Zero Energy Project

Case Studies
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Positive Energy Homes
Cost Less to Own Homes?
What are Zero Energy
BUYER
Engage the Team

Get Started

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Commercial

Zero for Homeowners

Step 1

High performance homes, especially those striving to achieve zero energy performance, be a number of trade-offs and compromises made during the design phase. Therefore, it is important to ensure that the design team communicates effectively with the clients and builders to ensure that their vision is clearly understood and that they are comfortable with the compromises required.

Site Selection
The first step in choosing a zero energy home design should be to consider the site. This is not just about finding the right location for the home, but also about understanding the local climate and how it will affect the design decisions.

Draughts
If your site is in an area prone to draughts, your design should consider windbreaks, shelterbelts, and other features to reduce the risk of uncontrolled airflow into and out of the building.

Size
It is important to choose the correct size and shape for your home. The size should be in line with your needs and the location, while the shape should be designed to optimize passive solar gain and reduce heat loss.

Thermal Boundary
Clearly state insulating levels and design details. The overall thermal envelope should be as low as possible. Thermal envelopes should be designed to minimize heat loss.

Ceilings
Ceilings should be designed to minimize heat loss. The ceilings should be insulated, with the insulation level being determined by the climate zone and the building's orientation.

Building Orientation
Optimize the location of the building to take advantage of the local climate and weather conditions. The building should be oriented to maximize passive solar gain and minimize heat loss.

Roof Overhangs
Design overhangs that provide shading to reduce the amount of heat gain and cool the interior of the building. Overhangs should be designed to be energy-efficient and to minimize heat loss.

Thermal Bridging
It is important to design thermal bridging in the building envelope to minimize heat loss. The building envelope should be designed to minimize thermal bridging and to ensure that the insulation is in contact with all surfaces.

Envelope Insulation
Envelope insulation is critical in achieving zero energy performance. It is important to ensure that the insulation is properly installed and sealed to minimize heat loss.

Air Sealing Goal
Air sealing is critical in achieving zero energy performance. The goal is to minimize air infiltration, which can lead to heat loss and increased energy consumption.

Air Barrier Systems
An air barrier system is critical in achieving zero energy performance. It is important to ensure that the air barrier is properly installed and sealed to minimize air infiltration.

Blower Door Directed Air Sealing
A blower door test is a critical tool in achieving zero energy performance. It is important to ensure that the air barrier is properly installed and sealed to minimize air infiltration.

Heating and Cooling Equipment
The choice of heating and cooling equipment will affect the energy performance of the home. It is important to choose energy-efficient equipment that meets the needs of the home.

Ventilation
Proper ventilation is critical in achieving zero energy performance. It is important to ensure that the ventilation system is properly installed and sealed to minimize heat loss.

Water Heater
Properly sized and maintained water heaters are critical in achieving zero energy performance. It is important to ensure that the water heater is properly sized and maintained to minimize energy consumption.

Solar Energy System
A solar energy system is a critical component of a zero energy home. It is important to ensure that the solar panels are properly installed and maintained to maximize energy production.

Appliances
Properly sized and maintained appliances are critical in achieving zero energy performance. It is important to ensure that the appliances are properly sized and maintained to minimize energy consumption.

Engage the Team
Engage the team of professionals early in the design process to ensure that the goals of the project are met. This includes architects, engineers, builders, and other professionals who are involved in the design and construction of the home.

Conclusion
Zero energy homes are a great resource for choosing energy-efficient appliances. It is important to ensure that the appliances are properly sized and maintained to minimize energy consumption.

References
This article provides a comprehensive overview of the design and construction of zero energy homes. It includes information on site selection, thermal boundary, air sealing, and ventilation, among other topics.

For more information on zero energy homes, please visit the Zero Energy Project website at www.zeroenergyproject.com.
Energy modeling helps determine which energy-savings features are most cost-effective. Energy modeling software is an important design tool that helps builders identify the best energy-saving measures required to construct a zero energy home. Detailed changes can be evaluated in minute detail by analyzing the energy impact of different design choices, such as a ground source heat pump versus an on-site heat pump, or comparing the impact of R-20 vs R-30 insulation.

Energy modeling can be as simple as the designer creating preliminary plans with dimensions, elevations, basic floor plan, and windows and doors. The plan can then be uploaded into the modeling software, and the impact projected for the zero energy model at the lowest cost possible. Because more detailed energy modeling will be required for the plan and construction documents, the use of energy modeling as the starting point will result in the zero energy goal at the lowest possible cost. Because more detailed energy modeling will be required for the plan and construction documents, the use of energy modeling as the starting point will result in the zero energy goal at the lowest possible cost. Because more detailed energy modeling will be required for the plan and construction documents, the use of energy modeling as the starting point will result in the zero energy goal at the lowest possible cost.

The payback on the costs of energy modeling itself - a matter of a couple of months - is surprisingly short. Any energy savings gained that costs ten per cent or more than the cost of energy savings itself will be more cost-effective and should be integrated into the plan. By using energy modeling in the early stages of the energy modeling process, the overall costs of constructing a zero energy home will be at its best for the sale price, after rebates and tax incentives, depending on the location.

### Energy Savings Comparison Chart

The chart below is a comparison of energy factors, showing small improvements to specific building elements, such as air sealing, insulation, windows, and doors, and systems, and state.

<table>
<thead>
<tr>
<th>Improvement</th>
<th>Energy Savings in kWh</th>
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<tbody>
<tr>
<td>Wall from R38 to R44</td>
<td>500,000</td>
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<tr>
<td>Floor from R30 to R38</td>
<td>500,000</td>
</tr>
<tr>
<td>Windows from U0.8 to U0.2</td>
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</tr>
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<td>ACH from 3.0 to 1.5</td>
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</tr>
<tr>
<td>Adding one 180W PV panel</td>
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Energy modeling helps determine which energy saving features are most cost-effective. Effective any longer. Similarly, upgrading one component will affect the impact of upgrading another component. Energy modeling will help determine the point at which returns in efficiency are no longer cost-effective as well as overall combination of energy saving measures required for the highest savings. It is clearly impossible to predict the exact net cost of different energy measures because they vary over time and across home building markets. But while energy modeling only provides an estimate, it gives useful guidance as to the relative cost/benefit of each energy saving measure considered.

### Energy Modeling Software Directory

The following links provide information about some of the different energy modeling software that is available.

#### ENERGY MODELING

- **BuildingScope**: This is a web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.
- **Carbon Foot Printing and Life Cycle Assessment Software**: This is a highly sophisticated modeling engine.
- **One Click LCA**: This is a web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.
- **Passive House Planning (Design) Package**: This is a web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.
- **EnergyPlus**: This is a highly sophisticated modeling engine.
- **BeOpt**: This is a unique web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.
- **EnergyGauge**: This is a web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.
- **REM Design**: This is a web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.
- **Energy Savings Comparison Chart**: This is a web-based tool used to model and analyze environmental life cycle impact, greenhouse gas emissions and energy use.

#### Energy Savings Comparison Chart

The chart below is a comparison of energy factors, showing small improvements to specific building elements, such as air sealing, insulation, windows, and doors, and systems, and state.

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It is important to factor in the cost of each improvement when comparing their relative energy savings. Further upgrades will give additional savings, so that upgrading one energy feature beyond a certain point may not be cost-effective any longer. Similarly, upgrading one component will affect the impact of upgrading another component. Energy modeling will help determine the point at which returns in efficiency are no longer cost-effective as well as overall combination of energy saving measures required for the highest savings.

Energy modeling software is an important design tool that helps builders identify the best energy-saving measures required to construct a zero energy home. Because more detailed energy modeling will be required for the plan and construction documents, the use of energy modeling as the starting point will result in the zero energy goal at the lowest possible cost.