

# LEED Certification and Simulations

Susan Reilly, P.E.

Enermodal Engineering, Inc.

# LEED Certification

| Category  | Points | Tools       |
|-----------|--------|-------------|
| Site      | 14     | Spreadsheet |
| Water     | 5      | Spreadsheet |
| Energy    | 17     | Hourly Sims |
| Materials | 13     | Spreadsheet |
| IEQ       | 15     | Spreadsheet |

# Energy Optimization

- Prerequisite: compliance with ASHRAE 90.1-99 or equivalent, no sims required
- Credit 1: Energy Optimization (up to 10 pts)
  - ASHRAE 90.1 Energy Cost Budget Method
  - Regulated loads and unregulated loads
  - Unregulated loads include plug loads, process loads
  - Includes contribution from renewables
  - Deviation: if less than 150 tons, assume air-cooled condenser

# Energy Cost Budget Method

- Hourly simulation program
- Design energy cost of proposed design compared to energy cost budget of budget building
- Mandatory requirements, such as efficiency of HVAC equipment

# Energy Cost Budget Method

- Building form identical up to 50% WWR
- No shading on budget building
- Identical schedules
- Fan power limitations, otherwise the same
- Map system to define budget building

# Building Energy Simulation Tools

- DOE-2, TRACE/TRANE, BLAST, TRNSYS, EnergyPlus
- Cost? \$5k-\$20k depending on scope of work and project complexity
  - Design assistance and/or LEED certification

# Limitations/Issues

- ASHRAE 90.1-99 developed to define minimum cost-effective efficiency level, not to determine energy optimum
- Orientation ignored
- Fan power assumed the same
- Energy benefits of one system over another not recognized by standard
- No fuel switching