace or classroom

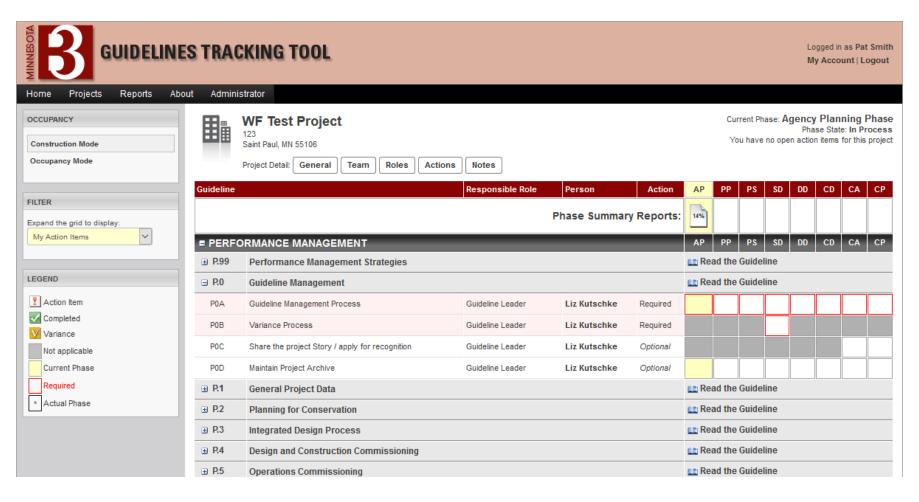
Branded as SPOES (sustainable post-occupancy evaluation survey)

To provide feedback on design solution and building performance from occupants

Knowing which IEQ components influence occupants' satisfaction with their environments affects the understanding of productivity.

To compare the buildings' metrics to benchmarks, industry standards, and other buildings

B3 GUIDELINES TRACKING TOOL



Key Roles



Agency contact

The Agency Contact is the representative of the State Agency that provided the funding for the project, and is responsible for approving each phase as it is submitted. There are also limited variances available for programmatic conflict – this is also handled by the Agency Contact.

CSBR manages this role for several State agencies; organizations that require compliance without State Bond funding typically take on this role themselves (such as Saint Paul)

Key Roles



GUIDELINE LEADER

The Guideline Leader is responsible for managing the submission of the design team. In larger projects they are most often from of the Architecture firm involved with the project.

The Guideline Leader should ensure that all project information is accurate, compliance with the B3 Guidelines and submitted in a timely manner. In the Tracking Tool they are also responsible for reviewing each phase submission prior to it being submitted to the Agency Contact.

Key Steps

Early Project Setup

Getting a project set up early in the program allows the owner and design tea to work towards the performance goals outlined by the B3 Program.

Projects adopting later may have some amount of redesign to reach compliance.

Design Team Coordination around goals

One of the primary functions of the B3 program is setting performance goals for projects and helping to retain those goals as the project evolves.

This is achieved by checking in as the design progresses to request that design teams ensure that they are on track to meet the Guidelines.

Transition to operations

When the B3 Tracking Tool has completed the last Design phase

Tracking tool is ready to be converted from Construction Mode to Operations Mode

Project is automatically entered into the B3 Benchmarking tool to set monthly energy targets and track monthly energy consumption

SB 2030 Standard should be adjusted if the operation of the building shifts

Program Update: Alternative paths

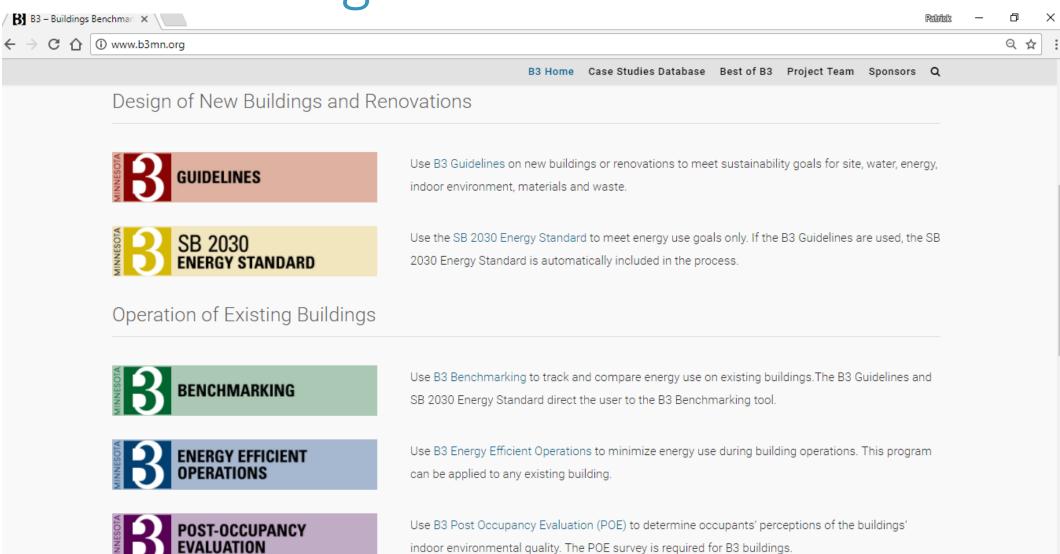
Small Buildings Method: Projects (currently under 20,000 sf) are permitted to use the Small Buildings Method, which uses prescriptive approach in lieu of a comprehensive building energy simulation.

Partial Mechanical Upgrades: Major renovation projects that are not replacing the full mechanical systems have fewer opportunities to achieve improved performance and limited system design opportunities.

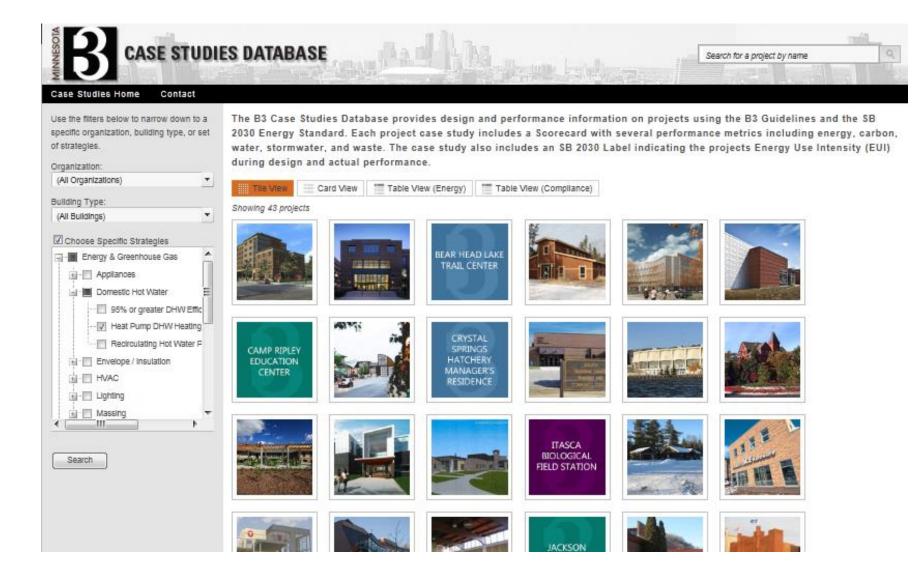
Wastewater Treatment Facilities: Wastewater Treatment Facilities required to meet SB 2030 are asked to follow a process which evaluate and benchmark existing facility (if any), document energy conservation measures considered for the project and provide anticipated performance metrics.

Cost-Effective Adjusted Standard (pre-2020): As SB 2030 is required to be achieved cost-effectively some projects may request to document the limit of this cost-effectiveness in order to adjust the SB 2030 Standard EUI. This process has been adapted into the process for setting the On-Site SB 2030 Target for projects needing to access off-site resources to hit their targets.

B3MN.org



CASE STUDY DATABASE



Case Studies Home

Contact

Use the filters below to narrow down to a specific organization, building type, or set of strategies.

Organization:

Minnesota State Colleges and Universiti€ ▼

Building Type:

(All Buildings)

Choose Specific Strategies

Table Views:

Energy View

Columns:

✓ Project

✓ Organization

City

■ Building Type(s)

Construction Type(s)

✓ SF

Owner

Architect

Submit

Reset

Export To Excel

The B3 Case Studies Database provides design and performance information on projects using the B3 Guidelines and the SB 2030 Energy Standard. Each project case study includes a Scorecard with several performance metrics including energy, carbon, water, stormwater, and waste. The case study also includes an SB 2030 Label indicating the projects Energy Use Intensity (EUI) during design and actual performance.

IIII Tile View

■ Card View

Table View

Project	Organization	Building Type(s)	SF	Energy Standard EUI (kBtu/SF/Yr)	Energy Design EUI (kBtu/SF/Yr)	Energy Ratio Standard/Design	Energy Ratio Graphic
ICC Academic Classroom Addition & Renovation	Minnesota State Colleges and Universities	Classroom	12,400	98	42	0.43	_
MSU Livingston Lord Library	Minnesota State Colleges and Universities	Library	131,993	79	45	0.57	_
MSU Science Education Center	Minnesota State Colleges and Universities	Laboratory, Classroom	64,163	154	69	0.45	_
NCC Academic Partnership Center	Minnesota State Colleges and Universities	Classroom, Office	76,000	102	95	0.93	_
NCTC Aviation Addition and Renovation	Minnesota State Colleges and Universities	Airplane Hangar, Classroom, Laboratory	20,370	69	78	1.13	<u> </u>
NHCC Bioscience and Health Careers Center	Minnesota State Colleges and Universities	Classroom, Laboratory, Student Center	62,284	172	68	0.40	_
PTC Entrepreneurship Center and Technology Business Incubator	Minnesota State Colleges and Universities	Office, Classroom	12,110	62	51	0.82	•
SCC Classroom Renovation & Addition	Minnesota State Colleges and Universities	Classroom, Library	18,760	171	67	0.39	_
SCTCC Medium Heavy Truck and Auto Body	Minnesota State Colleges and Universities	Vehicle Maintenance Garage	27,025	85	71	0.83	_

B3 Project Benefits

Added Value:

- Reduced energy/water usage and costs.
- Increased resilience through energy efficiency and improved site design.
- Increased durability for longer building life and reduced maintenance costs.
- Reduced waste in construction and operations which mitigates the impact on landfills.
- Use of local materials which creates economic benefits
- O Use of healthy materials that improves occupant health
- o Improved lighting and ventilation that improves occupant health

SB2030 Benefits

Major accomplishments of the SB2030 initiative through 2020 include:

- 197 buildings designed to the SB2030 Energy Standard are predicted to save approximately 1,351 million kBtus/year.
- To date, 88% of all building projects enrolled in the SB2030 program have documented designs that met or exceeded the SB2030 Energy Standard.
- Buildings designed to the SB2030 Energy Standard are predicted to save approximately \$22.1 million per year assuming an average cost of \$16.37 per mmBtu.
- Buildings designed to the SB2030 Energy Standard anticipate a reduction in carbon emissions of 119,000 tons of CO2e annually.
- o 151 completed SB 2030 projects are estimated to have saved 4,582 million kBtus, a reduction of 617,000 tons of CO2e and a savings of \$75.0 million to-date.