NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Session II: Performance-Based Design-Build Process

Moderator: Drew Detamore

Panelists:

Jeff Baker

Karen Leitner

Byron Haselden

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Performance Based Design-Build Process

Achieving Superior Energy Performance at Competitive Cost

RSF Workshop, Golden, Colorado **July 27-28, 2011**

Discussion Team

- **Moderator:**
  - *Drew Detamore*
    Director, Infrastructure and Campus Development Office
    National Renewable Energy Laboratory
- **Panelists:**
  - *Karen Leitner*
    Senior Supervisor, Contract and Business Services
    National Renewable Energy Laboratory
  - *Byron J. Haselden*
    President, Haselden Construction
  - *Jeffrey M. Baker*
    Director, Office of Laboratory Operations
    U.S. Department of Energy
    Golden Field Office

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Session Topics

- Performance based design-build process
- Incentives
- Shared Values
- Owner's perspective
- Design-Builder's perspective

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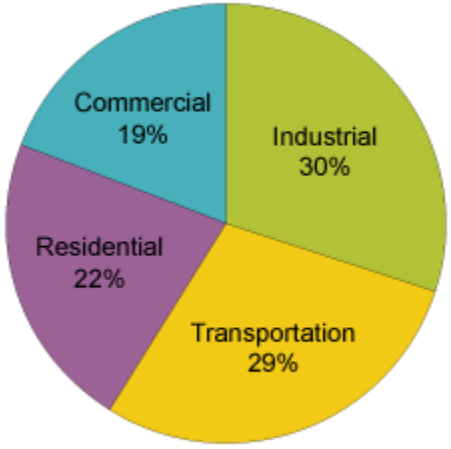
Question

- Has anyone ever utilized one design-build team to perform design from conceptual through final design, and all construction, under the umbrella of a single contract?

Energy Drives National Security, Competitiveness, and Environmental Quality

Energy Consumption

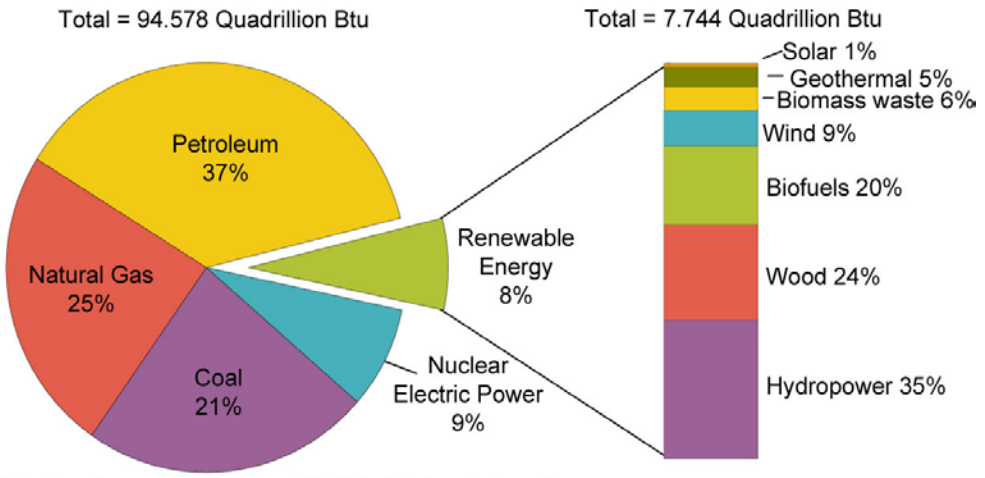
Share of Energy Consumed by Major Sectors of the Economy, 2009



Source: U.S. Energy Information Administration, *Annual Energy Review 2009*.

Energy Supply

U.S. Energy Consumption by Energy Source, 2009



Note: Sum of components may not equal 100% due to independent rounding.
Source: U.S. Energy Information Administration, *Annual Energy Review 2009*, Table 1.3, Primary Energy Consumption by Energy Source, 1949-2009 (August 2010).

Buildings are Strategically Important to Energy Goals

- Consume 40% of Primary Energy and 72% of Electricity
- Represented 9% of GDP (2006)

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Myth, Challenge, and Benefits

- Myth
  - Superior Building Energy Performance Requires Advanced Technologies and is Too Costly Relative to Standard Construction
- Challenge
  - Create a Replicable Acquisition Strategy to Achieve Superior Building Energy Performance at a Comparable Cost
- Engaging the Challenge
  - Leveraging DOE's Building Energy Performance Expertise into Commercial Success
  - Creating Value Beyond Budget through Acquisition Strategy
- What Are the Benefits?
  - Contributing to Security, Economic Competitiveness, and Environmental Quality

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Elements for Acquisition Success

- Performance-Based Acquisition Strategy
- Extensive and Informed Owner Planning
  - What are the Project Goals?
  - Is the Project Technically Feasible?
  - What are the Project Objectives and Substantiation Criteria?
- Leadership Team Commitment and Involvement
- Recognizing What You Don't Know and Seeking Help
- Integrated Project and Acquisition Planning
- Commitment to Risk Management for All
- Owner Must Relinquish Some Control

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Summary of Acquisition Strategy

- Two Step Best Value Selection
  - Step 1: Request for Qualifications
    - Request for Qualifications
    - Short List to Three
  - Step 2: Request for Proposals
    - Issue Draft RFP
    - Finalize and Issue RFP
      - One-on-One Meetings
        - » Purpose: Answer Questions and Build Trust
      - Sharing of All Non-Proprietary Information
    - Design Competition
      - Twenty Six Performance Objectives

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RFP Performance Objectives

- **Mission Critical**
  - Attain Safe Work Performance
  - LEED Platinum
  - Energy Star First Plus
- **Highly Desirable**
  - Up to 800 Staff
  - 25 kBTU/sf/year
  - Architectural Integrity
  - Honor “Future Staff” Needs
  - Measurable ASHRAE 90.1-50%
  - Support Culture
  - Expandable Building
  - Ergonomics
  - Flexible Workplace
  - Support Future Technologies
  - Documentation to Produce a “How To” Manual
  - “PR Campaign Implemented in Real-time
  - Allows Secure Collaboration with Outsiders
  - Building Information Modeling
  - Substantial Completion by May 2010

- **If Possible**
  - Net Zero Energy Approach
  - Most Energy Efficient Building in the World
  - LEED Platinum Plus
  - ASHRAE 90.1 plus 50%
  - Visual Displays of Current Energy Efficiency
  - Support Public Tours
  - Achieve National and Global Recognition and Awards
  - Support Personnel Turnover

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Design-Build Delivery Method

- Types of Design-Build Acquisition Strategies
  - Bridging Documents
    - Owner has significant input into the preliminary design
    - Some overlap of A/E costs
  - Performance Specifications
    - What something must do - not what it must be
    - Subcontractor must substantiate their design meets the objectives
    - Owner must not give the subcontractor technical direction
- Use of Criteria Consultants
  - Aid owner with the creation of performance specifications
  - Provide owners representative services
  - Fixed-Price type subcontract preferred

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Design-Build Institute of America (DBIA) Best Practices

- Use of Seven DBIA Best Practices
  - Best Value Procurement
  - Two-Step Solicitation
  - Short-List To No More Than Three Qualified Teams
  - Conduct Interim Interviews During Competition
  - Payment to Unsuccessful Offerors for Design Rights
  - Milestone-Based Award Fee Program
  - Use of Performance-Based Specifications

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Partnering

- Partnering is a very important aspect of Design-Build
  - Builds Trust Between Design-build Team/Owner/Owner's Rep
  - Should Be Collaborative and Not Adversarial
  - Integrated Project Team (IPT) is Crucial to Develop Solutions During the Design-build Project
    - Members of IPT must include all members of the design-build team and all stakeholders in the project
  - Ensures the IPT Continues to Work as a Team
  - Partnering Sessions Should Be a Safe Environment for All Parties to Be Completely Transparent

Identification, Mitigation, and Allocation of Risk

- Initial Risk Matrix Developed by Owner
- First Owner/Contractor Partnering Session Convened on Risk Identification and Management
  - Indentified Risk to All Parties
  - Allocation to Party Most Able to Manage
  - Resulted in Trust Building
  - Not a Traditional Adversarial Relationship
    - *"Setting You Up to Succeed and We'll Ride Across the Finish Line on Your Coat tails"*

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Final RSF Acquisition Strategy

- Performance-Based, Phased Contract, Firm-Fixed Price Design-Build with Award Fee
  - Performance-Based (Unleash Creativity)
  - Two-Phased Acquisition (Improve Knowledge and Reduce Risk)
  - Firm-Fixed Price (Set Bounds and Manage Risk)
  - Award Fee Milestones (Engage Contractor Management)
- Acquisition Strategy Created Value By
  - Leveraging Owner Knowledge
  - Enabling Contractor Creativity
  - Reducing Project Risk

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Performance-Based: Owner's View

- Fundamental Change in Acquisition Focus
  - Traditional: *Here's a Design, What's the Cost?*
  - Alternative: *Here's the Requirements and Budget, What's the Design?*
- Specific and Measurable Performance Objectives and Substantiation Criteria
  - Define the Design-Build Team's Value Challenge
- Contractor Free to Design to Performance Objectives
  - No Traditional "Return on Investment" Tests
  - No Bridging Documents to Impede Creativity
  - How Many of the Performance Objectives Can You Achieve?

Performance-Based: Contractor's View

- Quickly Define the Boundaries and the Goal
  - Performance Boundaries
  - Cost Goal
- Creative Tension Under Market Conditions
  - Drives Team to Optimize Value
- Starting with a Clean Palette
  - Motivated Team to Take Ownership

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Phased Contract: Owner's View

- Two Phased Contract
  - Phase 1: Preliminary Design (~50% Final)
    - Off-Ramp Option to Continue for Contractor and Owner to Alleviate Risk to Capital and Reputation
    - Structured to Encourage Exercise of Option
  - Phase 2: Final Design and Construction
    - Completion of Detailed Design Packages for Foundation, Structure, and Interior in Parallel
    - Foundation Work Could Begin Immediately
- Ultimately Reduced Risk to All Parties but…
  - High Stakes Owner Gamble Given Fixed Appropriation and Aggressive Schedule

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Phased Contract: Contractor's View

- Original RFP: Too Much Risk
  - Single Phase: Required FFP Commitment Too Early in the RFP Process
  - Uninsurable Event for Design and Construction
    - Performance and Substantiation Requirements
    - Function of Time
- Two Phase Allowed for Shared Risk
  - Aligned Parties to Move Forward
- Started the Collaboration Process
- High Stakes Contractor Gamble Given Penalty if the Contractor Chose to Terminate

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Firm-Fixed Price: Owner's View

- Contract was "Derivative" Reflecting Best Ideas of Owner and Contractor
  - Absolute Understanding and Clarity of Purpose
  - Risks Identified, Mitigated, and Allocated
  - Builds Trust Between Parties to Attempt a Very Challenging Project
- Addressed Corporate Risk Aversion
  - Established Risk Boundaries
  - Reduced Risk Allocated to Party Best Able to Manage
- All for One, One for All!

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Firm-Fixed Price: Contractor's View

- Begin with the End in Mind
  - Fixed Amount of Money: No More & No Less
- Target Value Design
  - Grouped Dollars into Prioritized Areas, e.g., Energy and Envelope
- Risk Management
  - Control of Cost Allocation through Design and Construction

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Award Fee Program: Owner's View

- Incentives to Induce Continuous Attention by Contractor Management
- Best Money We Invested!

The Research Support Facility Award Fee Program

Milestones for evaluation of the Subcontractor's performance and Award Fee:

Milestone	*Available Fee (%)*	*Fee Based on $2.0 Million Pool*
Completion of Preliminary Design	20	$400,000
Completion of Design Development	15	$300,000
Completion of Construction Document	15	$300,000
Completion of Construction	25	$500,000
Completion of Closeout	20	$400,000
12 month post-occupancy	Balance	$100,000

Any period with "Unsatisfactory" performance noted in any evaluation category could render the Subcontractor ineligible to receive any Award Fee for the entire Evaluation Stage.

Rating System
Superior (90 to 100)
Excellent (80 to 89)
Satisfactory (70 to 79)
Unsatisfactory (0 to 69)

Rollover Fee
Unearned fee could be recouped in subsequent periods providing that the subcontractor earned at least 90 for that period.

Award Fee Program: Contractor's View

- Highly Motivating
  - Money Talks and People Listen!
  - Shared Incentive for Design and Construction
  - Aligned the Team to Drive for Superior Performance
- Measurable Result
  - Owner Criteria
  - Feedback Sessions
  - Feedback Shared to Motivate Team

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Acquisition Strategy Result?

- Created Value Beyond the Budget at Lower Cost and Risk to All Parties
  - No Claims or Controversy
  - No Contractor Change Orders
  - Virtually No Contingency Use for Unknowns or Omissions
  - Sixteen Months from Shovel to Move-In
- Defined a New National Building Energy Standard
- Replicable Acquisition Strategy for Use by Others to Create Their Own Successes!

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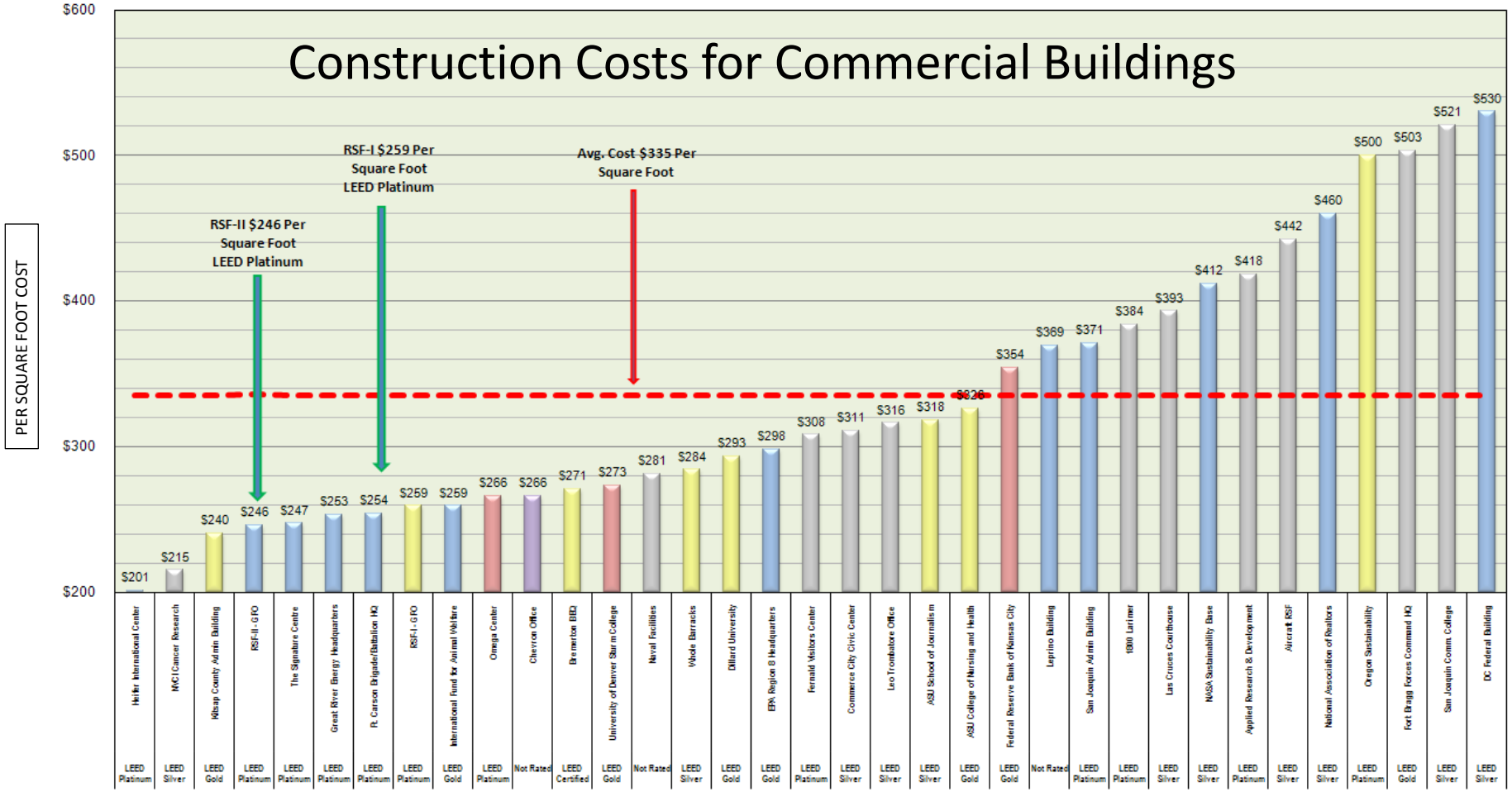
Construction Costs for Commercial Buildings



LEGEND:

- NOT RATED
- LEED CERTIFIED
- LEED GOLD
- LEED SILVER
- LEED PLATINUM

PROJECTS AND LEED CERTIFICATION

SOURCES:

www.fayobserver.com
www.dbia.com
www.nasa.gov
www.eomega.org
www.oregonsustainabilitycenter.org
www.americas.rlb.com
http://greensource.construction.com
www.1800larimer.com
www.usgbc.org
www.smithgroup.com
www.cronkite.asu.edu

Research Support Facility: A New National Standard for Commercial Building Energy Performance

Request for Proposals and Additional Information on High-Efficiency Building Design Available at:

http://www.eere.energy.gov/topics/buildings.html
www.nrel.gov/sustainable_nrel/rsf.html