



Welcome

Welcome to the Sustainable Building 2030 (SB 2030) process. In 2008 the State of Minnesota implemented a program similar to the national “*Architecture 2030*”¹ program called “*Sustainable Building 2030*”. It is now a state law that all state-bonded buildings that started Schematic Design after August 1, 2009 must comply with the SB 2030 Energy Standard.

This document contains information that will be vital in meeting the SB 2030 goals: (1) a schematic illustration of the SB 2030 process, (2) a step-by-step guide to the process to meet the requirements of SB 2030, and (3) suggestions if your project has difficulties meeting the SB 2030 Energy Standard. The web site has further information about the program at www.b3mn.org/2030energystandard/

If the B3 Guidelines are used, the SB 2030 Energy Standard is automatically included in the process. SB 2030 is the building energy efficiency requirement of the B3 Guidelines found at www.b3mn.org/guidelines/. Compliance information and status for both programs is found in the B3 Tracking Tool.

The SB 2030 Energy Standards for 2010 are challenging but achievable with a design focused on energy efficiency. Early energy modeling of your schematic building design is encouraged. The employment of an “Integrated Design Process”² will also be helpful in attaining the energy goals of SB 2030. Also, utility program support in the form of design assistance services and financial incentives for design upgrades are available for most projects. Data collected as part of the B3 and SB 2030 programs will be publicly accessible, including on the B3 Case Study Database.

Please contact me if you have further questions or need further assistance at sttron081@umn.edu.

Sincerely,

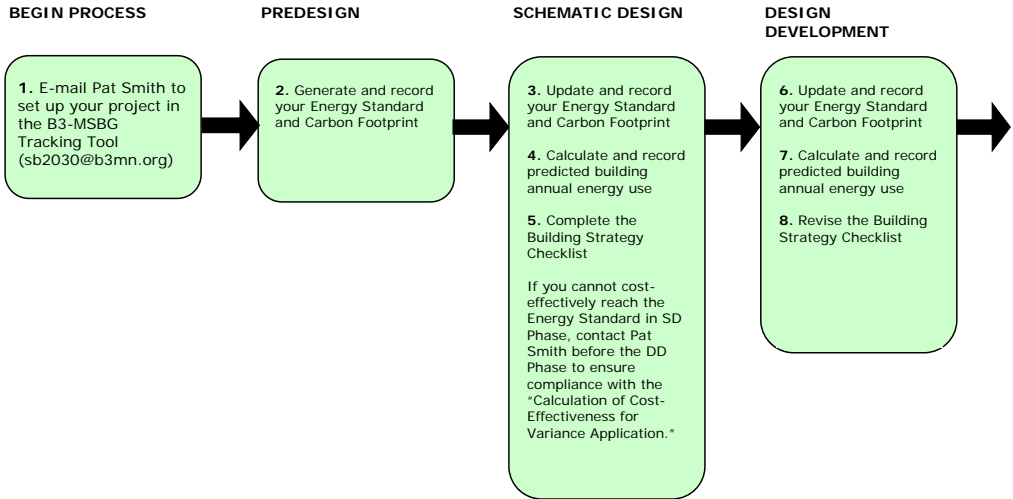
Richard Strong

SB 2030 Coordinator

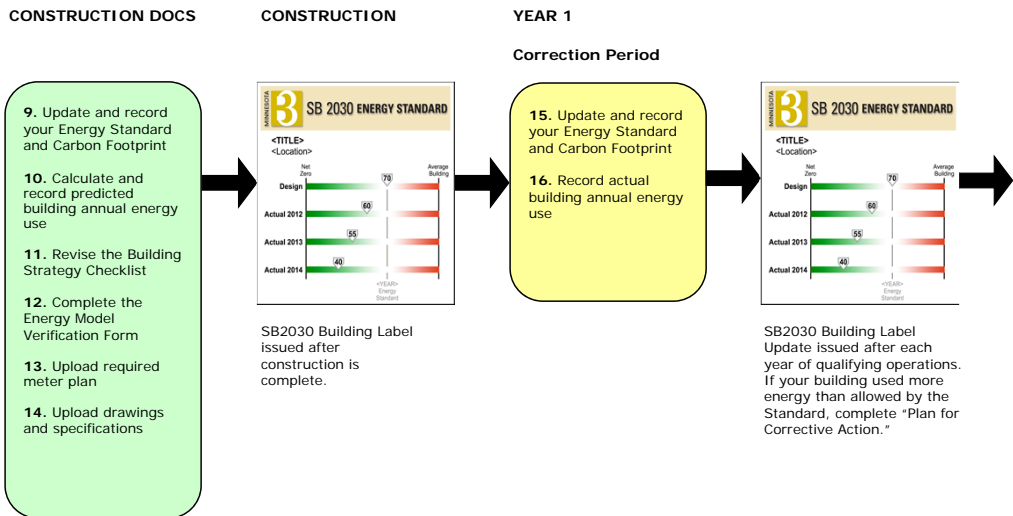
¹ Architecture 2030 www.architecture2030.org/

² The Integrated Design Process by iiSBE, www.iisbe.org/download/gbc2005/Other_presentations/IDP_overview.pdf

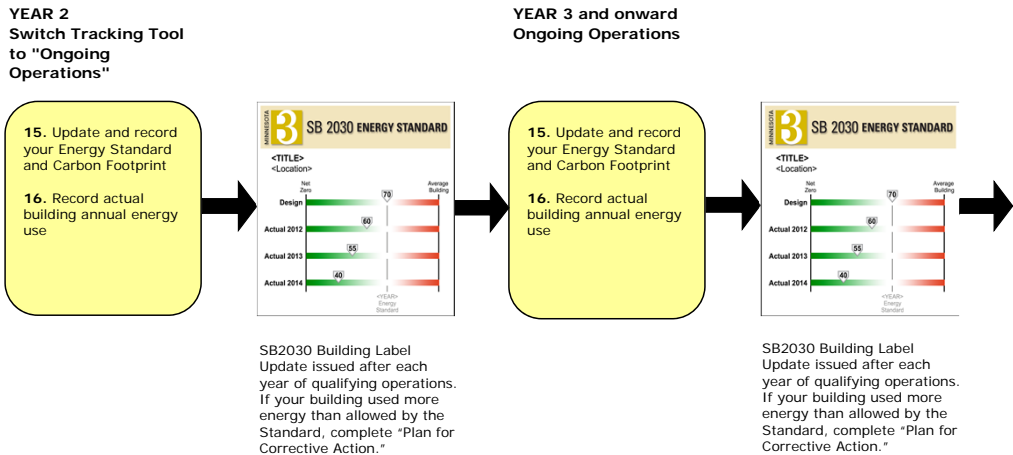
Design and Construction



Design and Construction **Occupancy**



Occupancy



Sustainable Building 2030 Compliance and Reporting Instructions

Congratulations on participating in the Sustainable Building 2030 Energy Standards program. Whether you have elected to do this program voluntarily or are required by the State of Minnesota, the procedure will be the same.

The following paragraphs outline the step by step requirements of the SB 2030 program. Following each of the steps below will ensure that you have met the intent of the SB 2030 Program.

Planning, Design and Construction Phases:

Step 1) Contact Pat Smith at the Center for Sustainable Building Research to set up an account in the B3-MSBG Tracking Tool. He can be reached at sb2030@b3mn.org or 612.626.9709.

Pre-Design Phase:

Step 2) In the Pre-design Site Selection (PS) phase, generate and record both the Energy Standard (kBtu/SF/Yr) and the Carbon Footprint (CO₂e/SF/Yr) in the B3 Guidelines Tracking Tool under Guideline E.1C during the Predesign Site Selection (PS) Phase. This will be done using one of two methods. Energy Standards for many building types (see list below) can be determined by accessing the “Energy Standard Tool” from within the MSBG Tracking Tool in Guideline E.1C (<http://trackingtool.b3mn.org/>).

Data generated in the Energy Standard Tool will be automatically entered in E.1C after the calculation is saved. Note that numerous options are available within the Energy Standard Tool that allow significant customization within each of the available building types. Each building type contains an editable allocation of several space types with pre-loaded (also editable) characteristics, such as schedules, plug loads, ventilation requirements and temperature setpoints. If all space types in your project are not adequately represented in the Energy Standard Tool then you can request to use the Interim Energy Standard Calculator, also linked in E.1C. **NOTE: It is strongly suggested that the same person who will be the energy modeler complete the documentation for the Energy Standard. This is to insure that spaces types are sized and treated in a similar manner both in the Energy Standard Tool and the energy modeling tool.**

If your building includes space types related to multiple building types it may be necessary to allocate several building types to your project. Once you have calculated your Energy Standard and Carbon Footprint, enter the calculated values in E.1C and save the completed calculator file by clicking “finish”. In each phase, it will be necessary to re-establish your Energy Standard using either the Energy Standard Tool or Interim Energy Standard Calculator to ensure that the inputs from the previous phase still reflect your project’s parameters. Listed below are the basic building types available in the Energy Standard Tool, though building types not listed can be created by configuring the space types (embedded in each building type) and by using one or more building types.

Building Types Available in the Energy Standard Tool:

- Apartment
- Clinic

- Coliseum
- Football Stadium
- Hospital
- Laboratory
- Large Hotel
- Office
- Parking Facility
- Primary School
- Recreational Center
- Restaurant
- Retail
- Secondary School
- Small Hotel
- Strip Mall
- Warehouse

Schematic Design Phase:

Step 3) In the Schematic Design Phase you will be required to update and record your Energy Standard and Carbon Footprint in E.1C using either the Energy Standard Tool or Interim Energy Standard Calculator to ensure that the inputs from the previous phase still reflect your project's parameters. The Energy Standard Tool will save your data from previous runs, so it will only be necessary to open the tool, edit changed items if applicable, and save the Energy Standard back to the tracking tool. If you used the Interim Energy Standards, upload the revised Calculator in E.1C.

Step 4) Perform calculations or simulations to predict energy use by fuel / energy type. The Building Performance Evaluation Guide is a document describing acceptable building energy modeling programs as well as acceptable protocols on your building energy modeling process. This guide can be downloaded from E.1D located at trackingtool.b3mn.org/. Smaller buildings (buildings with areas less than 20,000 sf office and retail buildings and less than 50,000 sf Healthcare, warehouse, highway lodging and k-12 school buildings) may wish to use the Small Buildings Method, available as a download from www.b3mn.org/2030energystandard/ or through the tracking tool.

Record the predicted energy use by type in Guideline E.1D in the beginning of Schematic Design (SD) phase. The predicted kBtu/SF/Yr is calculated based on these values, and is automatically entered in E.1C. If the calculated kBtu/SF/Yr is 15% greater than the Energy Standard, either 1) alter the design to meet the Energy Standard, or 2) If there have been programmatic changes, recalculate your Energy Standard to reflect the changes and repeat Step 4. Pay special attention that variables used in the generation of the standard are the same as variables that should be used in the building's predictive energy model. Compliance is achieved when the predicted energy use meets or is more efficient than the energy standard.

If you feel that your project will not meet the requirements of the SB 2030 Energy Standard at any time during the design process, contact Pat Smith to discuss alternative strategies or the use of the SB 2030 Cost Effective process. Caution: if the project is going to utilize the SB 2030 Cost Effective process, you must contact Pat Smith at this phase or you will be required to meet the SB 2030 Energy Standard without the Cost Effective Option at later stages.

Step 5) Download and complete the Building Strategy Checklist from Guideline E.1D. Upload the completed Building Strategy Checklist in Guideline E.1D. Following completion of the SD phase, an independent reviewer will examine your predicted kBtu/SF/Yr and Building Strategy Checklist, and compare them to your Energy Standard to check for obvious discrepancies. The reviewer will contact you to resolve any issues discovered.

Design Development Phase:

Step 6) In Design Development Phase you are required to update and record your Energy Standard In E.1C, using either the Energy Standard Tool or Interim Energy Standard Calculator, to ensure that the inputs from the previous phase still reflect your project’s parameters. The Energy Standard Tool will save your data from previous runs, so it will only be necessary to open the tool, edit changed items if any, and save the Energy Standard back to the tracking tool. If you used the Interim Energy Standards, upload the revised Calculator in E.1C.

Step 7) Perform calculations or simulations to predict energy use by fuel / energy type. The Building Performance Evaluation Guide is a document describing acceptable building energy modeling programs as well as acceptable protocols on your building energy modeling process. This guide can be downloaded from E.1D located at trackingtool.b3mn.org/.

Record the predicted energy use by type in Guideline E.1D in the Design Development (DD) phase. The predicted kBtu/SF/Yr is calculated based on these values, and automatically entered in E.1C. If the calculated kBtu/SF/Yr is greater 10% than the Energy Standard, either 1) alter the design to meet the Energy Standard, or 2) If there have been programmatic changes, recalculate your Energy Standard to reflect the changes and repeat Step 7. Pay special attention that variables used in the generation of the standard are the same as variables used in the energy model.

Step 8) Download Energy Efficiency Strategy Checklist from Guideline E.1D and fill it out. Upload the “Energy-Efficiency Strategy Checklist” in Guideline E.1D. Following completion of DD phase, an independent reviewer will examine your predicted kBtu/SF/Yr and Energy Efficiency Strategy Checklist, and compare them to your Energy Standard to check for discrepancies.

Construction Document Phase:

Step 9) CD Phase: In the Construction Documents Phase you are required to update your Energy Standard in E.1C, using either the Energy Standard Tool or Interim Energy Standard Calculator, to ensure that the inputs from the previous phase still reflect your project’s parameters. The Energy Standard Tool will save your data from previous runs, so it will only be necessary to open the tool, edit changed items if applicable, and save the Energy Standard back to the tracking tool. If you used the Interim Energy Standards, upload the revised Calculator in E.1C.

Step 10) Perform calculations or simulations to predict energy use by fuel / energy type. The Building Performance Evaluation Guide is a document describing acceptable building energy modeling programs as well as acceptable protocols on your building energy modeling process. This guide can be downloaded from E.1D located at trackingtool.b3mn.org/.

Record the predicted energy use by type in Guideline E.1D in the Construction Documents (CD) phase. The predicted kBtu/SF/Yr is calculated based on these values, and automatically entered in E.1C. If the calculated kBtu/SF/Yr is greater than 5% the Energy Standard, either 1) alter the design to meet the Energy Standard, or 2) If there have been programmatic changes, recalculate your Energy Standard to reflect the changes and repeat Step 10. Pay special attention that variables used in the generation of the standard are the same as variables used in the energy model.

Step 11) Download Energy Efficiency Strategy Checklist from Guideline E.1D and fill it out. Upload the “Energy-Efficiency Strategy Checklist” in Guideline E.1D. Following completion of SD phase, an independent reviewer will examine your predicted kBtu/SF/Yr and Energy Efficiency Strategy Checklist, and compare them to your Energy Standard to check for obvious discrepancies.

Step 12) In the Construction Documents (CD) phase, download the “Energy Model Verification Form” in Guideline E.1D located at trackingtool.b3mn.org/. Fill it out and upload the file in E.1D.

Step 13) In the Construction Documents (CD) phase, download the “Meter Plan Examples” document. Create a simple meter plan that describes meter types and locations for your project, and upload the file in E.1D.

Step 14) In the Construction Documents (CD) phase, upload required drawings, schedules and simulation documentation to E.1D.

SB2030 Building Label is issued after approval of Construction Phase (CA) documentation in the B3-MSBG Tracking Tool.

Note: All, “cost-effective” (defined here as 15 year payback) energy conservation and energy efficiency strategies must be employed to meet the project SB 2030 Energy Standard. However, if the project has employed all “cost-effective” energy reduction strategies and fails to meet its SB 2030 Energy Standard, the project team shall request an Energy Standard Adjustment. This adjustment will be offer only if the project team has alerted Pat Smith during Schematic Design and work with the SB 2030 staff on strategies to meet the SB 2030 Energy Standard without employing the Cost Effective Option.

If additional assistance is required, please contact:

- Richard Strong at 612.626.7327 or sttron081@umn.edu
- Pat Smith at 612.626.9709 or sb2030@b3mn.org

Things to consider when designing to the SB 2030 Energy Standard

The SB 2030 Energy Standards are challenging but achievable by following these practices:

At any point, if the team is finding obstacles to meeting the standards, contact Richard Strong (contact information below) to discuss.

- 1) Employ energy modeling early in the design process. At the beginning of the Schematic Design, there are several options to achieve this goal. This early design stage modeling will alert your design team if your project is anticipated to use more energy than the SB 2030 Energy Standard, and aid in the evaluation of alternative design options. Corrective actions to resolve this discrepancy can be taken for little or no cost early in the design process.
 - a. The mechanical engineering and/or architecture firm may have the expertise to be able to perform the necessary simulations—especially during the early design stages when “ballpark” estimation of the overall performance and impact of a large number of design options is more appropriate than the exacting simulation that is required at the CD stage.
 - b. A number of utilities offer services and/or financial support for energy analysis in various stages of design (e.g. Xcel Energy’s Energy Design Assistance Program—especially the “Enhanced” program tract).
 - c. If the project is not eligible for utility-sponsored design assistance because of its size or location, contract with an energy modeler in the early schematic design process. Contact the funding Agency to see if they are willing to fund an energy modeler for the project.
 - d. If an energy modeler cannot be obtained, consider using free Energy Analysis Tools such as those found at the Whole Building Design Guide located at: www.wbdg.org/resources/energyanalysis.php.
 - e. If use of energy simulation programs is not feasible, consider using “Simplified Method for Predicting Building Energy Consumption Using Average Monthly Temperatures” by James White and Howard Reichmuth located at ieeexplore.ieee.org/stamp/stamp.jsp?tp=&arnumber=553381
- 2) Consider employing an integrated design process from the beginning of schematic design to optimize across design and energy goals in order to break through the design and cost barriers that could prevent you from achieving the SB2030 Energy Standard. The Integrated Design Process can assist you in achieving very high energy performance at low or no capital cost.

- 3) Verify that the Energy Standard accurately represents the actual design of the building with its intended hours of operations, plug loads and ventilation requirements. If there is a discrepancy between the design assumptions and the assumption for the Energy Standard Calculation, update the Energy Standard for the building with the new design assumption. It could be that the building design is operating very differently than how it was inputted into the Energy Standard Tool. This can be done by downloading the Energy Standard Tool from the MSBG Tracking tool located at (<http://trackingtool.b3mn.org>) and checking the assumptions from the previous submittal and comparing them to the present building design. Upload the Energy Standard Tool and compare the actual building kBtus and the Energy Standard kBtus.
- 4) Review all pre-selected energy strategies to ensure that these strategies have been incorporated into the design (see Building Strategy Checklist). If these strategies have not been effectively incorporated, then develop a strategy for incorporation. When all strategies have been effectively designed into the project, determine the anticipated design energy consumption.
- 5) If despite best efforts, the standards are still not being met, the design team in conjunction with the Owner should clearly delineate the reasons the building design is not meeting the anticipated design energy consumption SB 2030 Energy Standard. Carefully review each reason to determine possible design solutions i.e. materials, operational assumptions, siting of the building, window to wall area, massing, and lighting or others. Confer with the Owner to select the most cost effective methods of meeting the SB Energy Standard.

If the design team and owner have exhausted all cost effective means of reaching the SB 2030 Energy Standard, contact Richard Strong at stron081@umn.edu for further assistance.