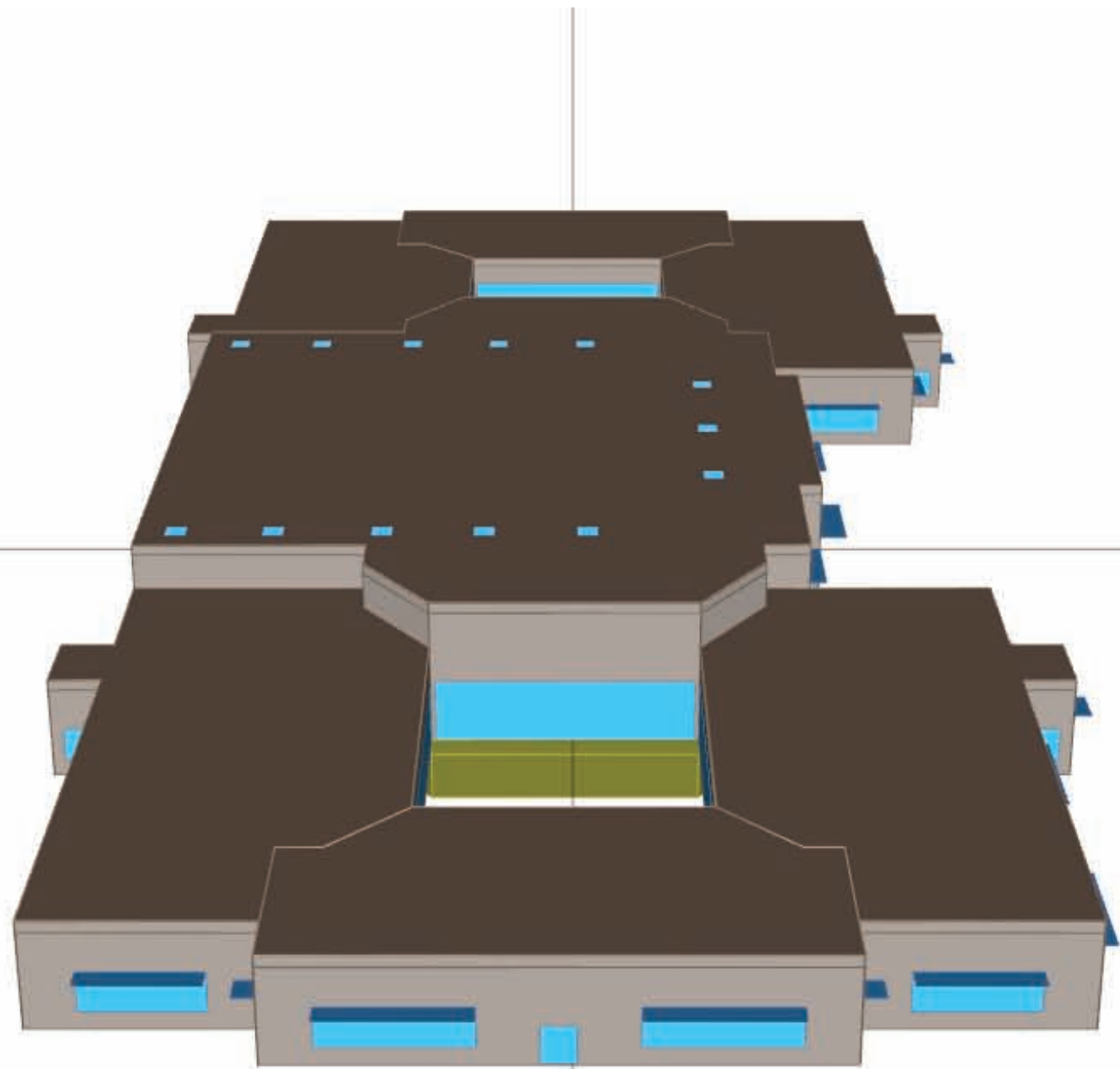


Whole Building Energy Simulations



Company Profile

Our LEED consulting group brings a positive and knowledgeable dynamic to LEED projects. From LEED building commissioning to LEED energy modeling using Equest or other DOE based software, we understand the requirements for project success. EcoHill brings design ideas and services that can improve all aspects of a building's energy performance. From water to landscaping to the latest HVAC system, our expertise and desire for your project to succeed makes us a valuable LEED partner.

For energy evaluations, not being affiliated allows us to make recommendations free of product bias. Our reports empower our clients to implement their own retrofits and changes, which maximizes savings.

Energy Modeling Team

Peter V. Hetzel
Business Development Director

Ken Reibeling, Member ASHRAE
HVAC Specialist

Jonathan Backos, LEED AP BD+C
Operations Director

Laurent Kanago
Energy Modeling Specialist

Other EcoHill Services

LEED Consulting and Commissioning

Geothermal Design and Installations

ASHRAE Energy Audits

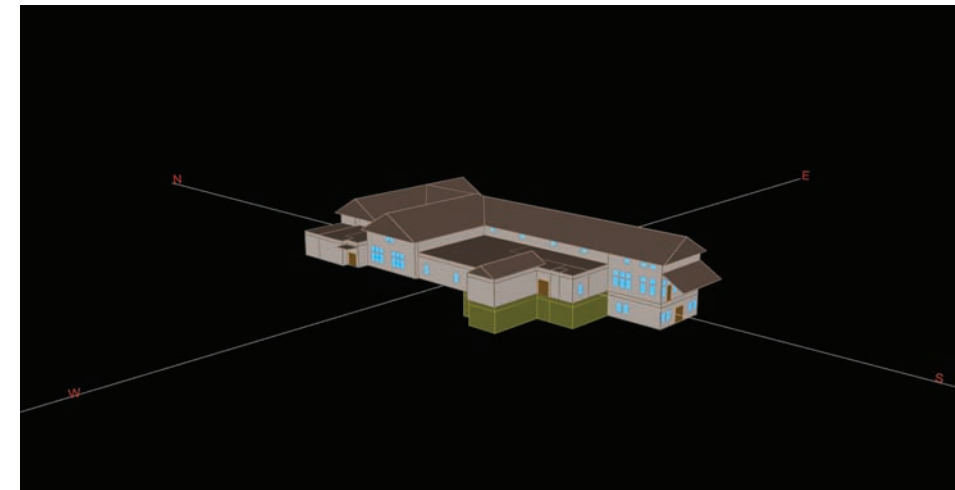
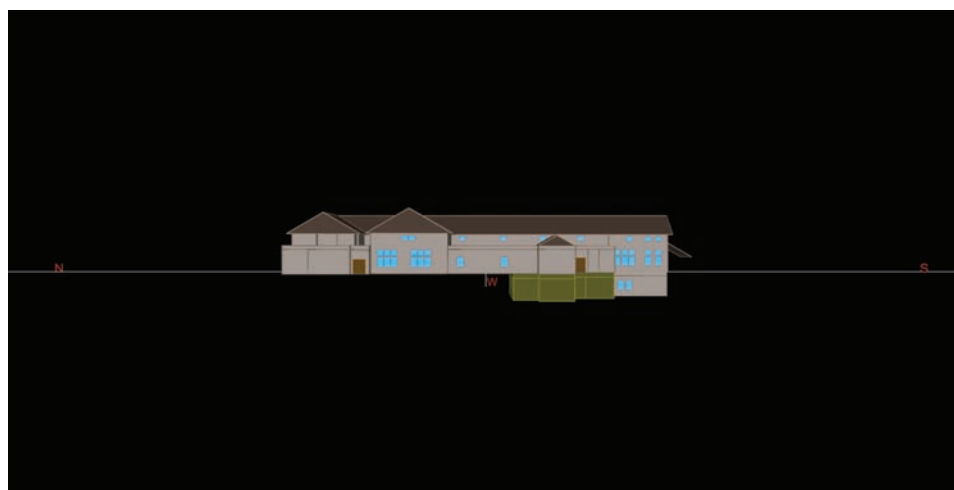
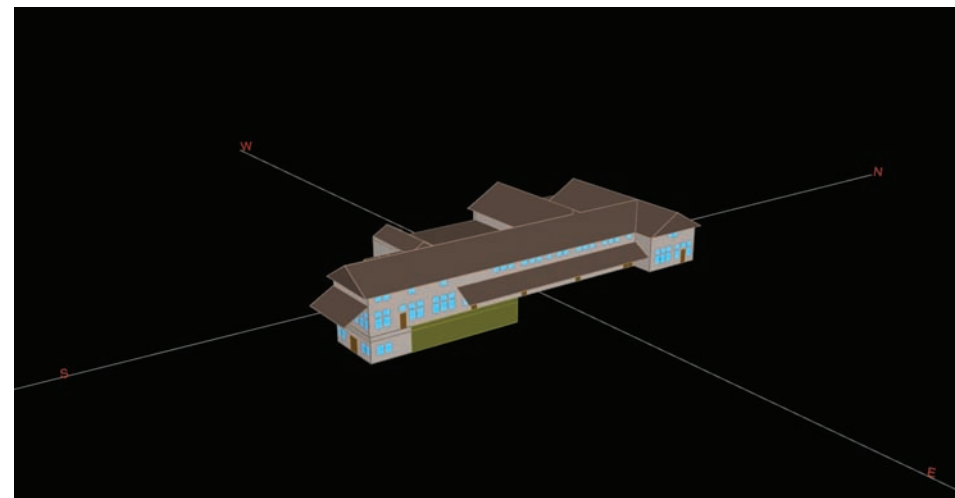
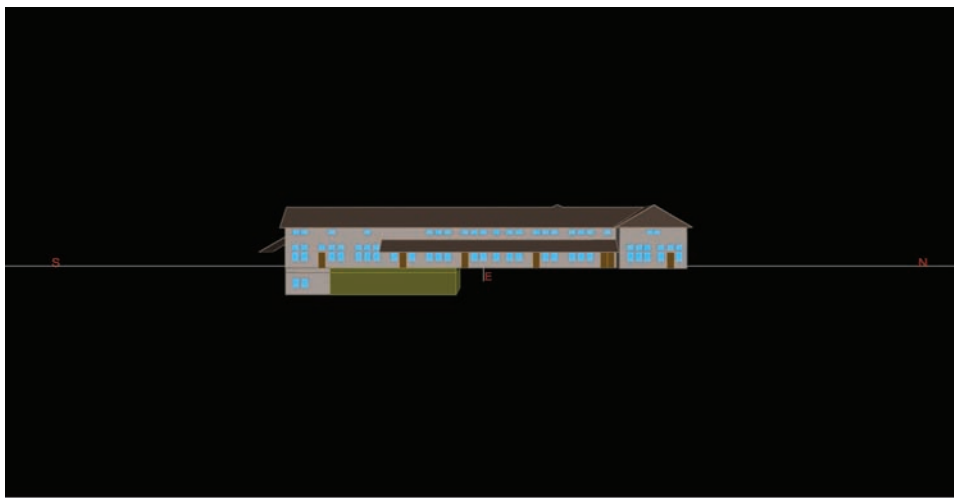
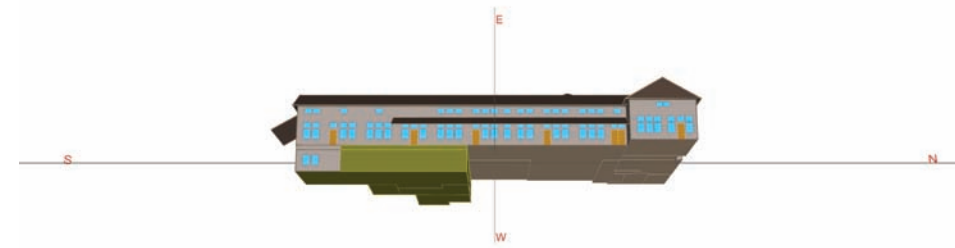
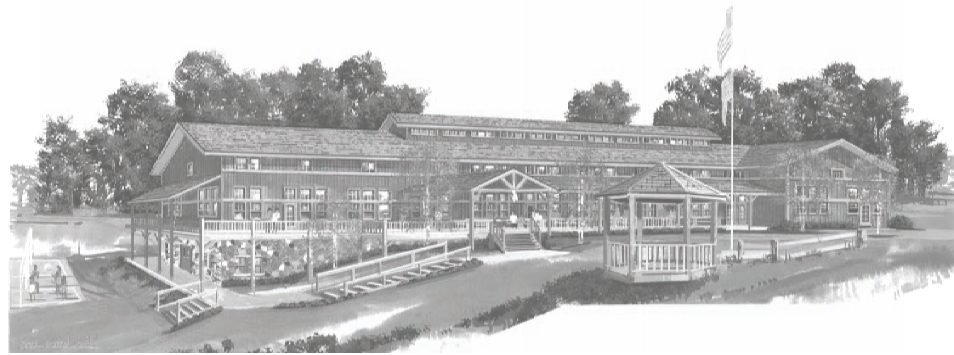
Green Schools Initiative



Need for Building Simulations

Whole building energy modeling is quickly becoming an important part of smart design. Our experienced and knowledgeable design team is familiar with the latest modeling and performance requirements for LEED. In the past, design changes meant weeks or even months of expensive and time consuming work involving multiple people. Today, energy modeling can quickly demonstrate energy and life-cycle impacts of design changes to a building's envelope, lighting, and mechanical systems. Comparing various design schemes using energy modeling reduces the time to view results, and provides valuable and quantifiable options to clients.

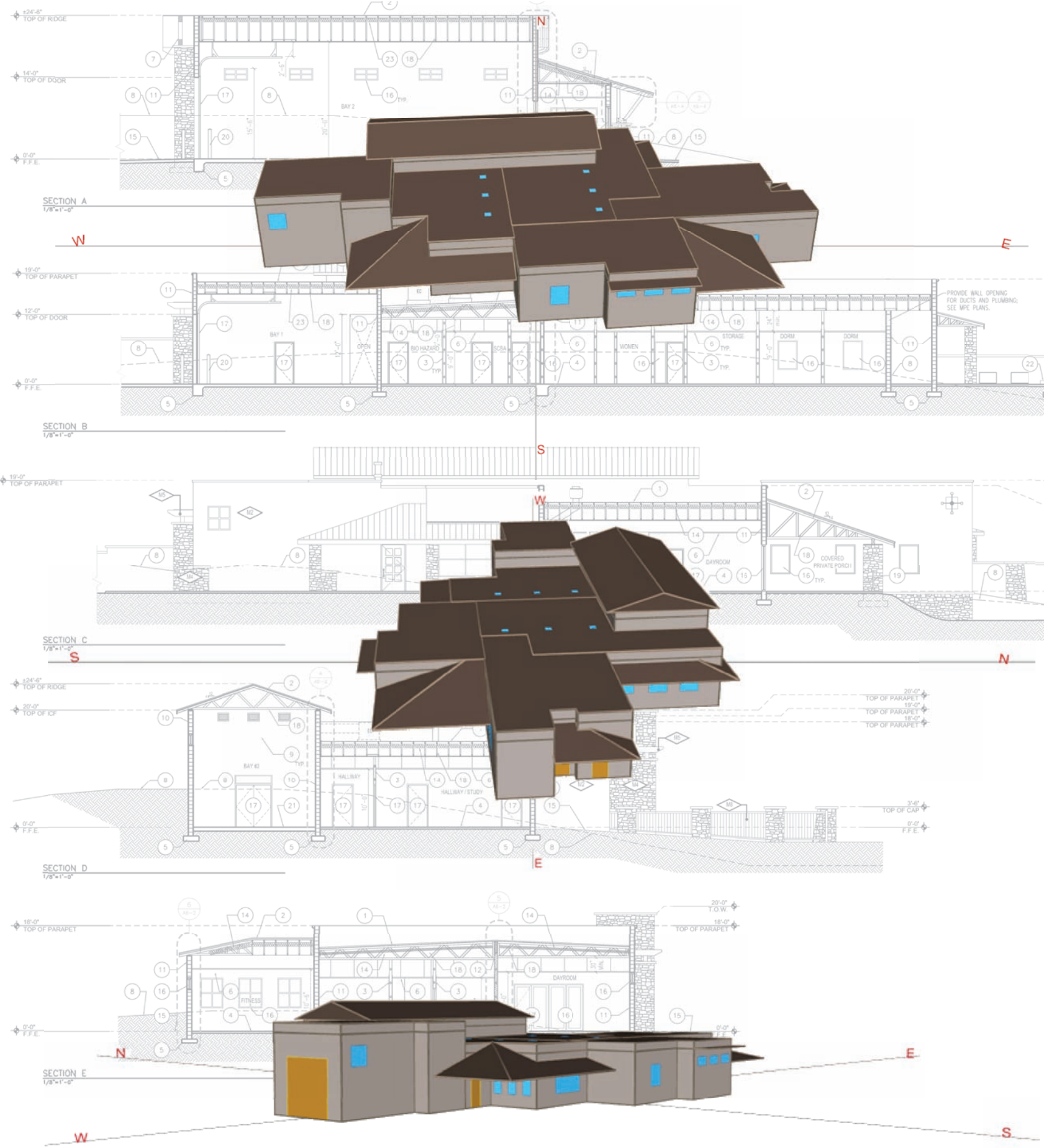
Camp Michgania: New construction on 16,000 sq foot building for a public university. This building serves as a dining hall for alumni and faculty.



Energy Modeling for LEED

LEED energy modeling processes involve collecting building design data: construction documents, product specs, ASHRAE, owner's goals, utility bills and communications with design teams. We then create a virtual copy of the building within DOE approved simulation software. After data is inputted, reports are run calculating the energy use throughout an operational year with multiple design scenarios. By creating an hourly usage schedule, we create an accurate day to day usage calculation (also accounting for holidays and other closed days). From these reports it can be determined if the proposed building will perform to ASHRAE, LEED and/or project goals.

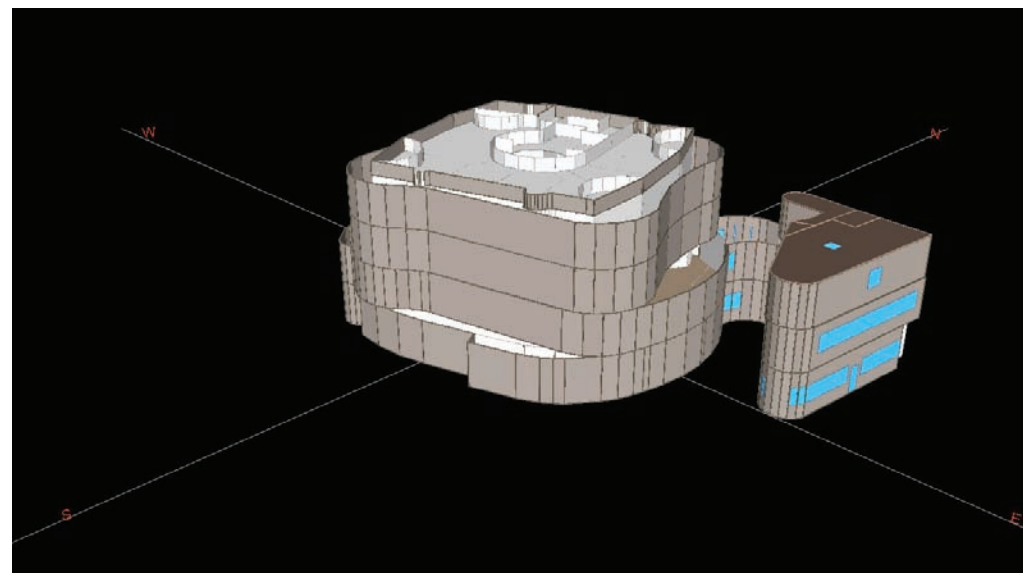
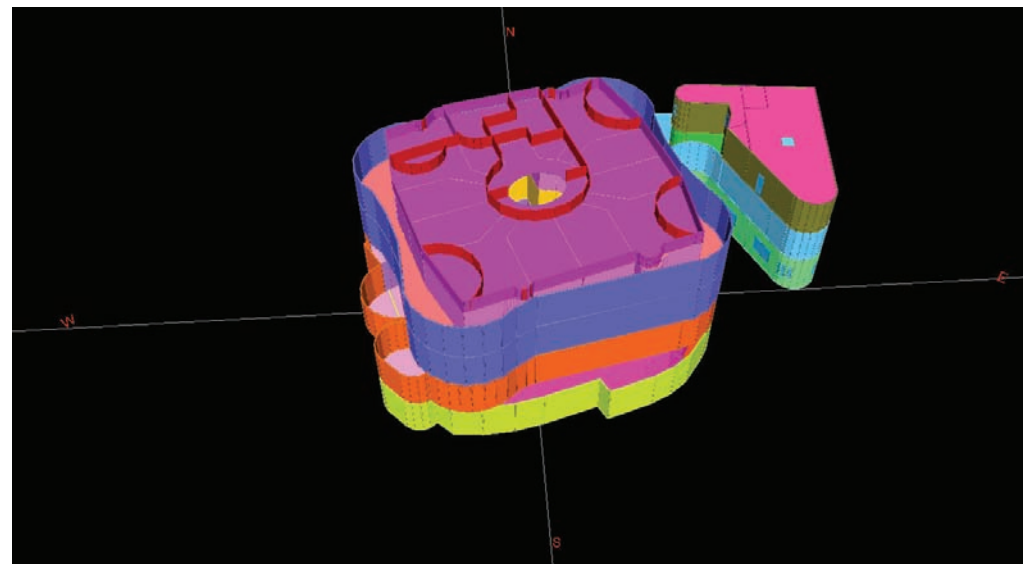
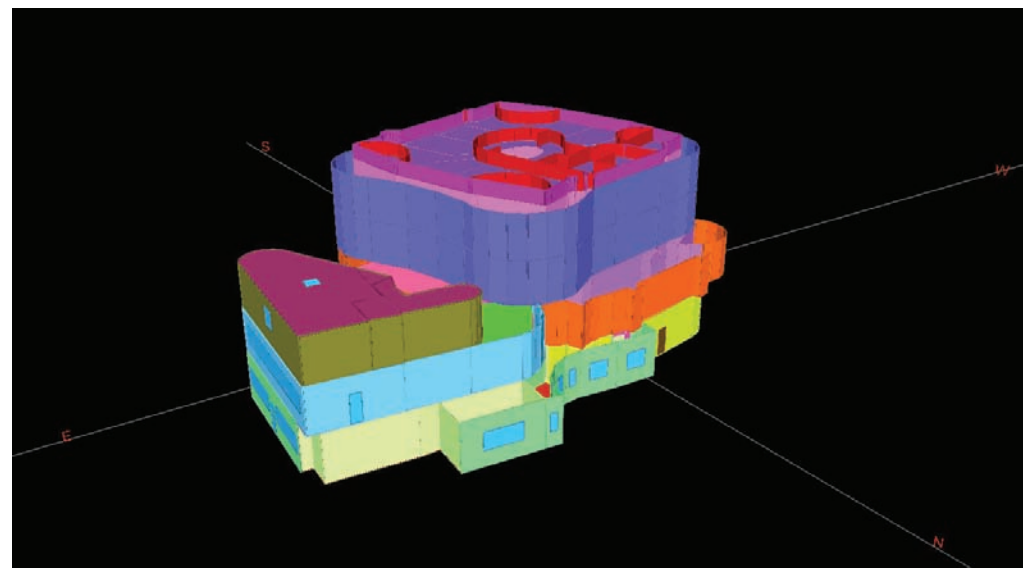
Phoenix Firehouse: New construction on 8,000 sq foot building. The modeling was meant to show a 24 hour 365 day building operation.



Renovations and Additions

For existing construction renovations or additions energy modeling can model the affects of design choices. Design decisions can result in unexpected and unwanted consequences. Energy modeling can replicate the building down to its building materials so you and your clients can feel confident making final design decisions. Over 500 components are entered into to the models to calculate usage. By involving us early in the process, major design changes like building orientations or shell and mechanical adjustments become much more manageable.

El Blok Hotel: New construction on 30,000 sq foot building in San Juan, Puerto Rico. This building has a unique, all curved, GRFC paneling along most of the facade. The building also features a central open area atruim.



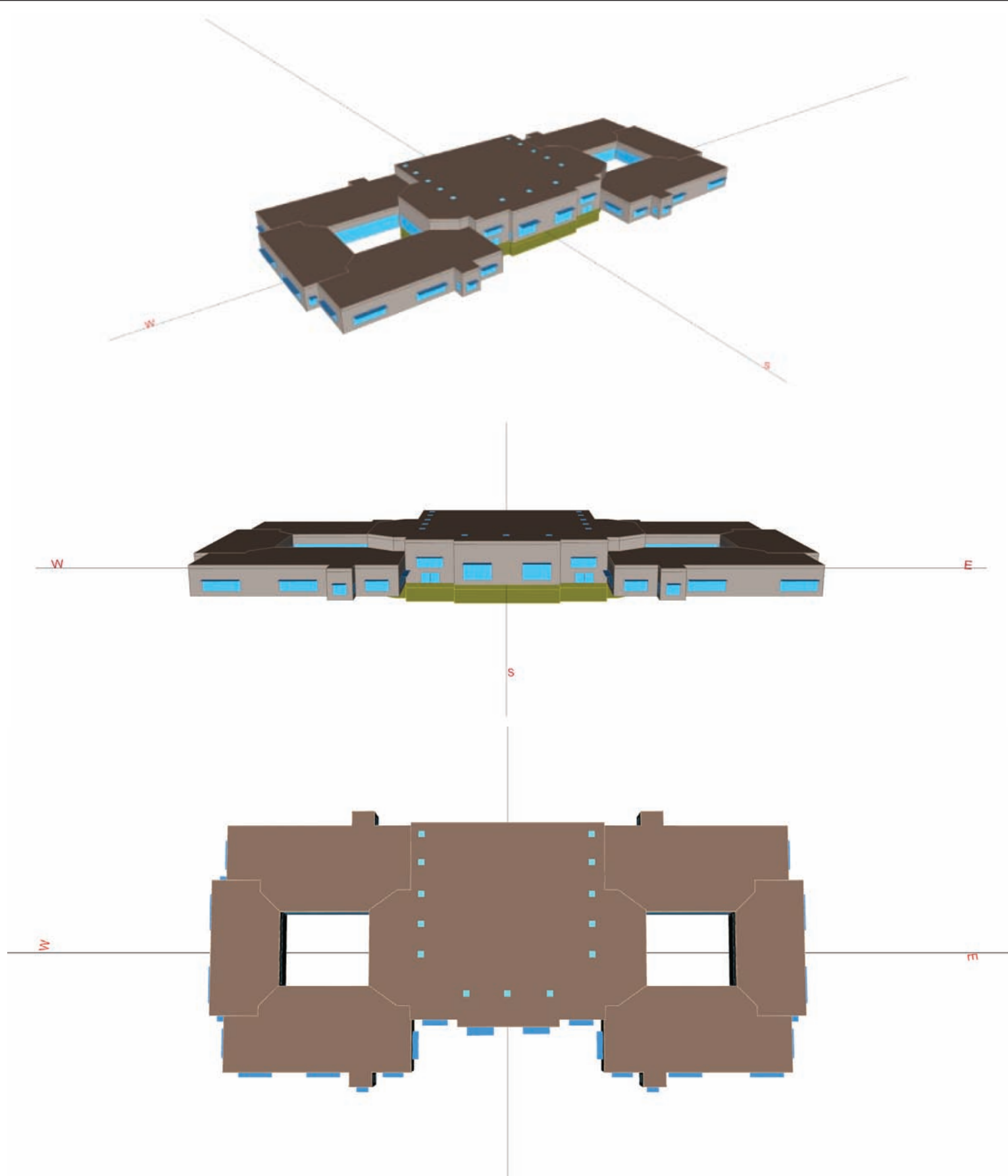
Other design processes

Energy modeling and BIM design are not only meant for viewing energy consumption (though helpful), it can also show solar collection samples, air movement, natural day lighting, and heat transfer. Building information modeling covers geometry, spatial relationships, light analysis, geographic information, process and non-process loads, quantities and properties of individual building components from manufacturers.

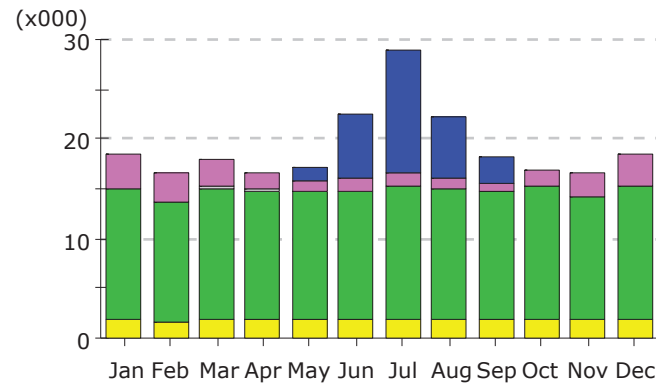
EcoHill primarily works with the Department of Energy's long proven eQuest v3.63b program but also can use:

- * Autodesk Revit and Ecotect
- * IES EnergyPlus
- * Wright software CHVAC

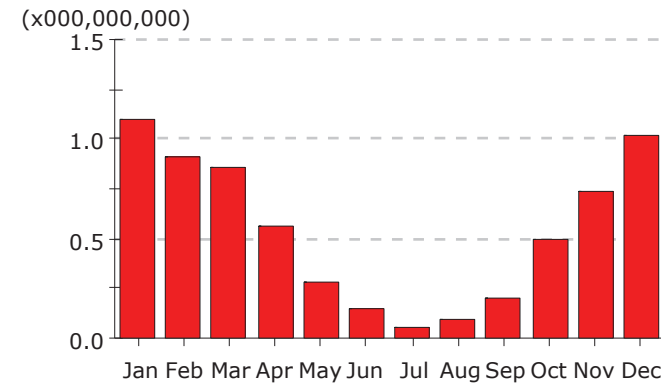
Evergreen High School: Case study for testing atrium spaces for modeling capabilities. The 52,000 sq ft building has many energy saving features including solar shades and solar thermal.



Electric Consumption (kWh)



Gas Consumption (Btu)



- Area Lighting
- Task Lighting
- Misc. Equipment
- Exterior Usage
- Pumps & Aux.
- Ventilation Fans
- Water Heating
- Ht Pump Supp.
- Space Heating
- Refrigeration
- Heat Rejection
- Space Cooling

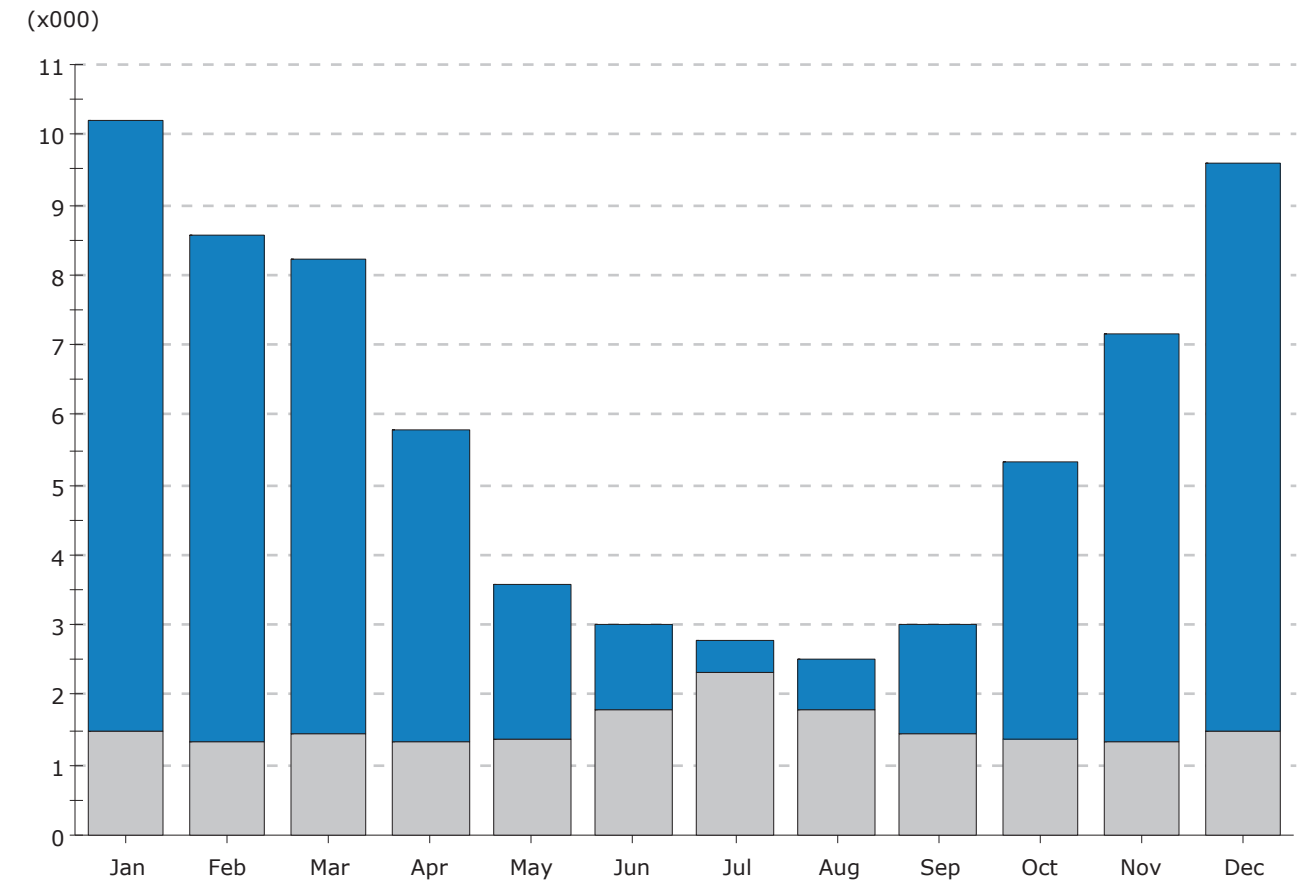
Electric Consumption (kWh x000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	0.06	1.36	6.53	12.13	6.23	2.64	0.20	-	-	29.15
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	-	-	-	-	-	-	-	-	-	-	-	-	-
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	-	-	-	-	-	-	-	-	-	-	-	-	-
Vent. Fans	3.45	2.84	2.70	1.74	1.00	1.23	1.57	1.01	0.90	1.58	2.33	3.22	23.57
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	0.05	0.03	0.04	0.03	0.02	0.02	0.02	0.04	0.04	0.04	0.04	0.05	0.41
Misc. Equip.	13.09	11.89	13.24	13.01	13.02	13.01	13.31	13.20	12.84	13.27	12.42	13.31	155.61
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	1.92	1.73	1.89	1.82	1.79	1.77	1.82	1.83	1.81	1.90	1.86	1.99	22.13
Total	18.51	16.49	17.86	16.67	17.19	22.57	28.85	22.30	18.23	16.99	16.64	18.56	230.88

Gas Consumption (Btu x000,000,000)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Space Cool	-	-	-	-	-	-	-	-	-	-	-	-	-
Heat Reject.	-	-	-	-	-	-	-	-	-	-	-	-	-
Refrigeration	-	-	-	-	-	-	-	-	-	-	-	-	-
Space Heat	1.09	0.91	0.85	0.56	0.27	0.15	0.06	0.09	0.19	0.50	0.73	1.02	6.42
HP Supp.	-	-	-	-	-	-	-	-	-	-	-	-	-
Hot Water	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.04
Vent. Fans	-	-	-	-	-	-	-	-	-	-	-	-	-
Pumps & Aux.	-	-	-	-	-	-	-	-	-	-	-	-	-
Ext. Usage	-	-	-	-	-	-	-	-	-	-	-	-	-
Misc. Equip.	-	-	-	-	-	-	-	-	-	-	-	-	-
Task Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Area Lights	-	-	-	-	-	-	-	-	-	-	-	-	-
Total	1.10	0.91	0.86	0.56	0.28	0.15	0.06	0.09	0.20	0.50	0.73	1.02	6.46

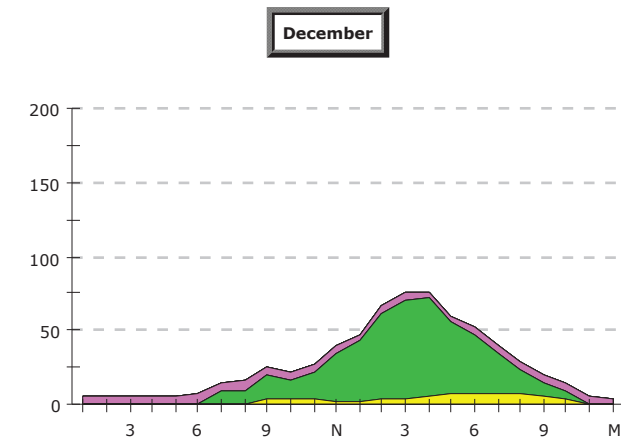
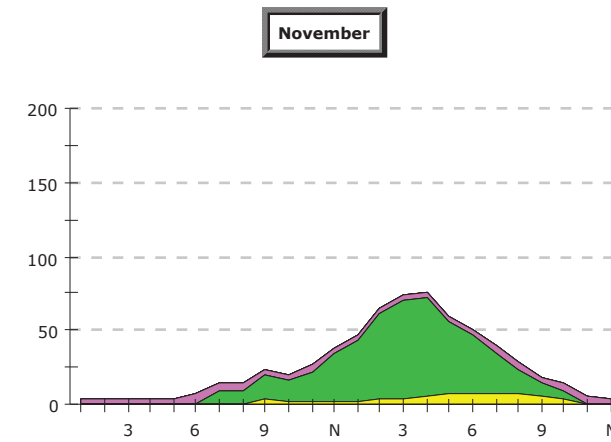
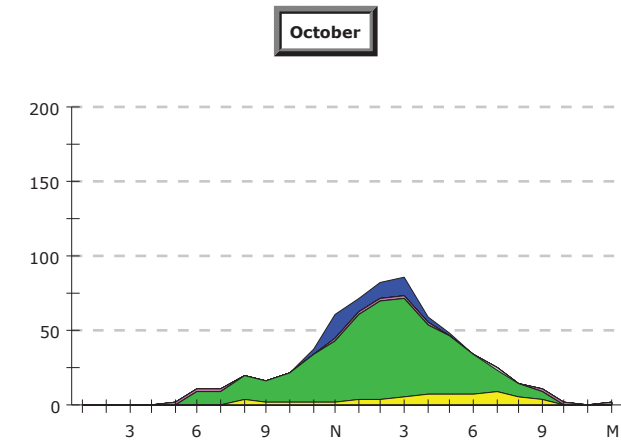
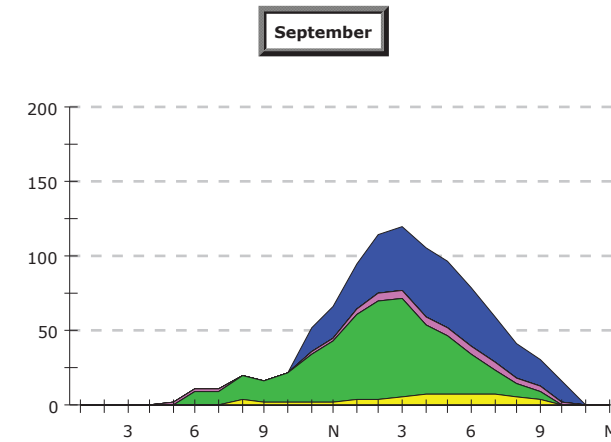
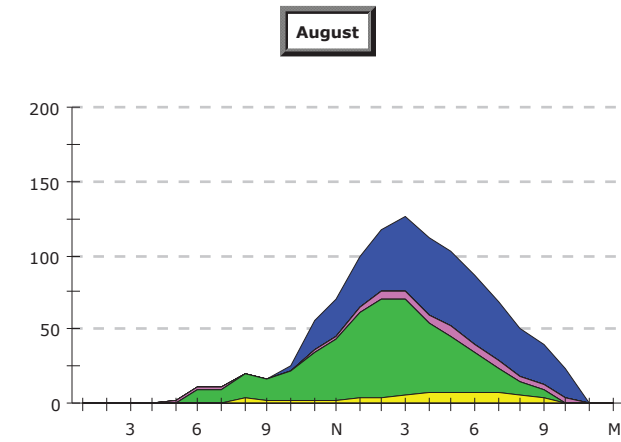
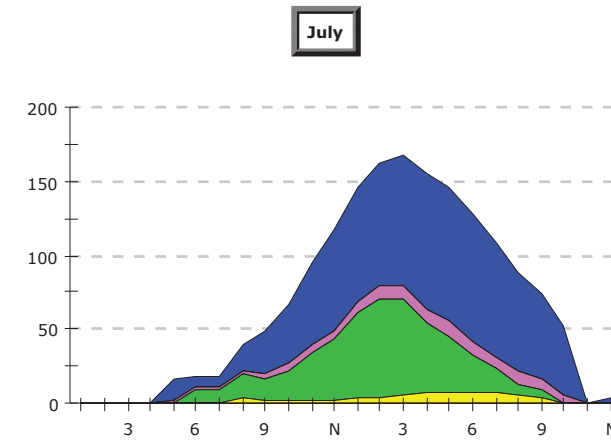
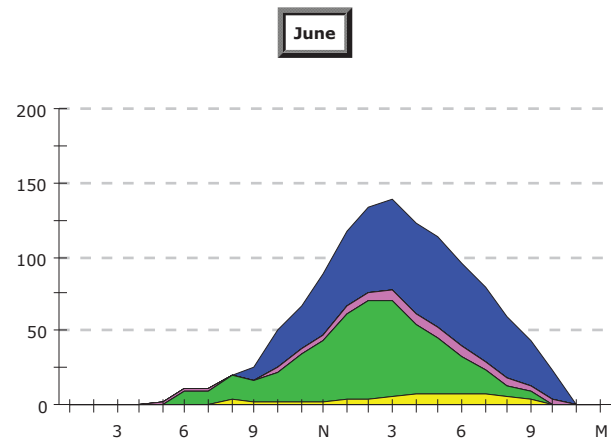
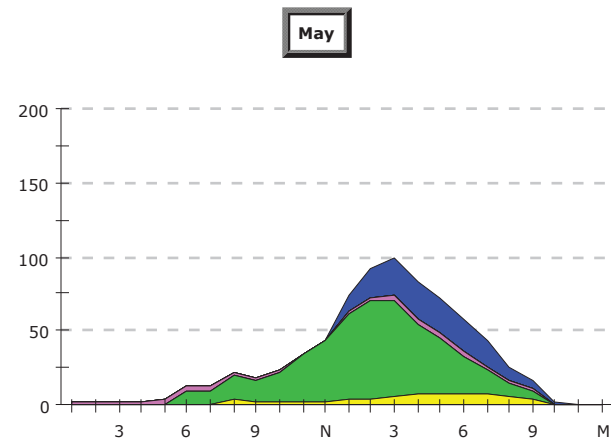
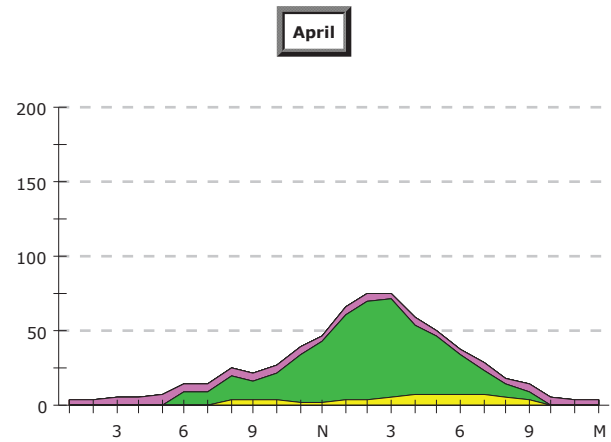
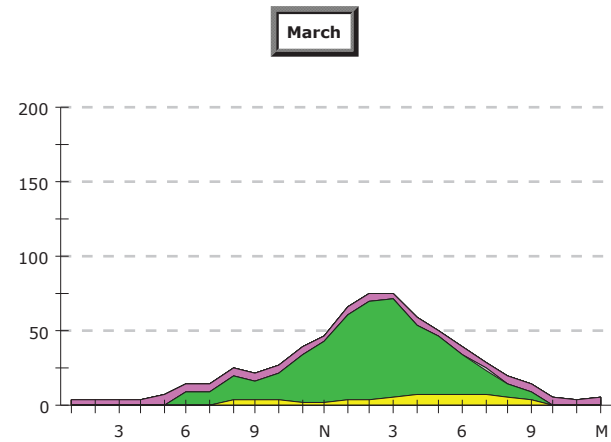
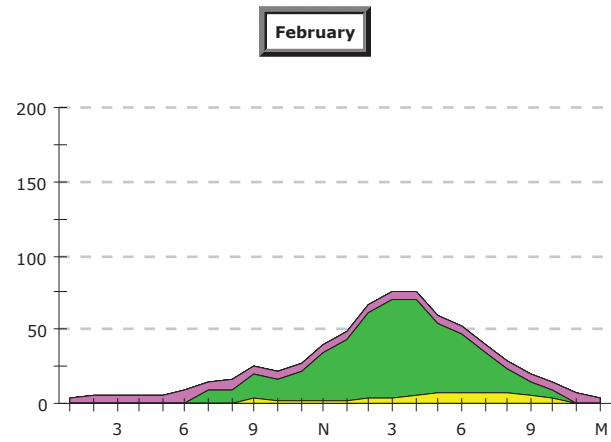
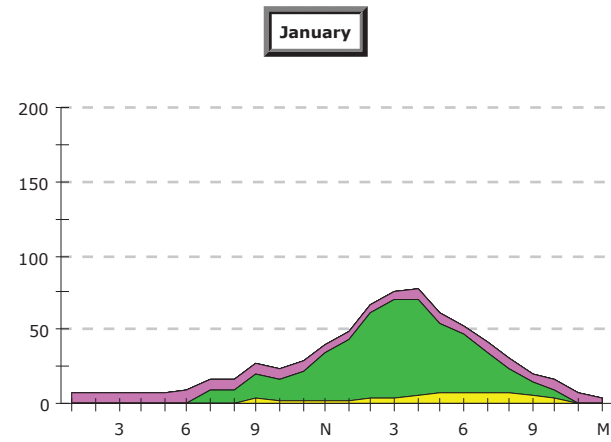
Monthly Utility Bills (\$)



Simple Electric Rate (annual bill: \$ 18,470) Simple Gas Rate (annual bill: \$ 51,269)

Total Annual Bill Across All Rates: \$ 69,739





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|-----------------|------------------|---------------|----------------|
| Area Lighting | Exterior Usage | Water Heating | Refrigeration |
| Task Lighting | Pumps & Aux. | Ht Pump Supp. | Heat Rejection |
| Misc. Equipment | Ventilation Fans | Space Heating | Space Cooling |

- | | | | |
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