

Sustainable by Design: Whole building energy, water and carbon analysis in minutes using digital 3D models.

Autodesk®

Challenge	To implement sound, cost-effective building energy retrofits, enhance the nation's energy security and environmental stewardship while modernizing towards sustainable public buildings.
Solution	Easy to use 3D modeling and analysis tools demonstrate energy savings and discover innovative cost effective alternatives for building energy retrofits.
Benefit	Fast delivery of critical energy and performance information accelerates the growth of energy efficient/carbon neutral/net-zero building inventories.

A key component of the economic recovery legislation is to make government buildings more energy efficient. Digital 3D models expedite energy analysis by quickly calculating efficiency gains for these buildings. This approach creates jobs, decreases energy dependence and fashions increasingly sustainable buildings for our future.

Public agencies can create, simulate and analyze energy performance with lightweight 3D building information models (BIM).

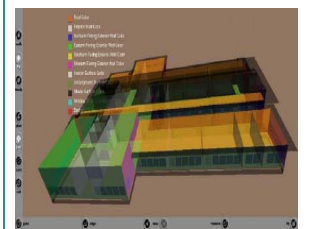
Today the architecture, engineering and construction industries are turning to a 3-dimensional information system called Building Information Models. These models efficiently classify all systems and components of a building; BIM classifies space and building functions and tracks solar orientation scenarios for new construction. BIM provides high quality data for critical decision-making and prioritization of energy performance options. Building models can be created from existing 2-Dimensional drawings, 3-D laser scanning, or manual observation and measurement. Depending on the size and complexity of the building approximately 1 day is needed to form a valid energy analysis model.

3D models of existing buildings provide critical information to improve building performance and reduce energy dependence.

Whole building energy analysis on BIM's afford accurate predictions for overall energy performance and predicts the success of energy improvements such as thermal insulation upgrades, solar voltaic and natural daylight usage, heating and cooling system upgrades, and including water conservation or reuse.

With this analysis improvements can be prioritized and entire building inventories can be examined to balance resources between regions. Unlike other forms of data archiving, intelligent models can be immediately shared with professionals within or outside the agency to build on the models as projects proceed.

The economic recovery legislation presents a unique opportunity to create an inventory of public buildings that save energy. This technology also provides a platform to evaluate and measure the effectiveness of allocated funds on energy projects today and far into the future. Given the magnitude and impact of the benefits it is important that 3D BIM technologies are at the forefront of the economic recovery programs.



U.S. Department of Energy concludes that buildings consume 70% of total electricity, 40% of raw materials and 12% of fresh water supplies, account for 30% of greenhouse gas emissions and annually generate 136 million tons of construction waste (approx. 2.8 lbs/person/day).¹

¹U.S. department of Energy Efficiency and Renewable Energy Network (EREN) Center of Excellence for Sustainable Development, 2003