



**ACHIEVING HIGH PERFORMANCE  
BUILDINGS THROUGH INTEGRATED  
PROJECT DELIVERY DESIGN-BUILD**

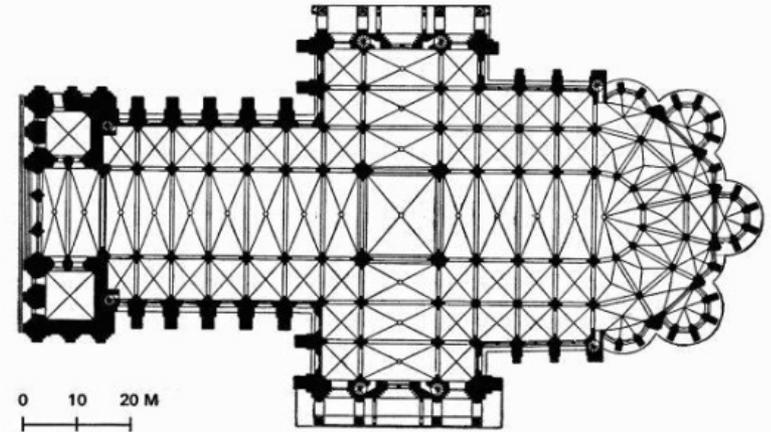
# Agenda

- History of Buildings and Construction
  - (Why the Energy Manager Needs to Know)
- High Performance Design-Build
  - (The Energy Managers Best Friend)
- Case Study
  - Rolling Plains Memorial Hospital (Nolan County)  
Renovation using ESPC and HPDB
- Questions

# Buildings Throughout History



# History of the Master Builder

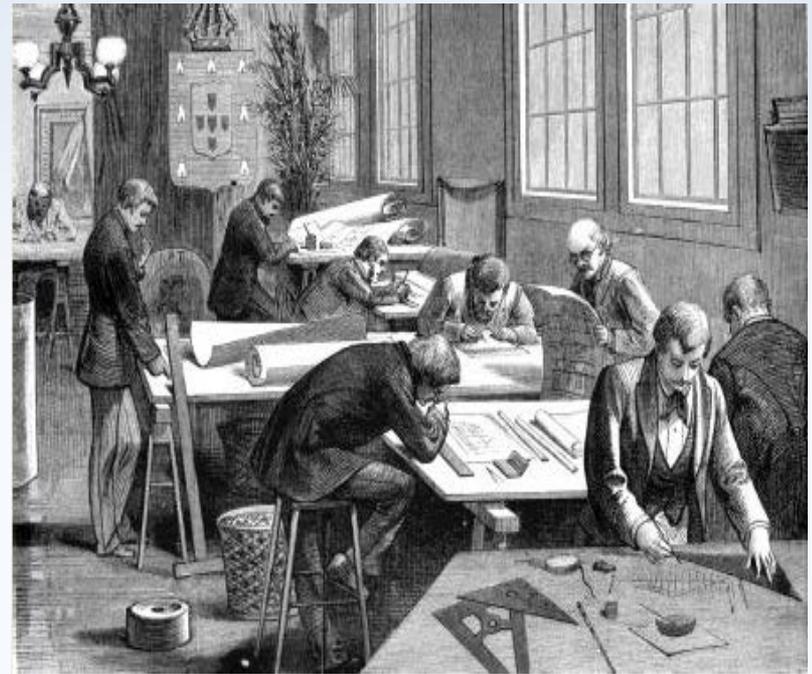


- Design-Build Professional
- Origins over 5000 years ago
- Predecessor to Modern Architect/Engineer
- Combined Functions of Design and Construction



# Separating Design from Construction

- Enlightenment Era
  - Architects/Engineers withdraw, become professionalized
  - Educated - learn craft in Universities
- Creation of Groups and Associations
  - 1852 – American Society of Civil Engineers
  - 1857 – American Institute of Architects (AIA)
  - 1894 – Predecessors to Mech/Elec (i.e. ASHRAE, ASME, IEEE)
  - 1918 – Association of General Contractors
- Clear Separation of Disciplines
- Division of Responsibility and Liability



# The Energy Manager – A New Category

## Emphasis On...

- Cost to Perform
- Technology
- Performance
- Sustainability
- Environmental Impact
- Comfort
- Control
- Changing Code Requirements
- Usable Space



# Defining High Performance Design-Build

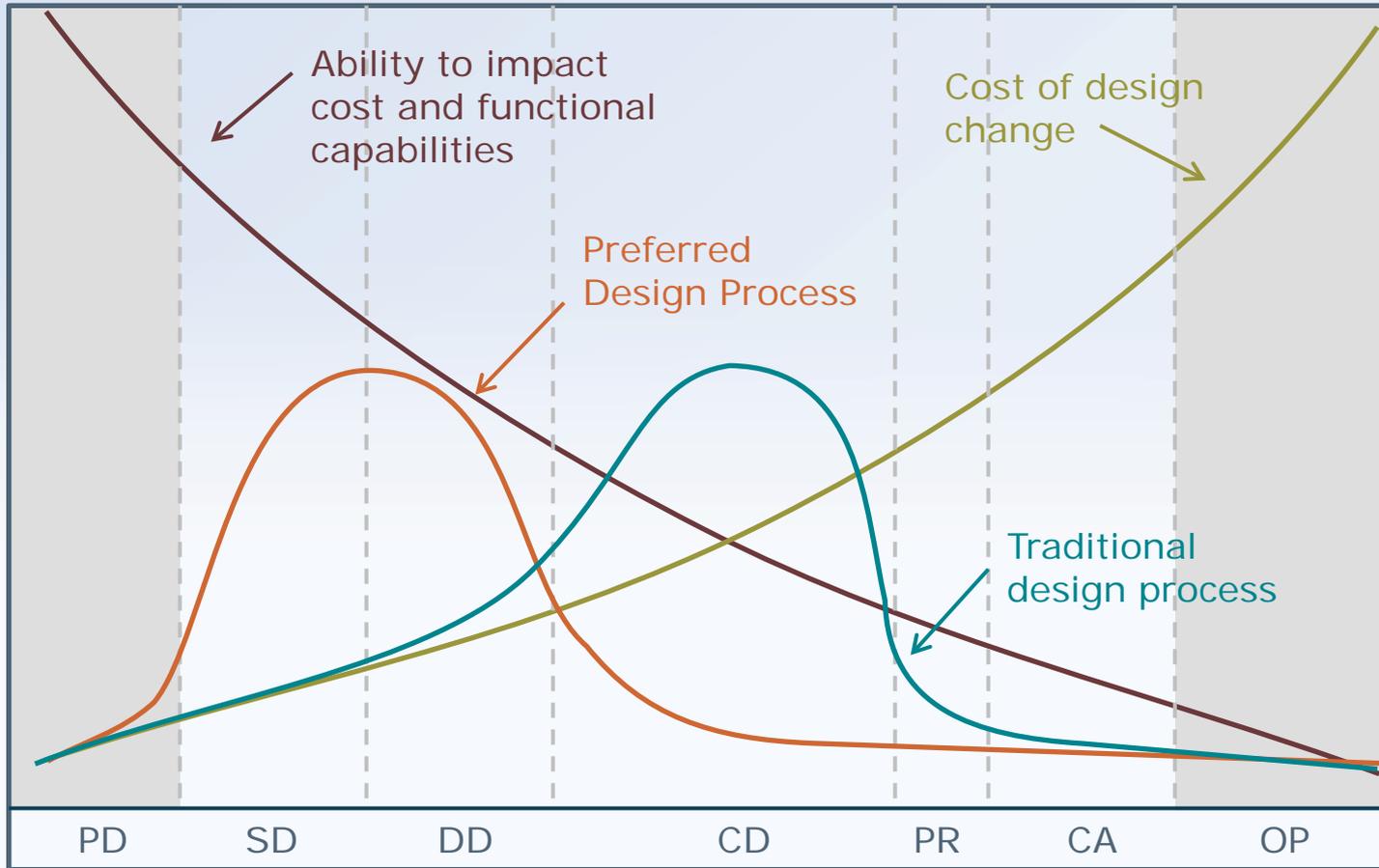
**High Performance Building** - a building that integrates and optimizes all major high-performance building attributes, including energy efficiency, durability, life-cycle performance, and occupant productivity.

*(Nat'l Institute of Bldg. Sciences – NIBS)*

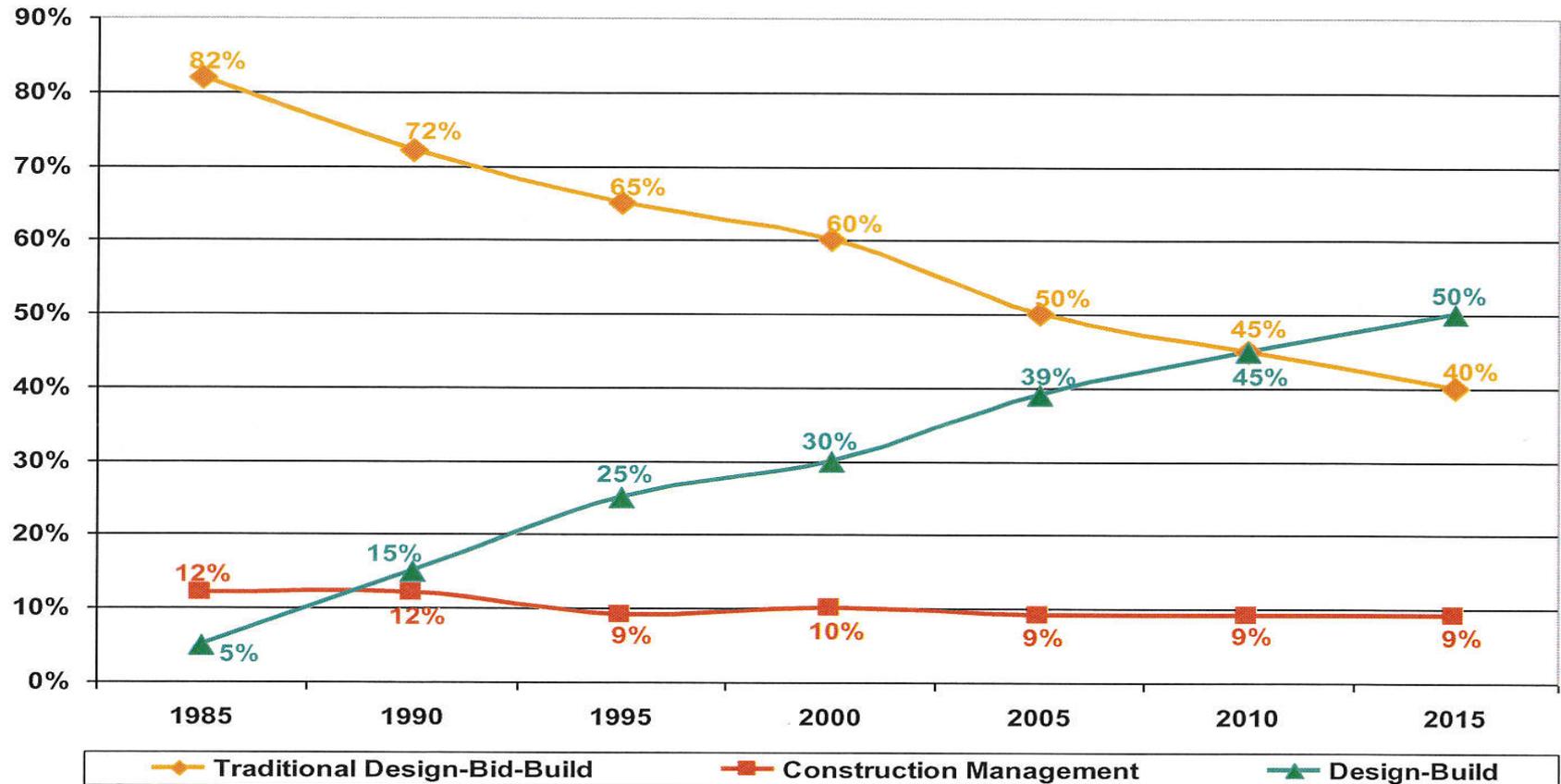
**Integrated Project Delivery (IPD)** - a project delivery approach that integrates people, systems, business structures and practices into a process that collaboratively harnesses the talents and insights of all participants to optimize project results, increase value to the owner, reduce waste, and maximize efficiency.

*(American Institute of Architects – AIA)*

# Energy Manager Early Involvement Saves \$\$



# Increasing Use of Design-Build

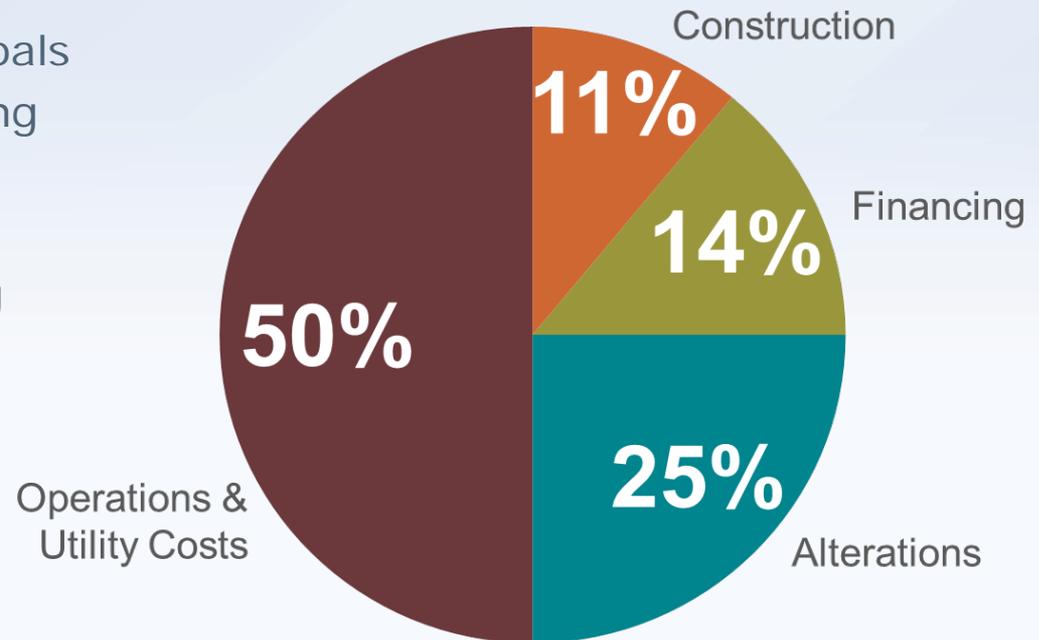


Source: Design Build Institute of America (DBIA)

# Energy Manager Impacts 75% of the Cost

How To Drive Long-term Savings...

- Emphasize Life Cycle Costs
- Performance Based Project Goals
- Construction like Manufacturing
- Increased Speed to Construct
- Increased Efficiency
- Building Information Modeling



# High Performance Design-Build

## The Essence of Performance-Based Integrated Delivery

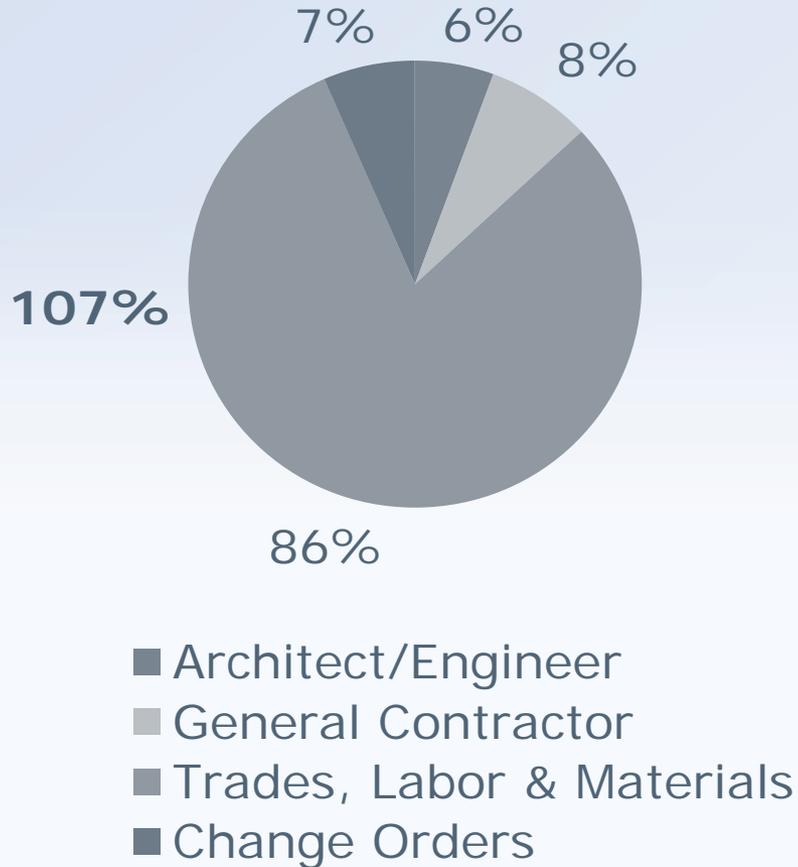


- Single Point of Accountability
- Outcome Based – Maximize Performance
- Primary Focus on Efficiency / Sustainability
- Overlapping Phases (Faster)
- Seamless Transfer of Knowledge
- Minimizes Project Risks
- Increased Owner (Energy Mgr.) Control
- Enhanced Flexibility and Adaptability

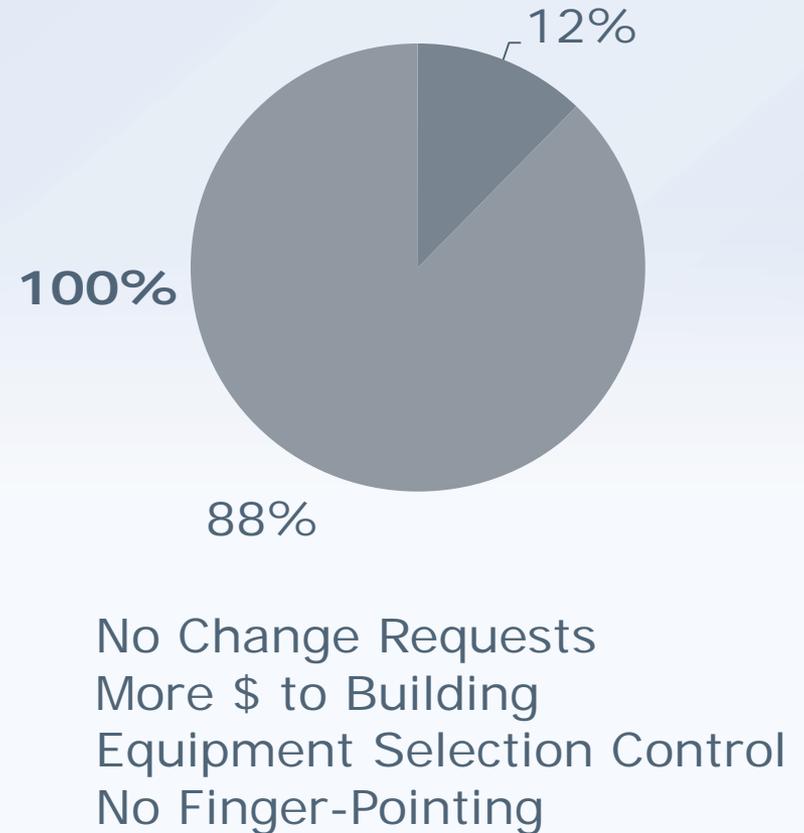


# Energy Manager Can Get More

## Design-Bid-Build



## Design-Build



# Rolling Plains Memorial Hospital – Multi-phase

- Energy Efficiency Renovation
- Facility Renovation HPDB
- HPDB of New Facilities



# The Opportunity for Energy Managers



- What do you want?

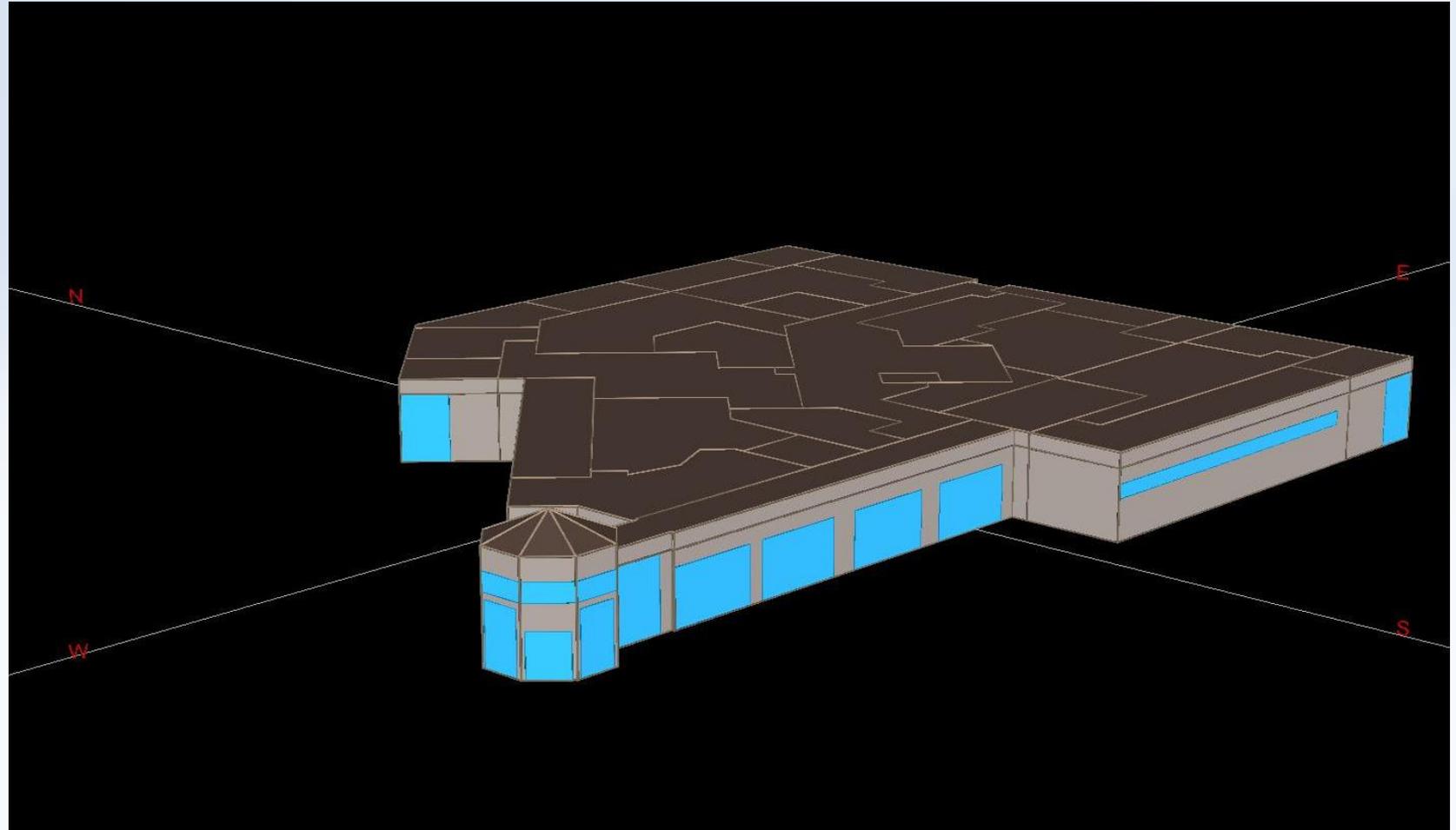
# Integrated Design Process

## Building Information Modeling





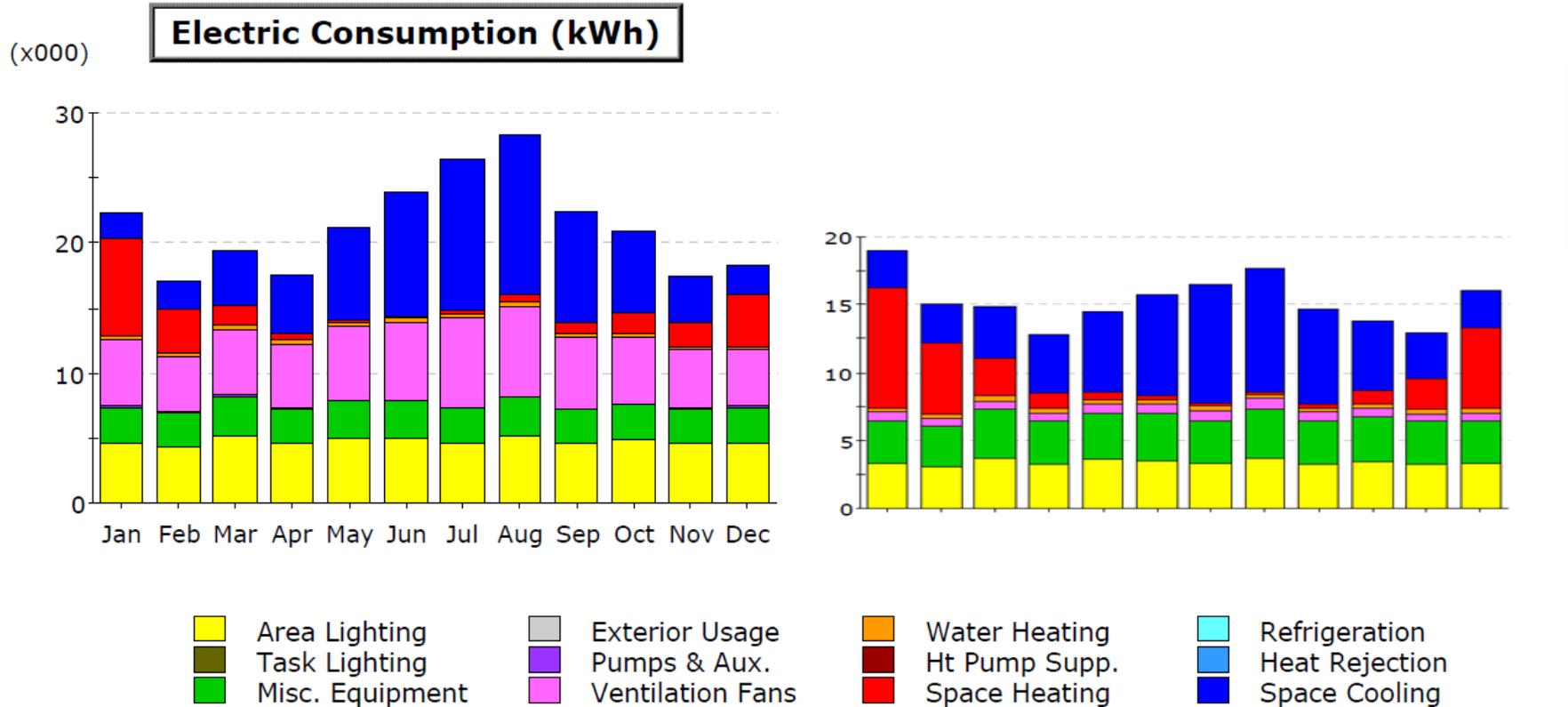
# Energy Modeling



# Energy Model

Baseline

Actual



# Energy Model - Results

- Annual Consumption (kWh)

- Baseline 255
- Model 184

Annual Consumption  
Decreased by 28%

- Summer Peak Demand (kW)

- Baseline 110
- Model 61

Peak Demand  
Decreased by 44%

- Winter Peak Demand (kW)

- Baseline 232
- Model 206

# Building Efficiency Measures

- What the Energy Manager by being present
  - HVAC Systems – Packaged VAV w/elec heat
  - Building Envelope
    - Increased Wall R-value (R13 to R20)
    - High reflective roofing membrane
  - Lighting Improvements – 0.72 watts/sqft
  - Low Flow Plumbing Fixtures
  - Rain and Condensate Water Harvesting
  - Designed for addition of Solar PV
  - Measurement and Verification

# What the Energy Manager Achieved in Cost

- Total Project Cost: \$3,500,000
- Per Square Foot: \$184.21/sqft
- Industry Benchmark: \$185.07/sqft
  
- Guaranteed Maximum Cost Model
- No Construction Change Orders to Owner

# Benefits of HPDB for the Energy Manager

- Works for Renovation and New Construction
- Energy Manager at the Table
- Long-term energy performance
  - Total cost of Ownership model (75%)
- Full commissioning and M&V
- Financial guarantees of performance

# Energy Manager – Questions to Ask

- Have you done the energy model?
- What are the results?
- What efficiency measures are included?
- Have you considered
  - Envelope Improvements
  - Lighting Improvements
  - HVAC Improvements

# Questions?

