

Energy & Mechanical Design Services



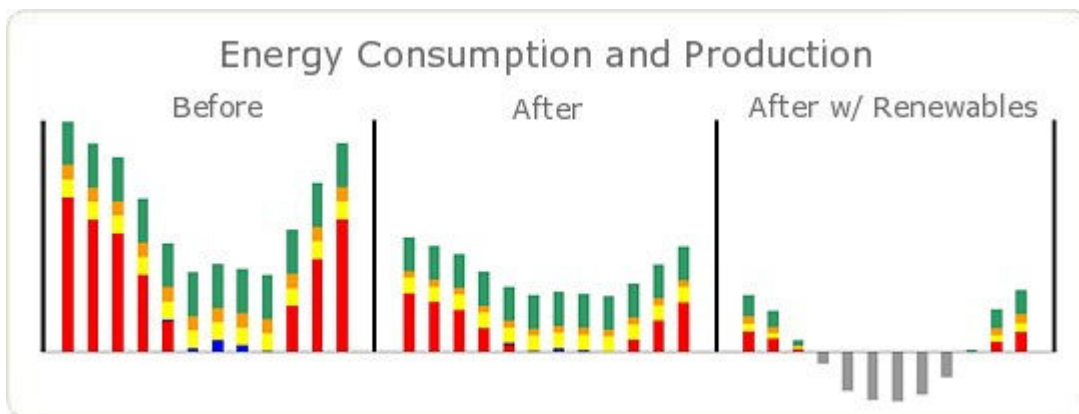
ZED can increase the energy performance of your home design and lower your utility bills.

The **Energy Design** service analyzes your home plan for its energy performance if built to current specifications, and then recommends detailed improvements to achieve your desired target.

The **Mechanical Design** service offers load calculation, specification and sizing of equipment, and duct and/or hydronic layouts. Proper sizing and design result in energy performance increases, lower utility costs, and longer system lifespan.

Bring us your home plans:

- In CAD format preferred with a site plan
- From any climate and any location
- With habits of the occupants
- With any special requests you may have



Choose a target for the improved energy performance:

- 15% better than code? (Energy Star), 40% better? 55% better?
- Most cost-effective improvements?
- Maximum improvements for an incremental budget amount?
- Net Zero Energy?



Energy Design service provides the construction specifications:

- Building envelope specifications
- R-values for walls, roof, foundation
- U-values and SHGC for windows
- Specs for heating and cooling system
- Specs for ventilation, hot water, appliances, and lighting
- Specs and sizing for renewable energy
- Forecast of utility bills for baseline and improved case
- See next page for more details on typical Energy Design deliverables

Mechanical Design service provides system sizing and layout:

- Manual J – Load sizing
- Manual S – Specify and size equipment
- Manual D – Duct sizing and layout
- Hydronic calculations and layout

Options are available:

- Detailed cost/benefit analysis with full payback analysis
- Construction systems comparison and analysis
- Financial incentive research
- Marketing PDFs for professionals to express the building improvements

For More Information:

ZeroEnergy Design

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Energy Design Specifications

Typical Results include the forecasted utility costs of the home, cost vs. benefit analysis, comparison of system choices, smart renewable energy options, and other outputs based upon client needs and professional discretion. Some typical output and areas of recommended specifications are shown below:

Energy Consumption and Production

- Heating consumption monthly/annually
- Cooling consumption monthly/annually
- Hot water consumption monthly/annually
- Appliances consumption monthly/annually
- Lighting consumption monthly/annually
- Appropriate units (kWh, Therms, Gallons, \$)
- Renewable energy production forecast
- Annual utility bill forecast
- Annual utility bill benefit for each recommendation

Windows

- Panes
- Construction material
- Emittance value (e)
- Coefficient of heat transmission value (U)
- Solar heat gain Coefficient (SHGC)

Insulation

- Infiltration rates
- R-Value of walls
- Type and thickness of wall insulation
- R-Value of roof
- Type and thickness of walls insulation
- U value of doors
- Door construction material
- R-value of foundation insulation

Hot Water

- System type & energy source
- Efficiency rating
- Gallons per day of usage

Lighting

- Type of lighting fixtures
- Type of recommended bulbs
- Passive lighting techniques

Appliances

- Electric dryer recommendation
- Washing machine recommendation
- Refrigerator recommendation
- Dishwasher recommendation
- Cooktop & Oven recommendation
- Plug Loads (small appliances)

HVAC System Performance

- Heating system type
- Heating system efficiency
- Cooling system type
- Cooling system efficiency
- Ventilation system type
- Ventilation system efficiency
- Duct leakage rates

Geothermal System Performance

- System type
- Heating efficiency
- Cooling efficiency

Photovoltaic Specifications

- Recommended modules
- Watts / panel
- Array size
- Panel efficiency
- Inverter efficiency
- Losses
- Overall system efficiency
- Optimal Orientation
- Optimal Angle

Solar Thermal Specifications

- Collector type
- Collector surface area
- Recommended modules
- Optimal Orientation
- Optimal Angle

Wind Turbine Specifications

- Input wind speed
- Watts
- Recommended turbine(s)

Anticipated Occupant Habits

- Number of building inhabitants
- Building occupancy hours per day
- Loads of laundry (wash and dry)
- Loads of dishes
- Number of showers
- Winter temperature set points
- Summer temperature set points