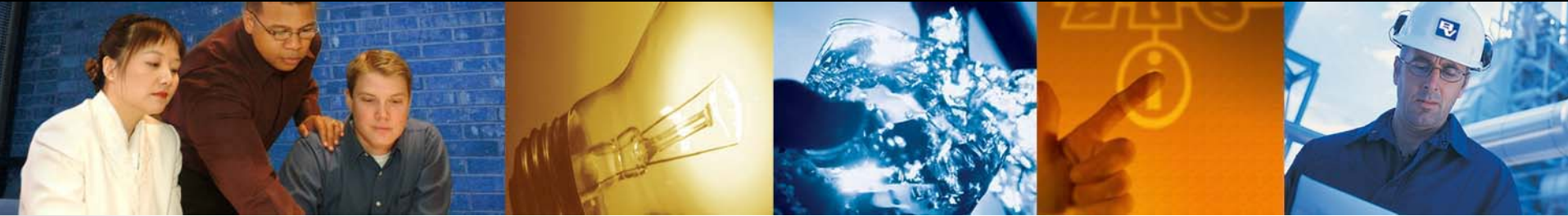


WE BRING IT ALL TOGETHER



**Presentation to City Utilities of Springfield, MO**

# **Analysis of Long-Term Power Supply Alternatives**

**Donald Knotts, Project Manager  
John Wynne, Project Economist**



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ENERGY WATER INFORMATION GOVERNMENT

**January 26, 2006**



## RFP BACKGROUND

- Submitted RFP to 31 Companies
  - Eight Responses Were Received
- |                     |                          |
|---------------------|--------------------------|
| • Calpine Ownership | • Peabody PPA            |
| • Conestoga PPA     | • Sunflower Ownership    |
| • Genova Ownership  | • Tenaska/GRDA Ownership |
| • Peabody Ownership | • Westar PPA             |

**These Responses Involved Gas, Coal, and Wind Power; Existing, and Planned Units  
CU Retained B&V to Evaluate the Offers**



# INITIAL ECONOMIC ANALYSIS RESULTS

Levelized Busbar Cost Summary	
Proposal	Busbar Cost (Cents per kWh)
Tenaska/GRDA	5.04
Sunflower	5.29
Calpine – \$5 per MBtu natural gas price	5.93
Peabody PPA	6.72
Calpine – \$8 per MBtu natural gas price	8.90

Tenaska/GRDA was Carried Forward for a Detailed Expansion Planning Analysis and Compared to SW2



# DETAILED ECONOMIC EVALUATION

- 30-Year Cumulative Present Worth Cost (CPWC) Comparison Using POWRPRO, B&V's Chronological Hourly Production Cost Model
- The Model Estimates the Total Production Cost and Fixed Costs for Each Year in a Planning Horizon, and Compares these Costs Between Competing Plans
- The Two Base Plans Evaluated Were:
  - CU Build the 275 MW SW2 Coal Unit, Commercial Operation in 2010
  - Tenaska/GRDA, Commercial Operation in 2012. CU Ownership is 280 MW, But CU Could Only Utilize 195 MW the First Five Years, Growing to 280 MW by 2027 (Tenaska Would Purchase and Utilize Some of the CU Capacity for 15 Years and Pay CU on a Pro Rata Cost Basis)



## BASIS OF SIGNIFICANT INPUTS

- Delivered Coal Price
  - Three Coal Pricing Scenarios Were Utilized Based on Projected Market Conditions
- Capital Costs
  - B&V Adjusted Tenaska/GRDA Capital Costs to Provide Equivalent Level of Cost Certainty
  - Added Indirect Owner and Financing Costs, Transmission Costs to Both Plans



# BASIS OF SIGNIFICANT INPUTS (Continued)

- Environmental Regulations
  - CAIR Mandates Reduction of SO<sub>2</sub> and NO<sub>X</sub> in 28 States, Including Missouri but not Oklahoma
  - Economic Benefit to Tenaska/GRDA, Question is How Long Benefit Will Last
  - Three Scenarios were Modeled Based on Duration of Benefit
- Off-System Sales
  - Base Case Included No Off-System Sales
  - Second Scenario was Evaluated Utilizing Off-System Sales Revenue



## BASE CASE RESULTS

**No Off-System Sales, Adjusted Tenaska/GRDA  
Capital Cost, Three Fuel Price Scenarios, and Three  
Emission Benefits Scenarios**

	<b>Percent Increase in CPWC, Tenaska/GRDA Above SW2</b>		
	<b>Fuel Pricing Scenario</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
<b>Emission Benefit thru 2017</b>	<b>1.4%</b>	<b>0.9%</b>	<b>-0.3%</b>
<b>Emission Benefit thru 2022</b>	<b>1.0%</b>	<b>0.5%</b>	<b>-0.7%</b>
<b>Emission Benefit thru 2027</b>	<b>0.7%</b>	<b>0.3%</b>	<b>-0.9%</b>

**SW2 has Cost Advantage in 6 of 9 Cases  
(all Fuel Scenario A and B Cases)**



## OTHER SCENARIOS EVALUATED

- Evaluate Impact of Off-System Sales Revenue for All Three SW2 Fuel Scenarios
- Evaluate Impact of Using Tenaska/GRDA Capital Cost As-Received



## OTHER SCENARIO RESULTS

**With Off-System Sales, Adjusted Tenaska/GRDA Capital Cost, Three Fuel Price Scenarios, and Three Emission Benefits Scenarios**

<b>Percent Increase in CPWC, Tenaska/GRDA Above SW2</b>			
	<b>Fuel Pricing Scenario</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
<b>Emission Benefit thru 2017</b>	<b>3.2%</b>	<b>2.7%</b>	<b>1.3%</b>
<b>Emission Benefit thru 2022</b>	<b>2.8%</b>	<b>2.3%</b>	<b>1.0%</b>
<b>Emission Benefit thru 2027</b>	<b>2.5%</b>	<b>2.0%</b>	<b>0.7%</b>

**SW2 has Cost Advantage in All Cases**



# OTHER SCENARIO RESULTS (Continued)

**As-Received Tenaska/GRDA Capital Cost, With  
Off-System Sales, Three Fuel Price Scenarios, and  
Three Emission Benefits Scenarios**

	<b>Percent Increase in CPWC, Tenaska/GRDA Above SW2</b>		
	<b>Fuel Pricing Scenario</b>		
	<b>A</b>	<b>B</b>	<b>C</b>
<b>Emission Benefit thru 2017</b>	<b>1.9%</b>	<b>1.2%</b>	<b>-0.1%</b>
<b>Emission Benefit thru 2022</b>	<b>1.5%</b>	<b>0.8%</b>	<b>-0.4%</b>
<b>Emission Benefit thru 2027</b>	<b>1.3%</b>	<b>0.5%</b>	<b>-0.7%</b>

**SW2 has Cost Advantage in 6 of 9 Cases  
(all Fuel Scenario A and B Cases)**



## RISKS WITH TENASKA/GRDA

- Has Not Obtained Property Rights
- Has Not Applied for Air Permit
- Emission Control Technology Requirements May Change
- In Service Date (2012) in Question Due to Above Risks
- Increased Risk of Transmission Interruptions



## ALTERNATIVE PLANS

- Plan With CU-Owned Combined Cycle Unit at SWPS (No Off-System Sales)
  - CPWC 19 % to 21 % Higher than SW2
- Plan With Market Purchases Only, No SW2 or Tenaska/GRDA (No Off-System Sales)
  - CPWC 20 % to 22 % Higher than SW2
- Based on Busbar Results, Peabody PPA Plan CPWC Could be 15 % or Greater than SW2 CPWC



## CONCLUSIONS

- SW2 Option is the Least Cost Option in Greatest Number of Scenarios
- Tenaska/GRDA Option is not as Fully Developed as SW2 and Therefore Carries Additional Risks and Uncertainties
- SW2 Option is the Least Cost Option When Compared to CU-Owned Combined Cycle or Market Purchases
- Thus, SW2 is Most Economic Baseload Alternative for CU System