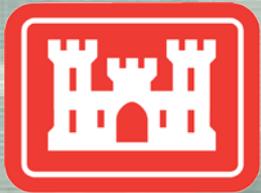


Energy Charettes



®

US Army Corps of Engineers
BUILDING STRONG®

Energy Charrettes

- ▶ Focus on Energy Efficiency before focus on Design
 - Passive Design (Free Energy)
- ▶ Preliminary Energy Model/Data
 - Climate data (temperatures, wind, sunlight, rain, etc)
 - Regional energy concerns and opportunities for region
 - Existing Utility Data (Existing Building)
 - Air Blower Test (Existing Building)
- ▶ Brainstorming
- ▶ Preliminary Life Cycle Costs
- ▶ Energy Goals Established
 - Issues and Constraints
- ▶ Compliance with Energy Mandates



Integrated Design Team – Goal Orientated

Holistic Approach

- Users
- Architectural
- Mechanical
- Civil
- Electrical
- Cost Estimators
- Other Key Stakeholders

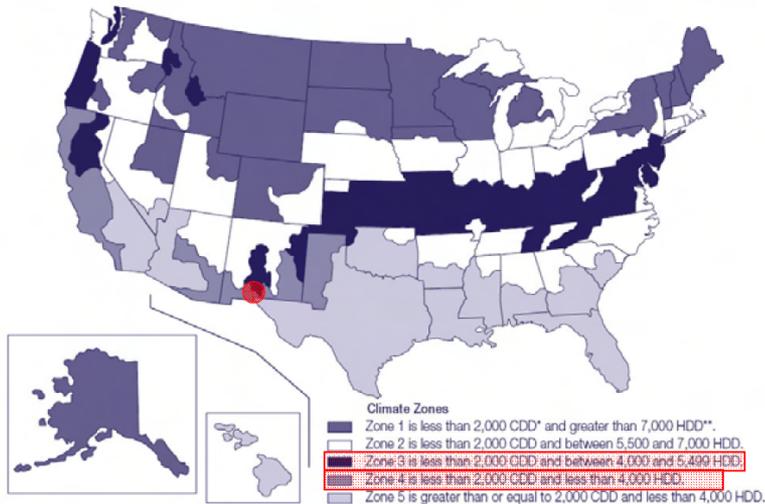


Early Energy Involvement

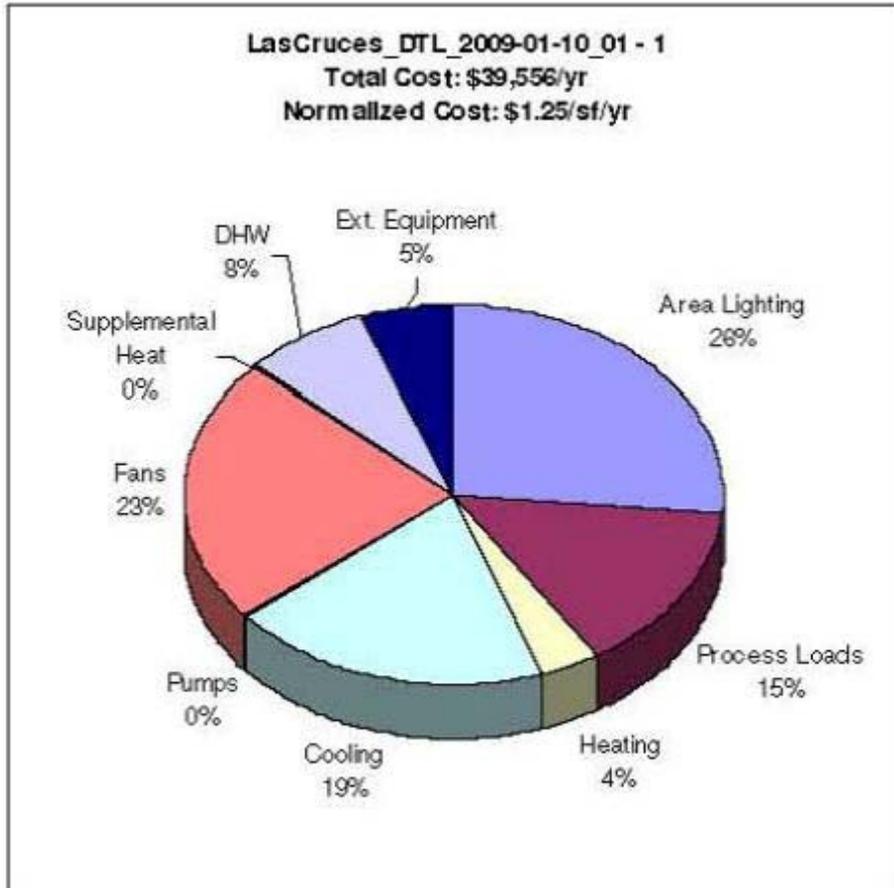
Energy Charrettes Define Project Requirements

- Do Energy Charrettes as early as possible
- As Part of Energy Audit
- Before Major Investment/Replacement Project
- During 1391/Budget Preparation
- Early Planning Costs recouped in life cycle cost improvements

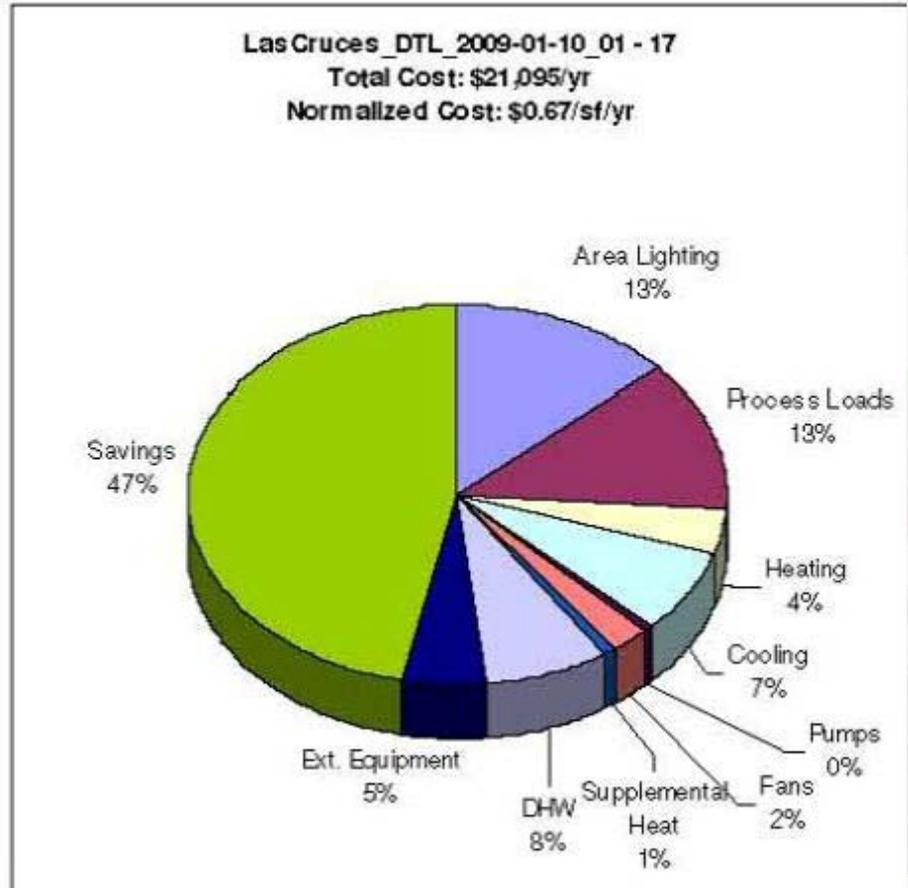
U.S. Climate Zones For Building Energy Consumption



Energy Charrette Las Cruces – Preliminary Model Results Conservation Measures



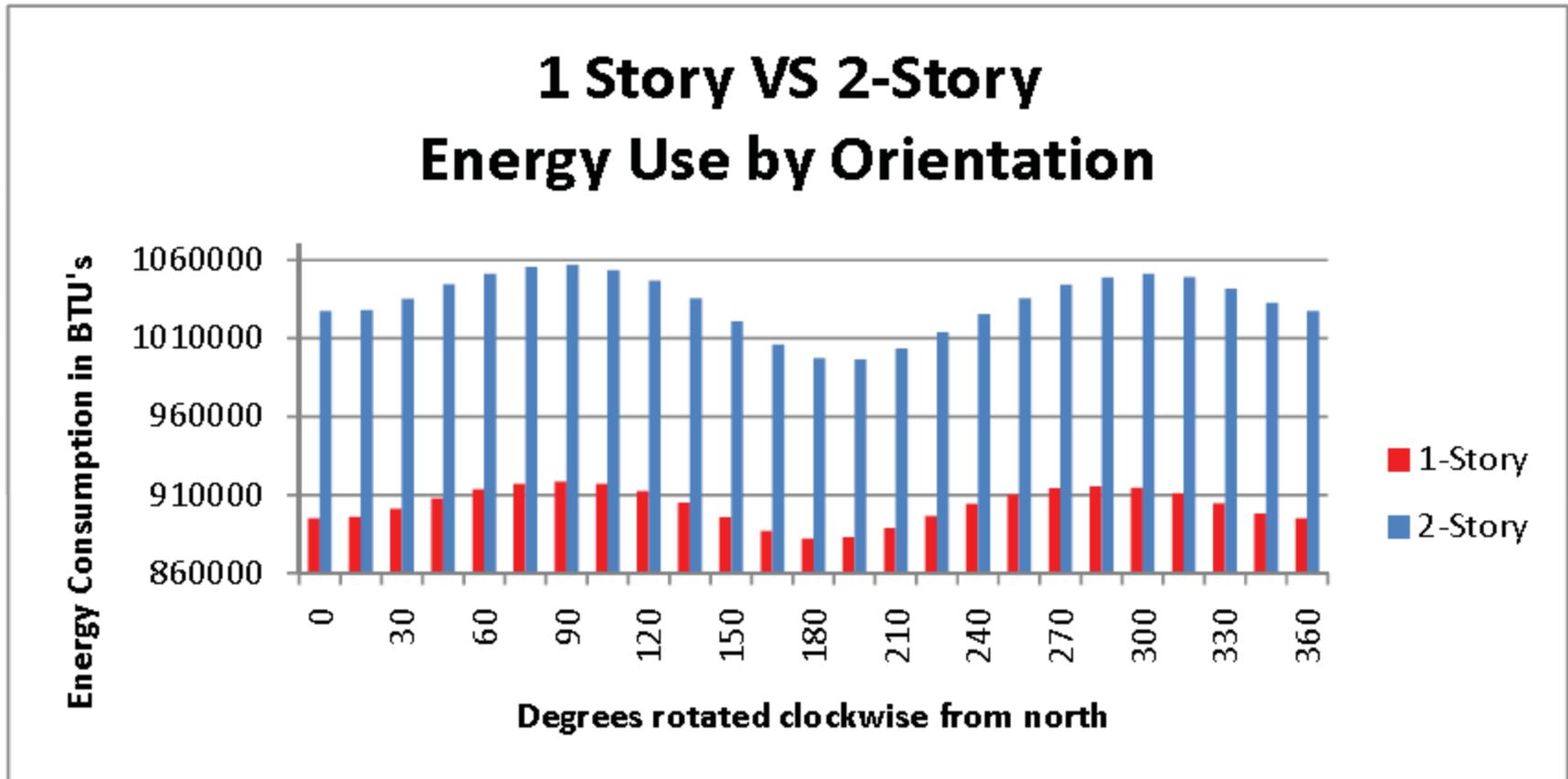
Baseline



Proposed (Preliminary)

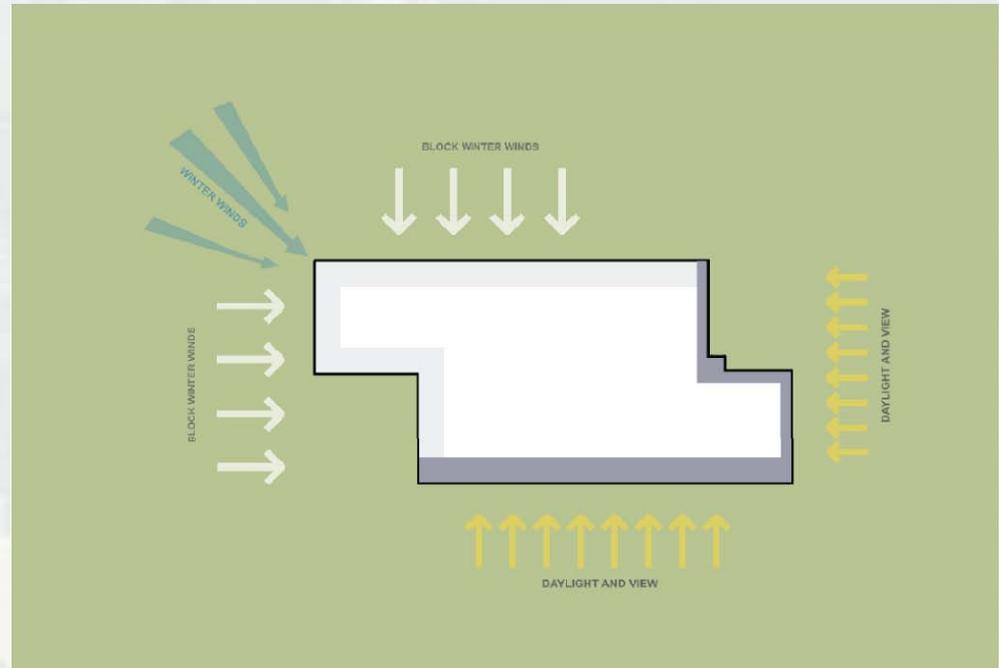
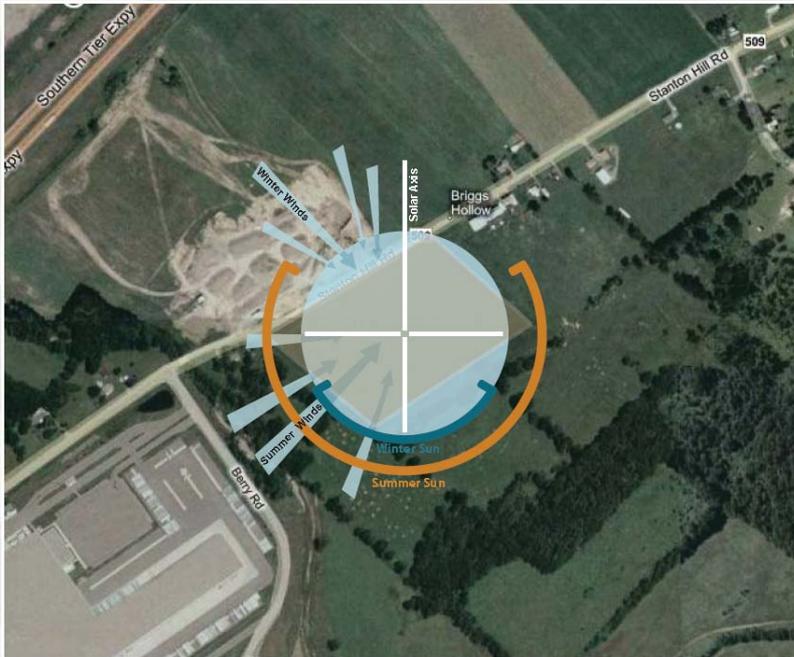


Energy – Binghamton 1 & 2-Story and Building Rotation Comparison



Binghamton Daylight and Wind

- Office/Admin portion of the building located in back of building to maximize daylighting and shield from winter winds



Sustainability and Energy Efficiency

Priorities

- 1) Energy Reduction – Don't use Energy
 - Air Barrier – Seal Up Building !!!!!
 - Daylighting
 - Increased Insulation, etc
- 2) Energy Efficiency – When we have to use it, be smart about it.
 - High Efficiency HVAC Systems
 - GSHP/Geothermal
- 3) Renewable Energy – What do I need to get to net-zero
 - Solar, Wind, Geothermal



Summary – Existing Buildings

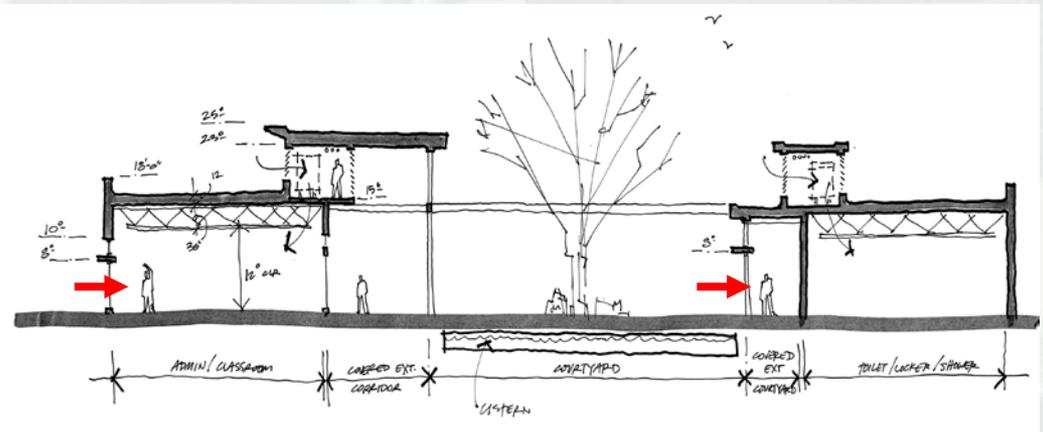
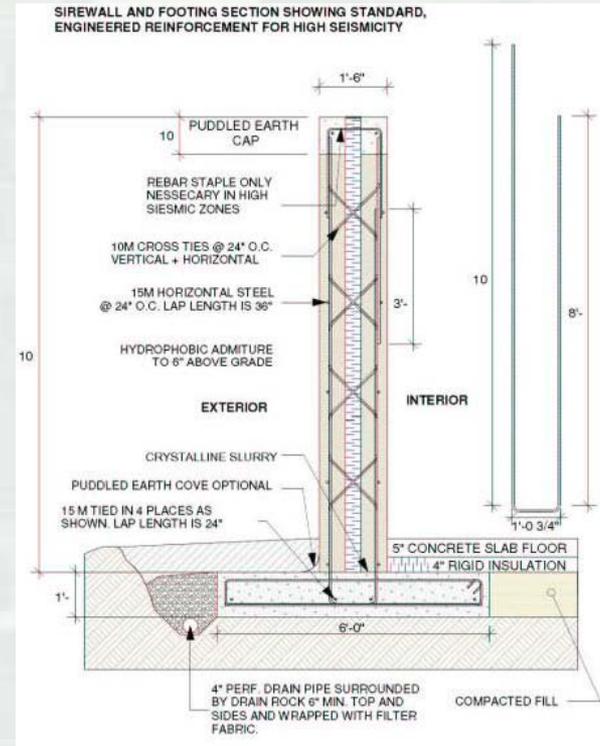
- Include all stakeholders
- Utilize Existing Data
 - Utility Data
 - Air Blower Test
 - Experience
 - Energy Model
- First Look at Air Barrier then at Mechanical Systems
 - Seal Up Building – Biggest Bang for the Buck
- Upfront Costs but potential for significant life cycle improvements
 - Reduced Utility Bills
 - Potential Reduces Mechanical System
 - More Efficient Building Improvement Plan and Budget
 - Enhanced Comfort for Users



Potential Energy/ Sustainability Initiatives

Architecture

- Building Siting/Orientation
- Internal layout and orientation
- Air/Vapor Barrier
- Increased R values/U values
- Insulated Concrete Forms
- Natural Ventilation
- Passive solar design
 - Thermal Mass
 - Shading
- Day lighting
 - Solar Tubes/Skylights
 - Window Placement
- Roofs – Roof Slope
 - Cool Roofs / Green Roofs



Potential Energy/ Sustainability Initiatives

Mechanical

- Enhanced Commissioning (LEED)
- Innovative High Efficiency Systems
 - Energy Star/FEMP
 - Energy Heat Recovery Systems
 - Dedicated Outside Air Systems for ventilation with heat recovery
 - Indirect Evaporative Cooling
 - Solar Walls
- Radiant Heating
- System Controls
- Solar Hot Water – 30% minimum
 - 100% should be considered.
- Demand Control Ventilation
- Water Conservation – Net Zero Water



Potential Energy/ Sustainability Initiatives

Electrical

- Lighting
 - Site Lighting – Solar LED Fixtures
 - Occupancy/Daylight sensors
 - Reduced Lighting Levels (AR Website)
 - LED Interior Lighting
 - Task lighting
- Renewable Energy
 - Wind, Solar, Geothermal (GSHP)
 - Future provision for renewable energy if not included in project

Interior Design

- Sustainable Finishes
- Environmentally Friendly Materials

