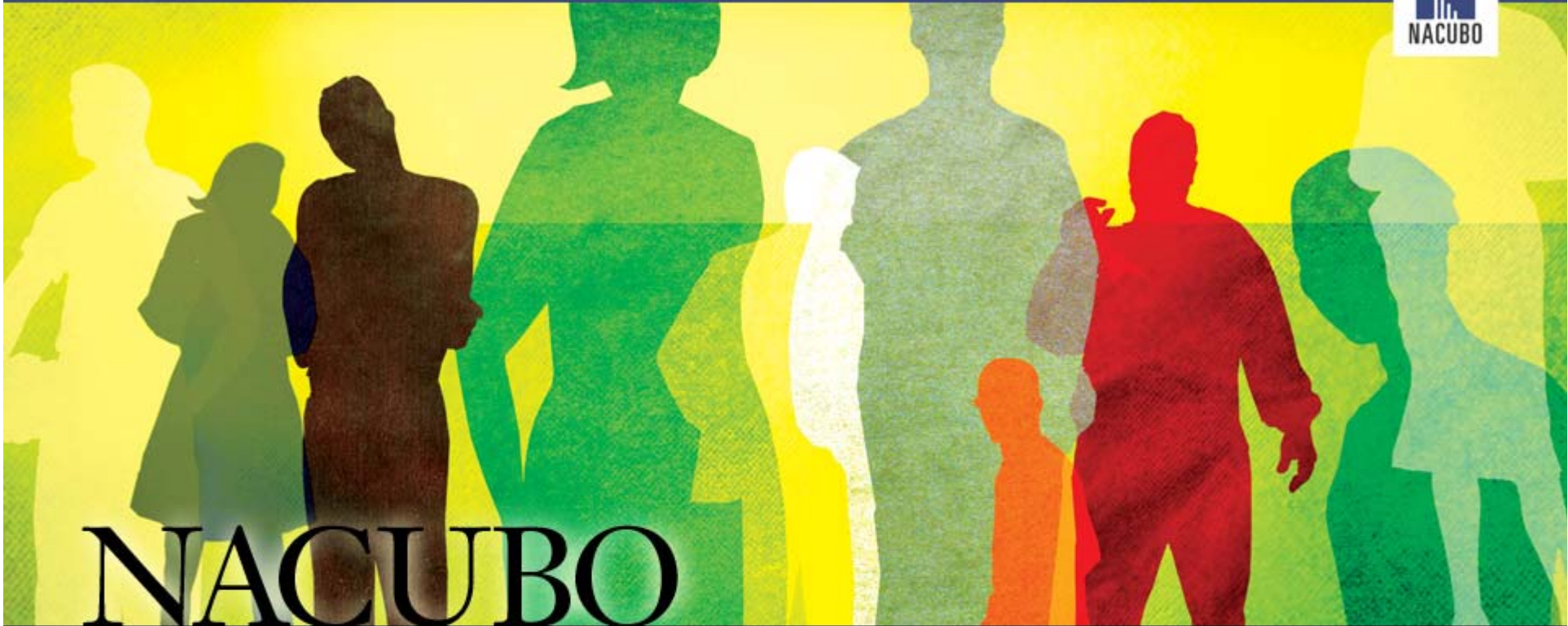


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BUILDING ORGANIZATIONAL CAPACITY

Creative Ideas for Energy Savings

Building Retrofits and Design Considerations



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Traditional Steps of a Project

- Step 1: Project Definition
- Step 2: Project Scope
- Step 3: Project Budget
- Step 4: Project Planning
- Step 5: Project Schedule
- Step 6: Project Tracking
- Step 7: Project Close Out





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Project Steps

- **Definition:** Intended Use *After* Completion
- **Scope:** Quantity, Quality, & Tasks





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Project Steps

- Definition: Intended Use *After* Completion
- Scope: Quantity, Quality, & Tasks
- **Budget:** 1st Cost? Life Cycle? “Greater Good”?
- **Planning:** 30 year? 5 year? “Children’s Children”?





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Project Steps

- Definition: Intended Use *After* Completion
 - Scope: Quantity, Quality, & Tasks
 - Budget: 1st Cost? Life Cycle? “Greater Good”?
 - Planning: 30 year? 5 year? “Children’s Children”?
 - **Scheduling:**
 - **Tracking:**
- Different Seminar*





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Project Steps

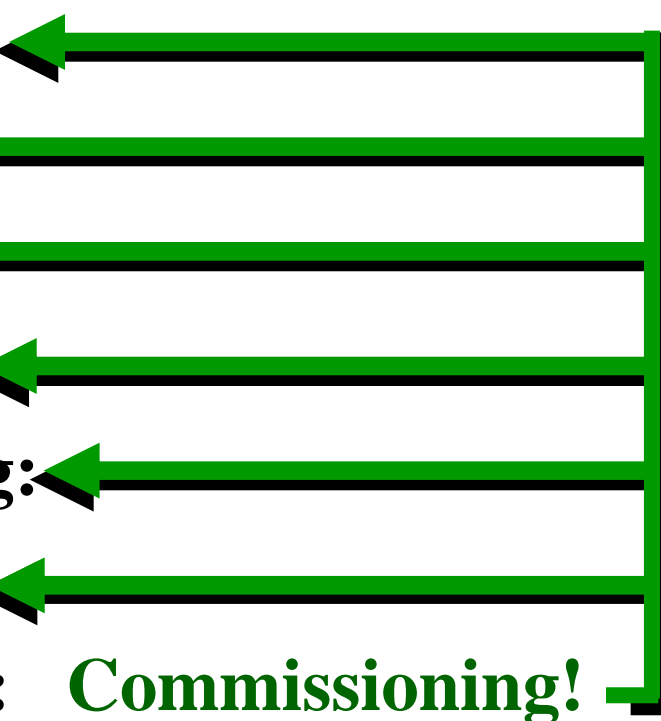
- Definition Intended Use *After* Completion
- Scope: Quantity, Quality, & Tasks
- Budget: 1st Cost? Life Cycle? “Greater Good”?
- Planning: 30 year? 5 year? “Children’s Children”?
- Scheduling:
- Tracking:
- **Close Out: Commissioning!**



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Project Steps

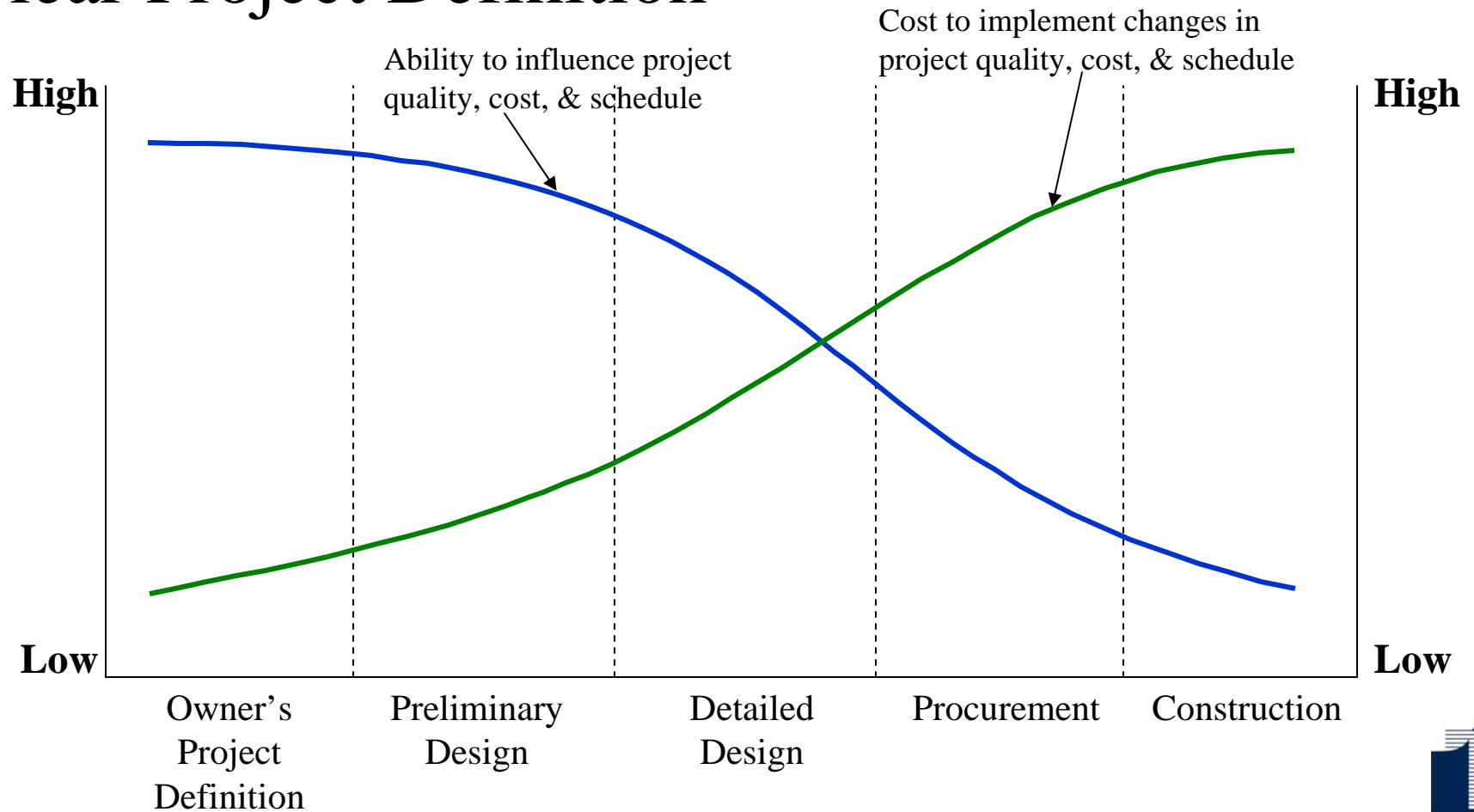
- **Definition:**
 - **Scope:**
 - **Budget:**
 - **Planning:**
 - **Scheduling:**
 - **Tracking:**
 - **Close-Out: Commissioning!**
- 



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Clear Project Definition





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Challenge The Program = Energy Savings = \$\$

- **Quality: “*Big Picture*”**
 - Building Diversification
 - Classroom Diversification
 - Sacred Campus Cows



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Challenge The Program

- **Quantity: “The Details”**

- # of Classrooms
- # of Fume Hoods
- # of Cappuccino Bars

*Then Live By
The Program!*



Did you know the total cost of a Fume Hood can exceed \$20,000 to install and \$8,300/yr. to operate?





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Project: Address Campus Energy Cost Savings

Bryn Mawr College's Definition:

No Net Gain in Campus Utility Consumption

- “If it is generating heat while consuming electricity, it must be evaluated.”
- “Conservation through technology not through sufferance.”
- LEED's Silver Rating as Guideline





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Bryn Mawr College's Scope

- Focus on All 24x7 Operations
- High Efficiency *Everything!*
- Relamp
- Power Distribution 2 voltages to 1 (15kV only)
- Change Transformers, Motor Replacements





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Bryn Mawr College's Results

Since 1999:

- 17% Increase in Buildings Air Conditioned
- ***2% Increase in Energy Consumption***
- www.brynmawr.edu/facilities/energy

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Other Colleges' Plans

- Cabrini College – “Revisit All Energy Saving Opportunities”
Result : \$85k/year savings from second relamping program
- Swarthmore College – “Redefine the Base”
Result : 7 projects/10 years = Energy Model ↓
Finding the New Normal
 - *Submeter All Buildings*
 - *Fix the Power Factor*
 - *Develop Education/Communication Program*



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Budget and Planning

- Late 1990's 5 Year Horizon
- **Green Design** Higher Efficiency, Dual Fuel, Longer Life Cycle, Sustainable Materials, & Good BMS Controls
- **Green Design** “Platinum Level”, Oberlin College, Leach Fields, Zero Energy Buildings





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Current Energy Saving Opportunities

- The “Basics”
 - Relamp Program
 - Dual Sensor Lighting Control
 - Motor Replacement: High Efficiency, Variable Speed
 - Building Envelope Upgrades
 - Building Management Controls





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Current Energy Saving Opportunities

- New Buildings/Renovations
 - Valence HVAC System
 - Variable Air Volume System
 - Geothermal ?
 - Energy Wheel ?
 - High Performance Building Envelope
 - Advance BMS
 - Commissioning



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Commissioning

Commissioning is *NOT* Building Start-up

Testing and Balancing is *NOT* Commissioning

- Commissioning is:
 - ASHRAE
 - LEED
 - IST “Commissioning Plus”
- *Commissioning Starts at Schematic Design*





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Commissioning

- Inefficient Building Operation
 - *ASHRAE Study: 60 Buildings*
 - 50+% Control Problems
 - 40% HVAC Problems
 - 15% Missing Equipment
- LEED: Prerequisite and Enhanced



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Summary

Campus Wide

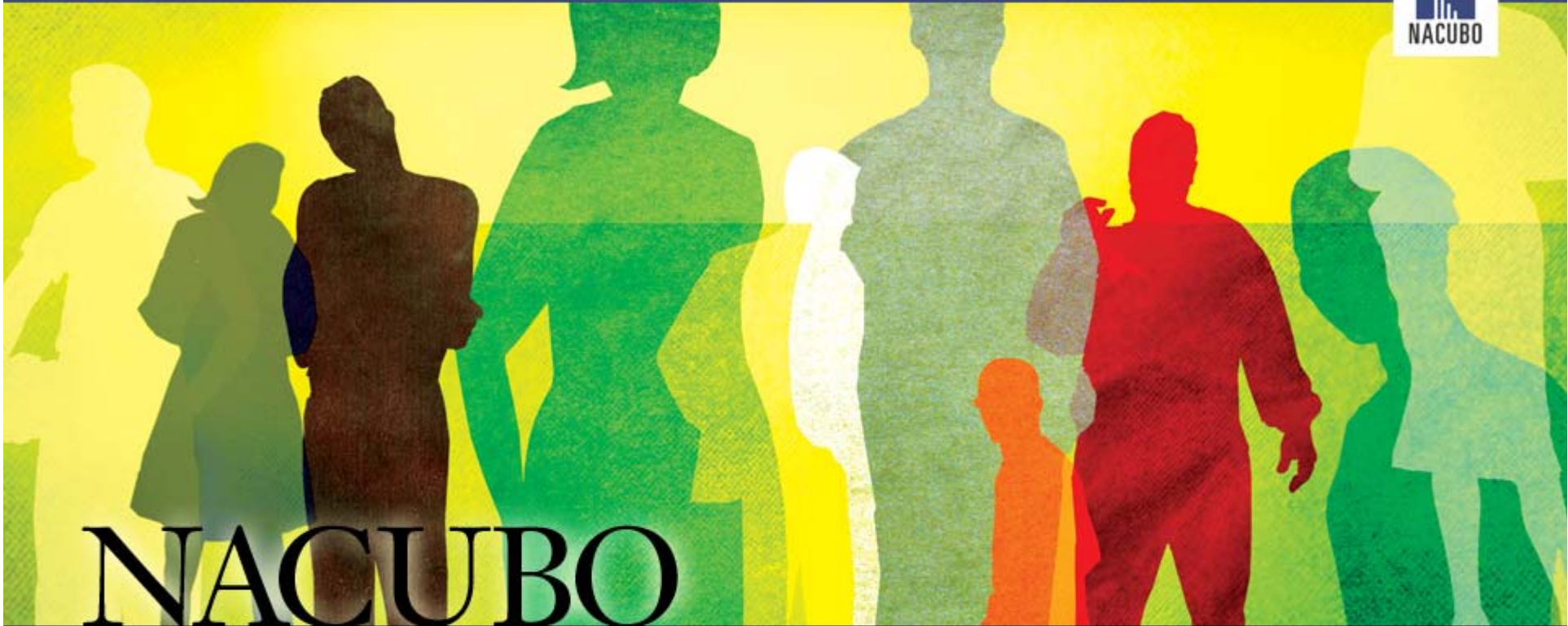
- Efficient Use of Buildings
- Green Initiatives May Change Culture

Per Project

- Clearly Define the Objective
- Challenge the Program Draft, Then Live By It
- Implement Prudent Energy Efficient Design
- Commission



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What is your EUI?

**An overview of Energy Costs and
why they are often overlooked.**

By: Kirk M. Bond, Senior Engineer, Aspen Systems Corporation.





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Agenda

- **Why knowing your EUI is important**
- **Why ENERGY costs are important**
- **Can ENERGY costs become revenues**
- **Capturing ENERGY revenues**
- **Where to get some Help**

So, What is an EUI?

Energy Utilization Index
a.k.a - Energy Usage Index
a.k.a - Energy Use Intensities

Usually expressed in kBtu/sqft/year or MBtu/sqft/year
where “k” equals 1,000 and M equals 1,000,000



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Why Knowing Your EUI Is Important

- **How do you determine the health of your institution?**
 - Balance Sheet
 - Profit and Loss Statement
 - Cash Flow Statement
- **How do you determine the “efficiency” of your institution?**
 - Dollars spent per student per year
 - Percent of students that graduate
 - Percent of students that seek advance degrees
 - What?

Why Knowing Your EUI Is Important

- **The “relative energy efficiency” of your buildings is to a facilities person what the balance sheet is to a business officer – not the whole story but a key element.**
- **Remember EUI means some number of Btu/sqft per year**
- **The two EUI types:**
 - **Source EUI**
 - **Site EUI**

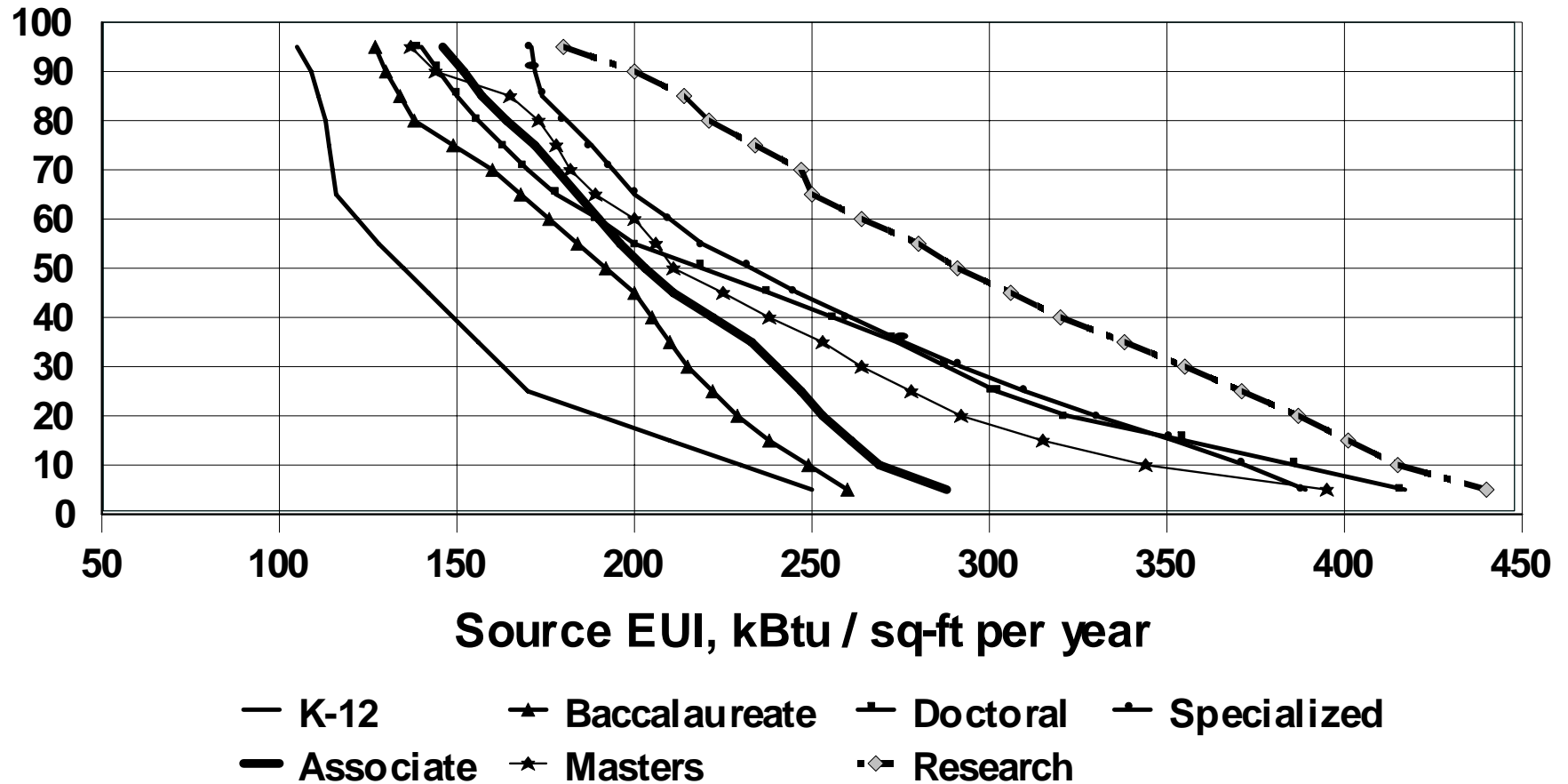


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Carnegie Distribution Curves

Percentile Ranking of those with higher EUI





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Why Are ENERGY Costs Important

- **It is easier to reduce costs than increase revenue**
- **Energy is no longer a “fixed cost”**
- **Electricity is becoming less reliable**
- **Environmental responsibility**

Can ENERGY Costs Become Revenues

- **Answer: YES**
 - **Utility expenses are treated as a “fixed operating cost”**
 - **Utility cost can be reduced in several ways**
 - **Purchasing at a lower unit cost**
 - **Use less energy with existing controls**
 - **Recommissioning**
 - **Occupant and Maintenance staff training**
 - **Installing more energy/water efficient technologies**
 - **Requiring better design – like LEED + High Performance**
 - **Better O & M procedures – and fully funding them**
 - **What else?**



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Capturing ENERGY Revenues

- **Baseline your campus**
- **Benchmark your campus**
- **Elevate the visibility of your facility & operation's managers**
- **Look at your institution's organization**
 - **Is it integrated or smoke stacked**
- **Develop an integrated utility/facility "Master Plan"**
- **Follow LEED + High Performance building standards**
- **Develop a policy to keep utility savings in a special account –KEY**
- **What else?**

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Where to get some Help

- **EUI**
 - <http://egov.oregon.gov/ENERGY/CONS/SB1149/Schools/EUI.shtml>
 - <http://eber.ed.ornl.gov/benchmark/homepage.htm>
- **Benchmarking**
 - http://www.energystar.gov/index.cfm?c=evaluate_performance.us_portfoliomanager
- **Energy Efficiency Solutions A-Z**
 - <http://www.rebuild.org/lawson/productservices.asp>



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Where to get some Help

- **Other Helpful Sites:**
 - **Your State's Energy Office, EPA Office, Other State Offices**
 - **APPA**
 - <http://www.appa.org/>
 - **NACUBO**
 - <http://www.nacubo.org/>
 - **Peers --- yes your peers -- everyone likes to help others – you just need to ask.**
 - **Labs21**
 - <http://www.labs21century.gov/>

Insight

Communications can alter Attitudes and Intentions

But . . .

Only experience Real or Vicarious

Can change Beliefs



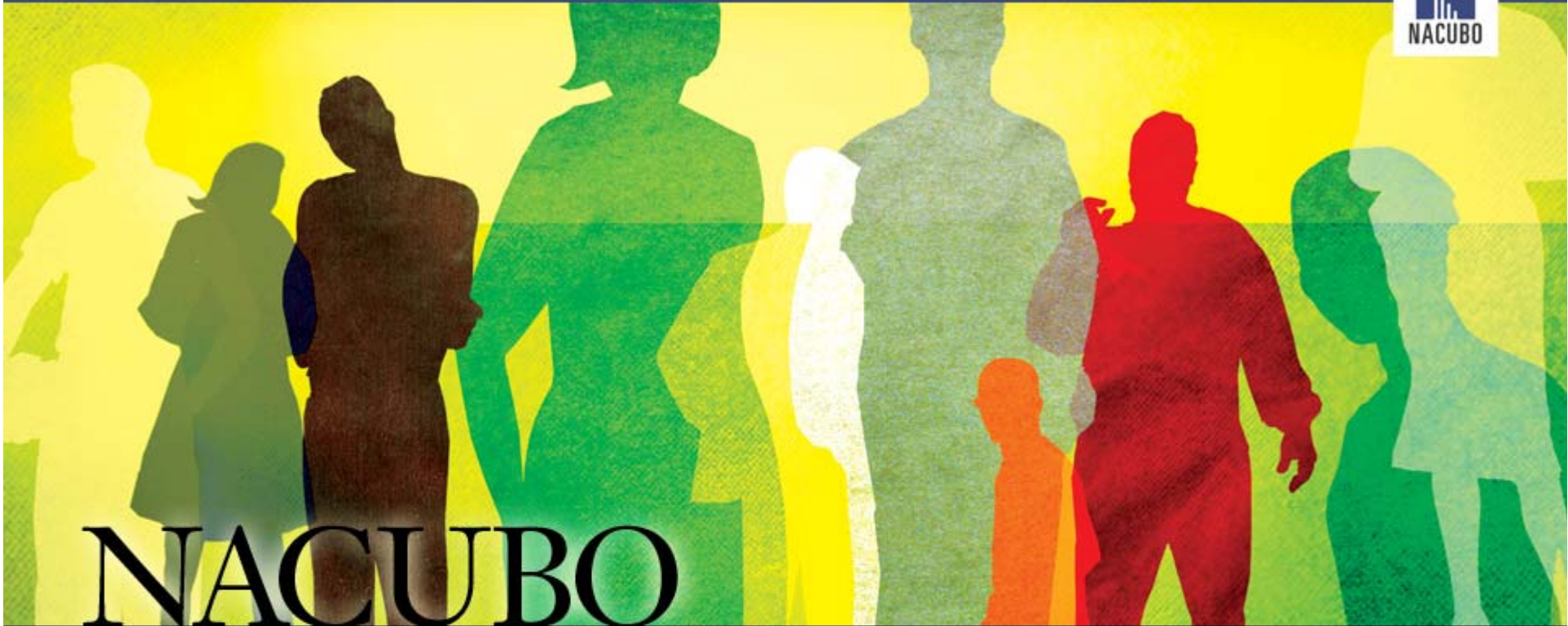
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Your Turn to Talk

What are your major challenges and or questions?

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BUILDING ORGANIZATIONAL CAPACITY

Creative Ideas for Energy Savings

Electric Procurement Strategies



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Agenda

- Energy Procurement In A Deregulated Market
- Why “Futures?”
- Stable Budgeting Strategy
- Competitive Bidding
- Signing The Contract

Electric Procurement Strategies



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Electric Procurement Strategies

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Electric Procurement Strategies



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
 - Electricity Futures follows NGas...



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
 - NGas Can Be Stored On A Limited Basis



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
 - NGas Volatility is Primarily Based on Weather



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
 - Electricity Is Energy On Demand... Or Future Acquisition



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Electric Procurement Strategies

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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
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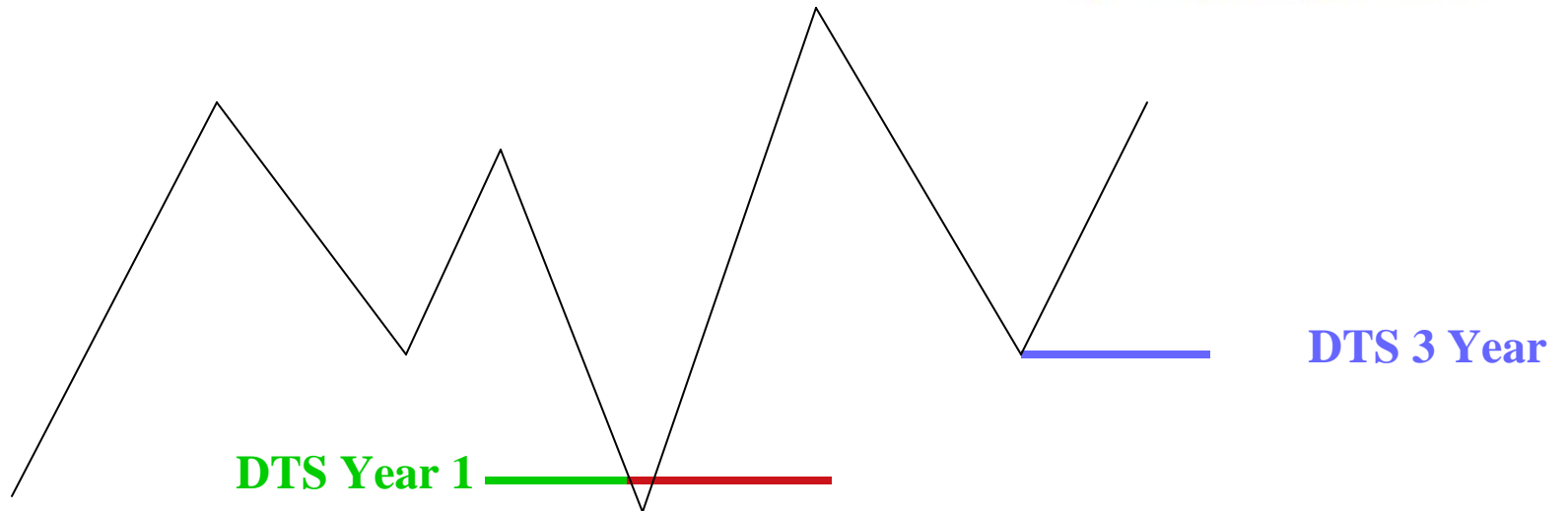


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Electric Procurement Strategies

- Stable Budgeting Strategy

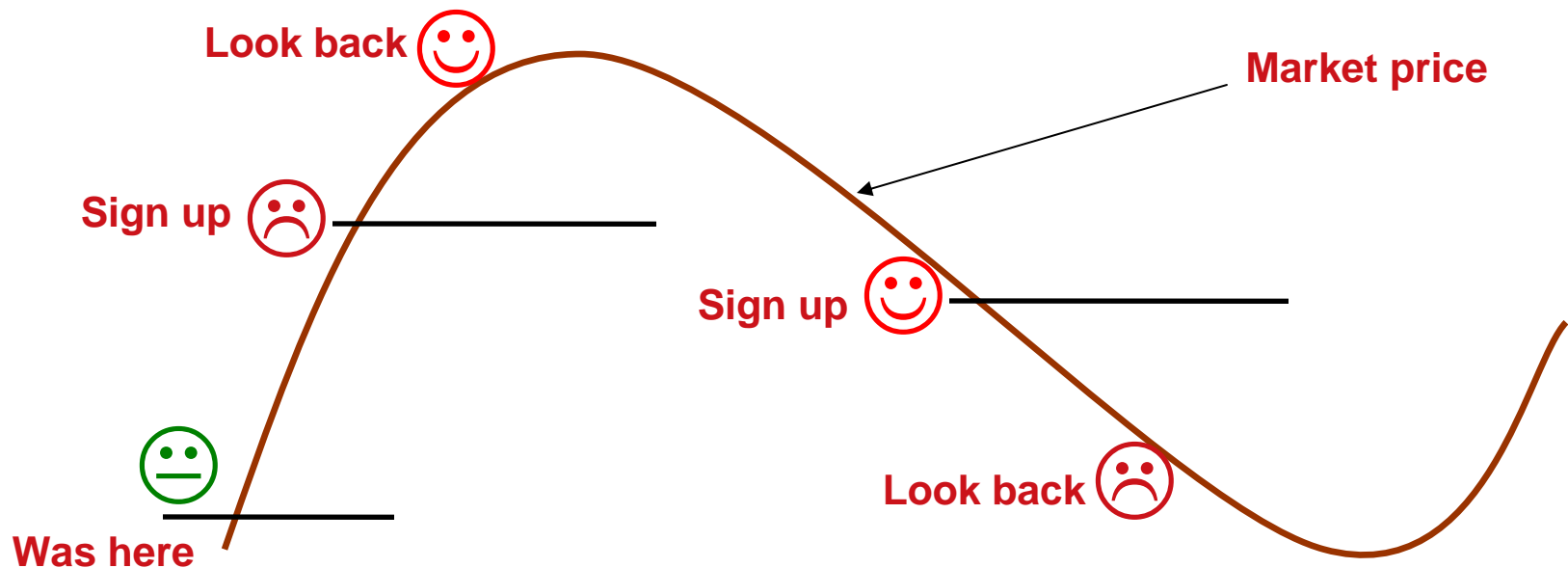


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Electric Procurement Strategies

- Stable Budgeting Strategy



Don't let the end date of your contract determine the renewal decision

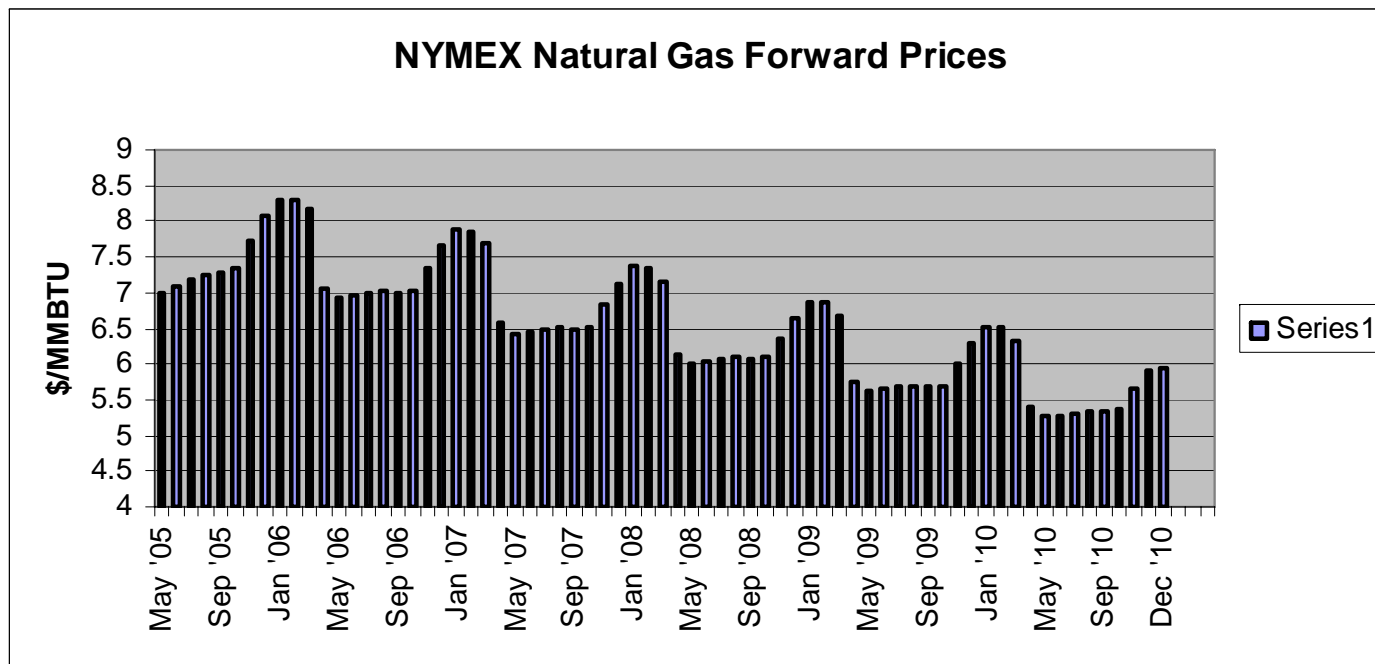


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Electric Procurement Strategies

- Stable Budgeting Strategy



Market on April 14, 2005



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
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- Competitive Bidding
- Signing The Contract



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
- Stable Budgeting Strategy
- Competitive Bidding
 - Be An Educated Customer
 - Stay Connected to the Market Daily
 - Use Some Level of Professional Market Expertise
 - Maintain Relationships with Retail Electric Providers (REPs)



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
- Stable Budgeting Strategy
- Competitive Bidding
- Signing The Contract
 - Use a Procurement Consultant
 - Have a Procedure for a One Day Turn Around



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Electric Procurement Strategies

- Energy Procurement In A Deregulated Market
- Why “Futures?”
- Stable Budgeting Strategy
- Competitive Bidding
- Signing The Contract
- Bonus for Regulated Buyers
 - Learn your power trends
 - Join a local or state organization with your interests
 - Participate in pilot programs



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Electric Procurement Strategies

- Resources



Cogdill Energy Consultants



Association of Energy Engineers



APPA: Association of Higher Education Facilities Officers