

Future Generation Planning The Empire District Electric Company

**Presentation to the KEC – Electricity Committee
June 17, 2008**



SERVICES YOU COUNT ON

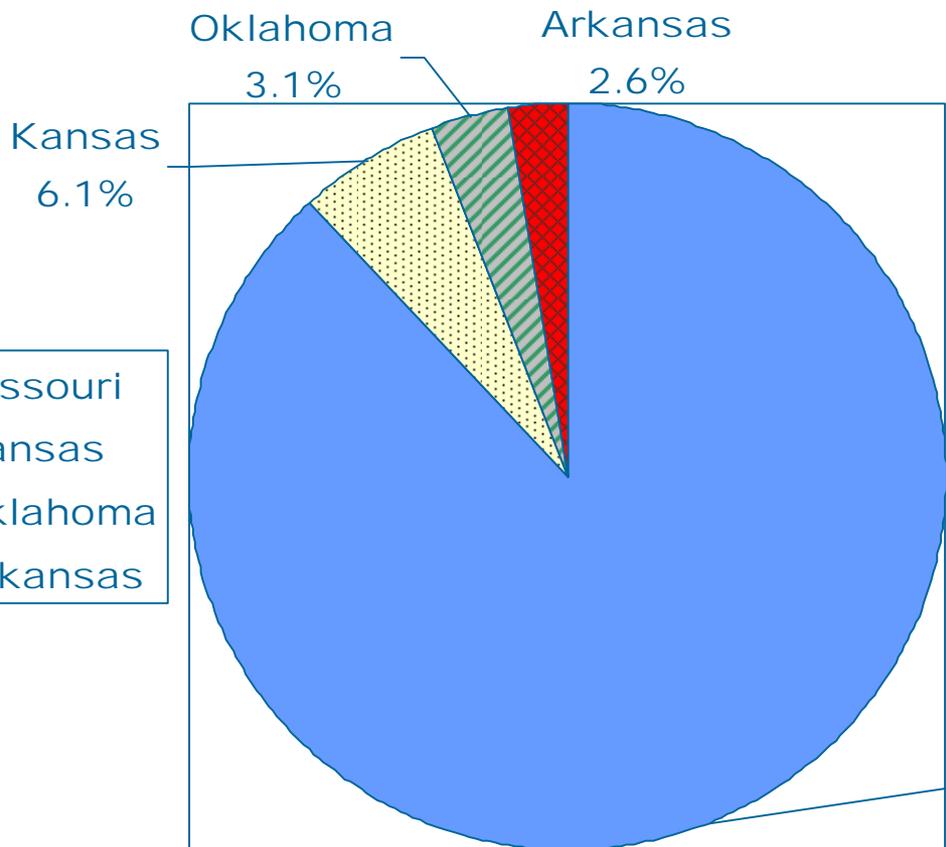
Overview

1. Empire District Introduction
2. Recent History of Generation Planning at Empire
3. The Integrated Resource Planning (IRP) Process at Empire
4. Closing Thoughts
5. Questions

Empire District at a Glance

- Investor owned utility (IOU)
- Headquartered in Joplin, Missouri
- Serve in Arkansas, Kansas, Missouri, Oklahoma and FERC jurisdictions
- Electric service territory is about 10,000 square miles
- Services
 - ▶ Electric (Since 1909, about 168,000 customers)
 - ▶ Natural Gas LDC (since June 2006, about 47,000 customers)
 - ▶ Water (serve 3 Missouri communities)
 - ▶ Fiber Optics
- 2007 electric peak demand 1,173 MW
- 2007 electric net system input 5,485,658 MWHs

Empire District Electric Retail Customers by State



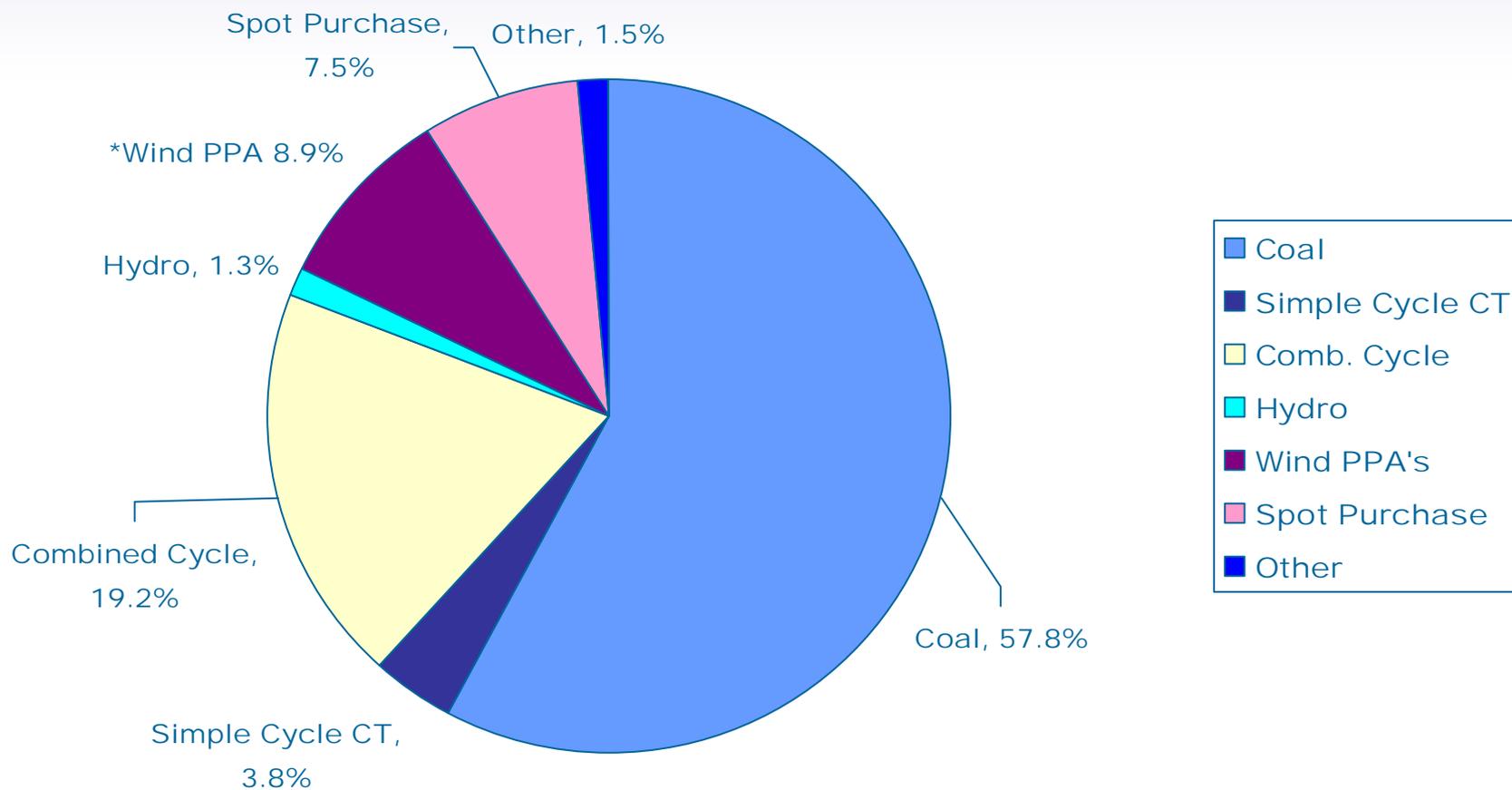
Jurisdiction	Retail Electric Customers (2007)	%
Arkansas	4,382	2.6%
Kansas	10,240	6.1%
Missouri	147,695	88.1%
Oklahoma	5,248	3.1%

Missouri
88.1%

Existing Generation Resources

Resource Name	Empire Share Rated (MW)	Type and Primary Fuel	Location
Asbury	210	Baseload - Coal	Missouri
Iatan	78	Baseload - Coal	Missouri
Riverton 7	38	Baseload - Coal	Kansas
Riverton 8	54	Baseload - Coal	Kansas
Ozark Beach	16	Intermittent - Hydro	Missouri
State Line Combined Cycle	300	Intermediate and Peaking - Natural Gas	Missouri
State Line 1	96	Peaking - Natural Gas	Missouri
Riverton 9	12	Peaking - Natural Gas	Kansas
Riverton 10	16	Peaking - Natural Gas	Kansas
Riverton 11	16	Peaking - Natural Gas	Kansas
Riverton 12	150	Peaking - Natural Gas	Kansas
Energy Center 1	85	Peaking - Natural Gas	Missouri
Energy Center 2	84	Peaking - Natural Gas	Missouri
Energy Center 3	50	Quick Start and Peaking - Natural Gas	Missouri
Energy Center 4	50	Quick Start and Peaking - Natural Gas	Missouri
150 MW Elk River Wind PPA	7	Intermittent - wind PPA	Kansas
Westar Jeffrey EC PPA	162	Baseload - Coal PPA	Kansas
TOTAL	1,424		

Generation Mix by Resource Type (2007)



*All renewable attributes have been sold via RECs

Kansas Wind Projects

Elk River Wind Farm PPA

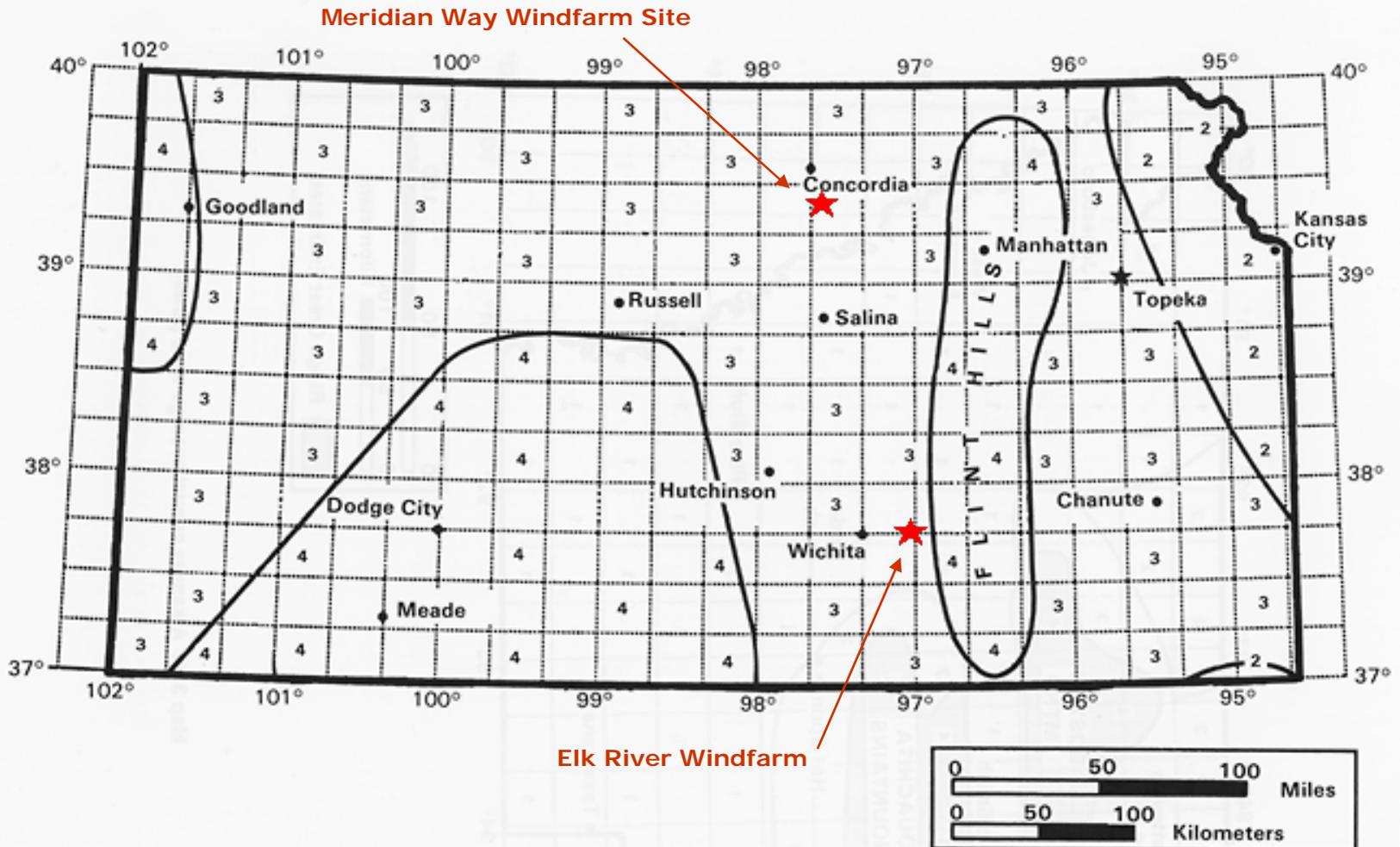
- Located in Butler County Kansas
- On-line Date Dec-2005
- 150 MW
- Approximately 550,000 MWh per year

Meridian Way Wind Farm PPA

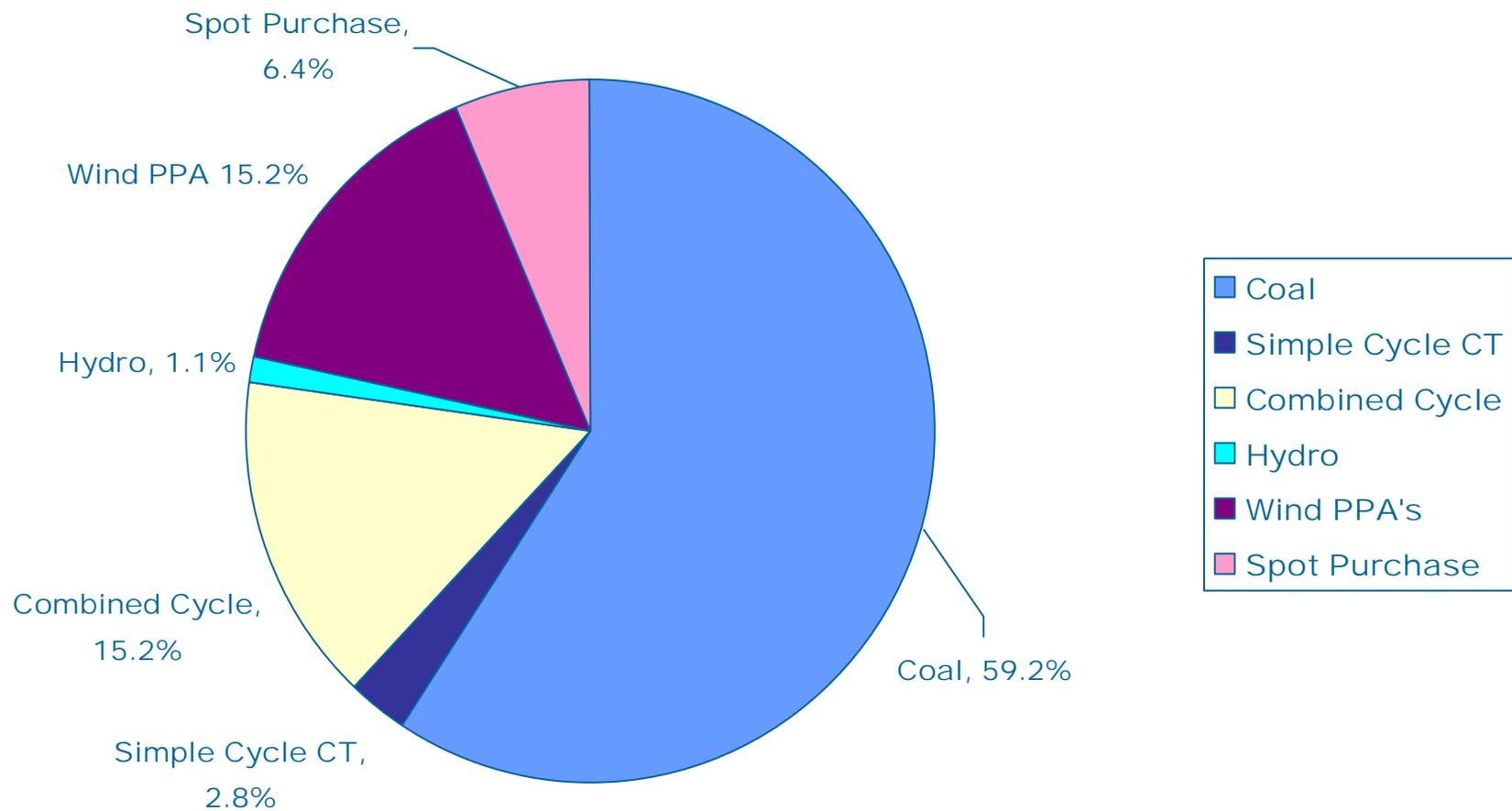
- Located in Cloud County Kansas
- On-line Date Dec-2008
- Empire Share 105 MW
- Approximately 350,000 MWh per year



Elk River and Meridian Way Relative Locations



Expected Generation Mix with Meridian Way Wind PPA in 2009



New Coal Construction

■ Iatan Unit 2

- ▶ Empire Share 12% or approximately 100 MW ownership
- ▶ Scheduled on-line date mid-2010
- ▶ Located near Weston, Missouri

■ Plum Point

- ▶ Empire share 7.52% or approximately 50 MW ownership
- ▶ 50 MW purchased power agreement (PPA)
- ▶ Total Empire capacity 100 MW
- ▶ Scheduled on-line date mid-2010
- ▶ Located near Osceola, Arkansas
- ▶ Empire has the option to purchase the 50 MW PPA in 2015
- ▶ Dynegy Services Plum Point and Plum Point Power Partners

Note: 162 MW Westar Jeffrey EC PPA expires May 31, 2010

Environmental Projects

- **Asbury**
 - ▶ Selective Catalytic Reduction (SCR)
 - ▶ Completed in December 2007
- **Iatan Unit 1**
 - ▶ SCR, scrubber and baghouse
 - ▶ Expected to be completed in late 2008
- **Missouri Carbon Sequestration Project**
 - ▶ A joint pilot project to evaluate the feasibility of local carbon sequestration
 - ▶ City Utilities' Southwest Power Station site in Springfield, MO
 - ▶ If results prove favorable, injection of food grade carbon dioxide at a depth of approximately 2,000 feet will take place
 - ▶ long-term monitoring and evaluation is expected to last two years

Demand-Side Management (DSM)

■ Missouri

▶ Customer Programs Collaborative (CPC)

- Empire, MPSC Staff, Missouri OPC, Missouri DNR, Industrials
- Development, implementation, monitoring and evaluation of Empire's customer programs

▶ Portfolio of energy efficiency programs are being implemented

■ Arkansas

▶ Quick start programs have been implemented

■ Kansas and Oklahoma

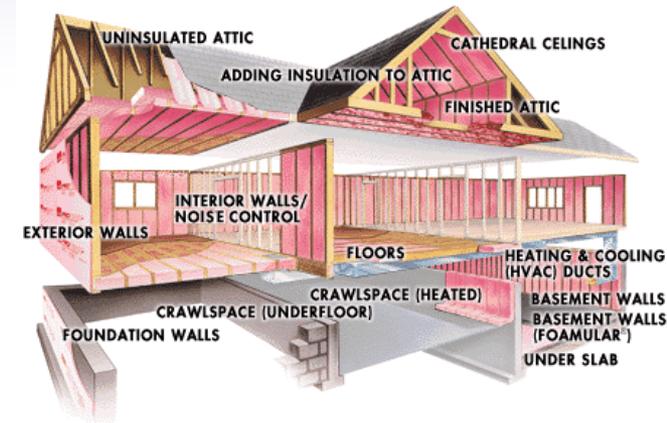
▶ DSM rule making in progress

■ Total Company

▶ An Empire team has been assembled to evaluate demand response programs

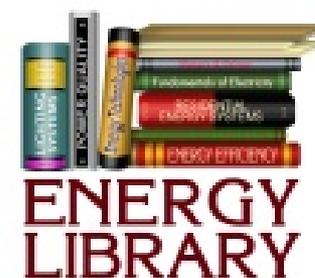
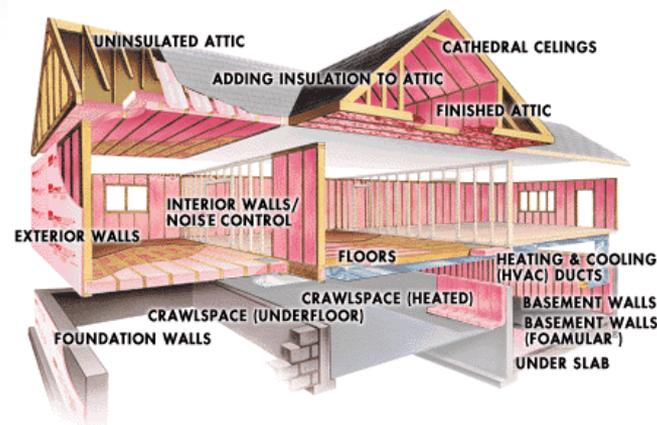
Missouri Energy Efficiency Programs

- Energy Calculators & Libraries
- High Efficiency A/C Program
- Change a Light—CFLs
- Low Income New Homes
- Low Income Weatherization
- Commercial & Industrial Program
- Building Operator Certification



Arkansas Energy Efficiency Programs

- Energy Efficiency Arkansas – Education (statewide)
- Arkansas Weatherization Program (statewide)
- A/C Tune Up
- C&I Rebate
- New portfolio of programs in 2010



Recent History of Generation Planning at Empire

- Mid-1990s
 - ▶ Formal Integrated Resource Plan (IRP) rules in Missouri
 - ▶ After Empire filed once, statewide waiver from the formal rule
 - ▶ Biannual meetings with Missouri PSC Staff, OPC and other stakeholders
- 1998
 - ▶ Black & Veatch Generation Planning Study
- 2001
 - ▶ MS Gerber & Associates Resource Expansion Plan
- 2003
 - ▶ Black & Veatch Generation Expansion Plan Study
 - ▶ Wind energy study
- 2006
 - ▶ Empire Resource Plan with Global Energy Decisions
- 2007
 - ▶ The statewide IRP waiver expired in Missouri
 - ▶ Formal IRP filed in Missouri September, 2007
 - ▶ IRP filed in Missouri, Arkansas and will be filed in Oklahoma
 - ▶ Next IRP filing requirement in September, 2010

Current IRP Rules

- IRP rules in Missouri, Oklahoma and Arkansas
- Missouri IRP rule highlights
 - ▶ At least a 20-year planning horizon
 - ▶ Primary selection criteria is to minimize NPVRR while considering other factors such as risk and uncertainty
 - ▶ Decision analysis
 - ▶ Demand-side and supply-side resources are to be evaluated on equal basis
 - ▶ IRP rules address load forecasting, supply-side resource analysis, demand-side resource analysis, integrated resource analysis, risk analysis and strategy selection

High-Level IRP Process Overview

- Review of IRP rules & application for variance
- Data & assumptions reviewed and updated from 2006 resource plan
- Existing resources analyzed
- New load forecasts developed
- Supply-side and demand-side resource candidates identified
- Alternate plans & sensitive variables selected
- Resources screened with capacity expansion model (CEM) for each plan
- Sensitivity analysis and full financial modeling conducted in the Strategic Planning Model powered by MIDAS
- Risk analysis conducted
- Preferred plan developed
- Implementation plan determined



IRP Project Consultants and Models



- **Ventyx (formerly Global Energy Decisions)**
 - ▶ Capacity Expansion Module (CEM) screening & optimization
 - ▶ Strategic Planning Model powered by MIDAS for sensitivity, financial & risk analysis

- **Technically Speaking, Inc.**
 - ▶ Report writing
- **Applied Energy Group (AEG)**
 - ▶ DSM program inputs

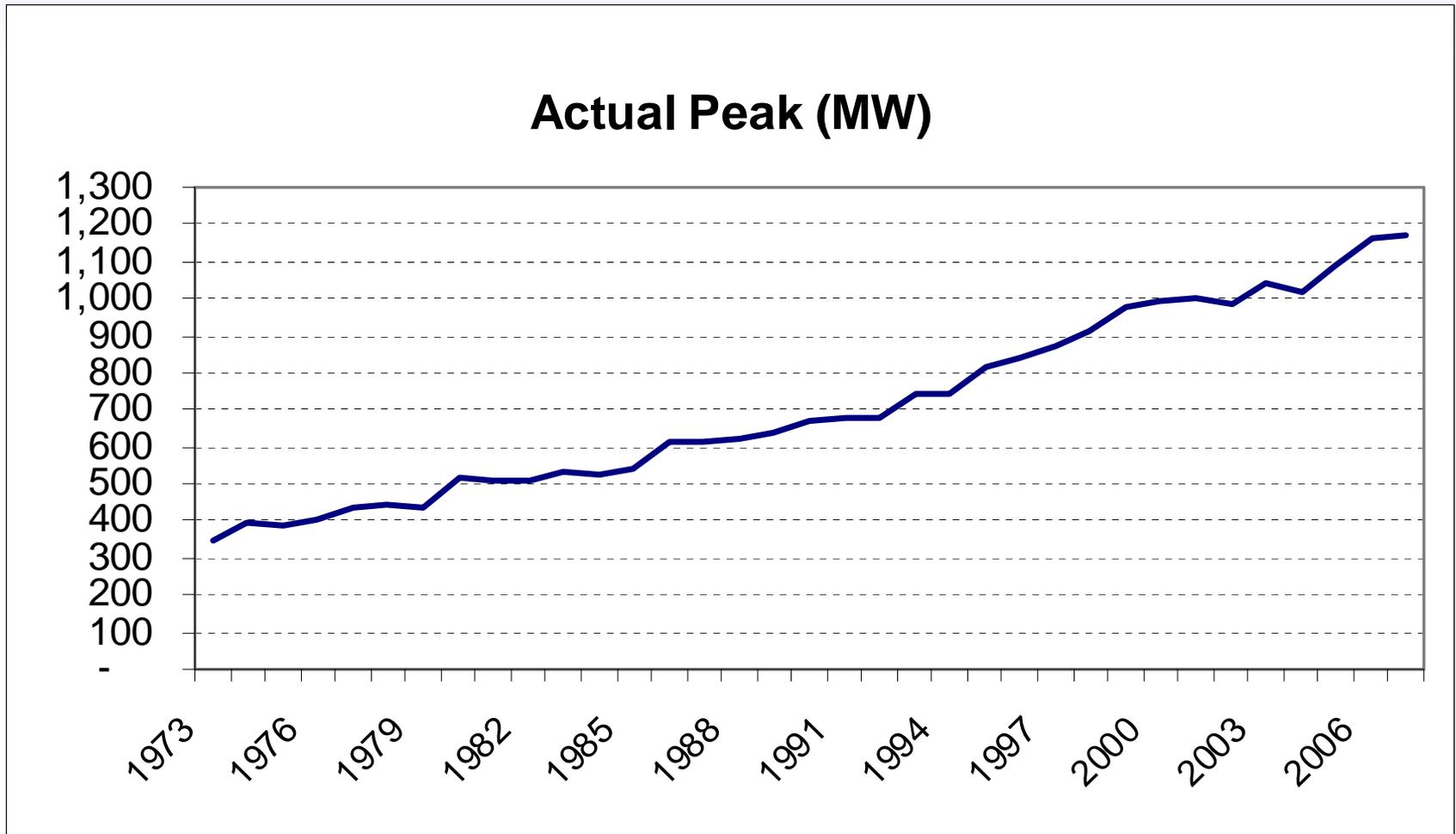


energizing ideas



Load Forecasting

Customer demand continues to increase



Not weather normalized

Candidate Resources in IRP

■ Demand-Side Resources

- ▶ Low Income Efficiency/New Homes
- ▶ Home Performance with ENERGY STAR
- ▶ Change a Light
- ▶ Residential High Efficiency CAC Program
- ▶ ENERGY STAR Homes
- ▶ C&I Rebate
- ▶ Building Operator Certification Program
- ▶ C&I Peak Load Reduction Program
- ▶ A/C Cycling Program

■ Supply-Side Resources

- ▶ Combustion turbine (aero-derivative and frame simple cycle)
- ▶ Combined cycle (including possible Riverton 12 conversion)
- ▶ Pulverized coal
- ▶ Coal PPA
- ▶ Integrated gasification combined cycle (IGCC)
- ▶ Atmospheric circulating fluidized bed (ACFB)
- ▶ Nuclear (not an option in base case)
- ▶ Distributed generation
- ▶ Compressed air energy storage (CAES)
- ▶ Wind (with Wind related CT)
- ▶ Biomass

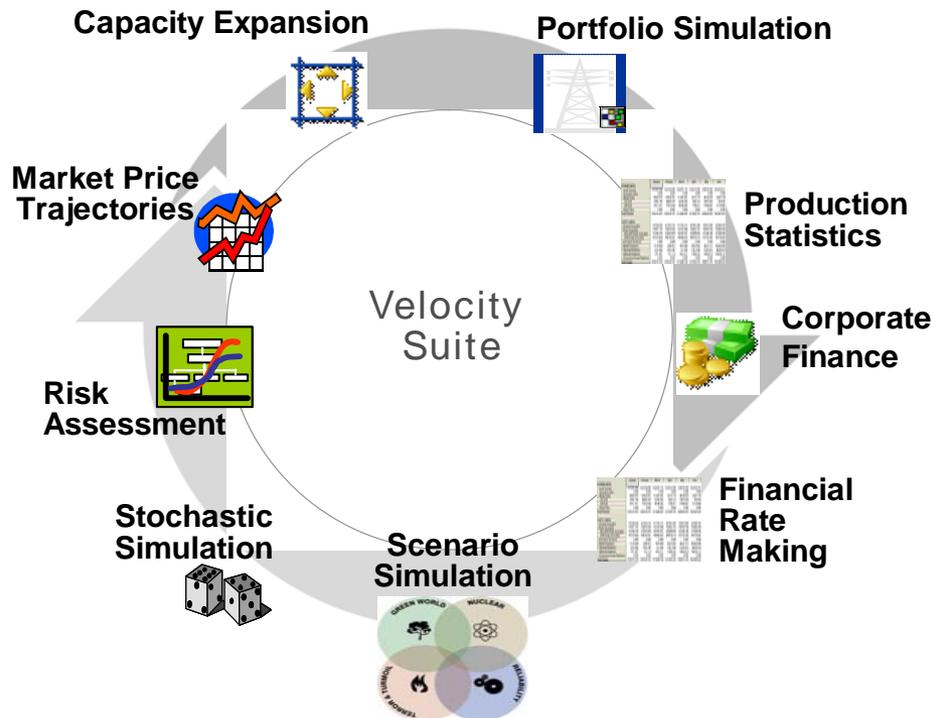
Ventyx (formerly Global Energy) IRP Model Overview

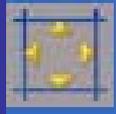
Strategic Planning
Enterprise-Wide Portfolio Analysis

 **Strategic Planning**

Challenge
Enterprise-wide solution

Best Practice
Strategic Planning combines zonal market price trajectories, portfolio analysis, corporate finance, capacity expansion, and risk assessment within a single model.



 **Capacity Expansion**

 **Strategic Planning**

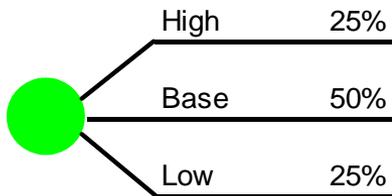
SOURCE: Global Energy

Alternate Plans in IRP

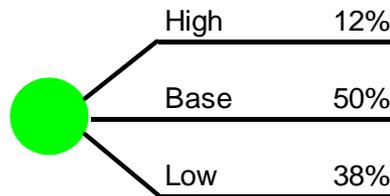
- The IRP considered 12 alternate plans
 - ▶ These alternate scenarios addressed items such as:
 - Various levels of load forecasts
 - Various levels of fuel and market prices
 - Various levels of environmental costs
 - The ability to construct or partner in the construction of certain generation technologies in the future
 - Potential unit retirements in the future

Uncertain Variables for Sensitivity Analysis in IRP

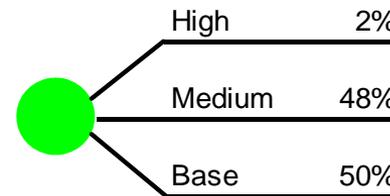
Market Prices/Fuel Prices



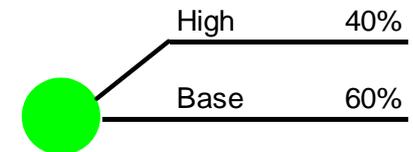
Load



Environmental



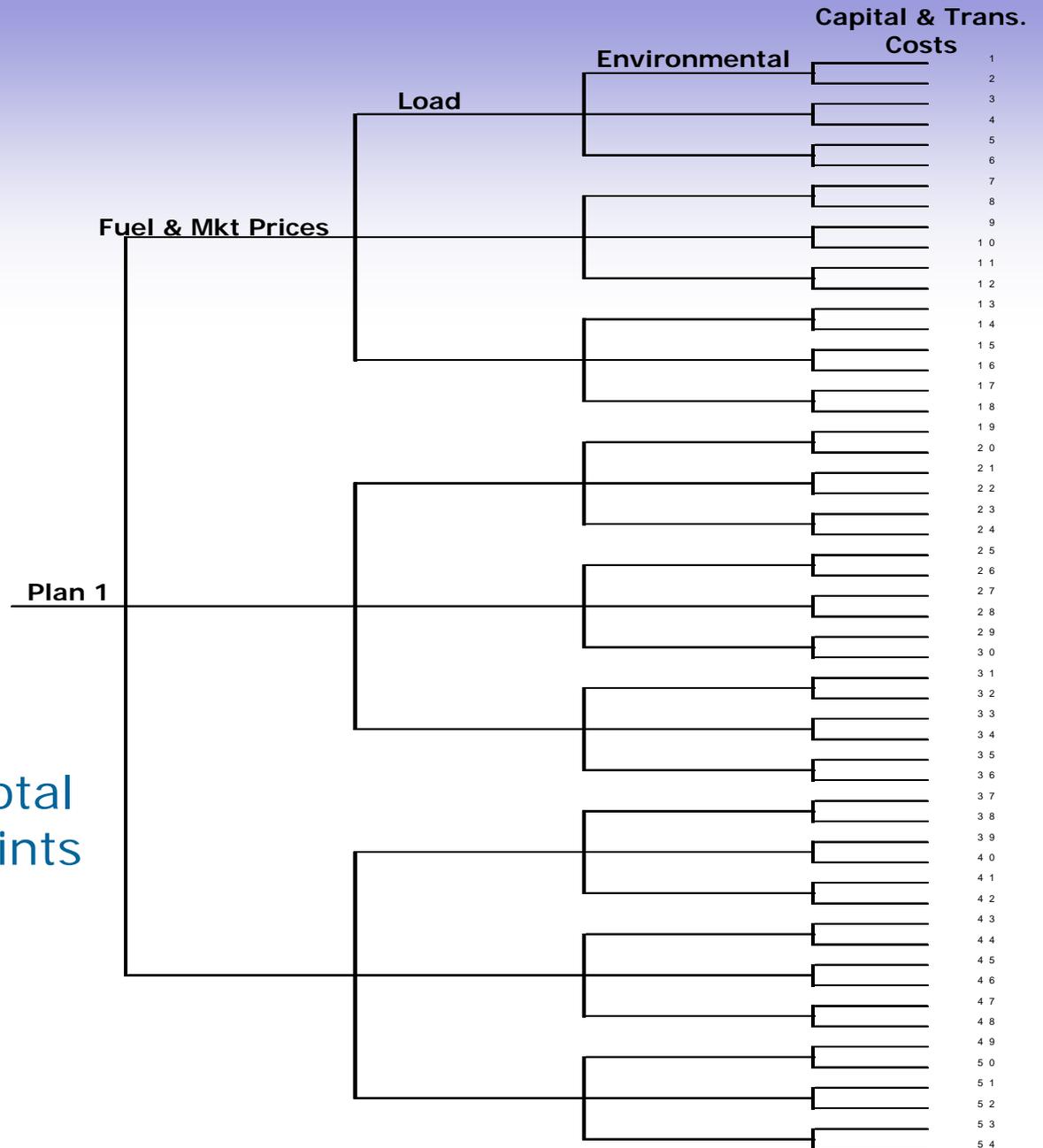
Capital/Transmission



Decision Tree Analysis for IRP

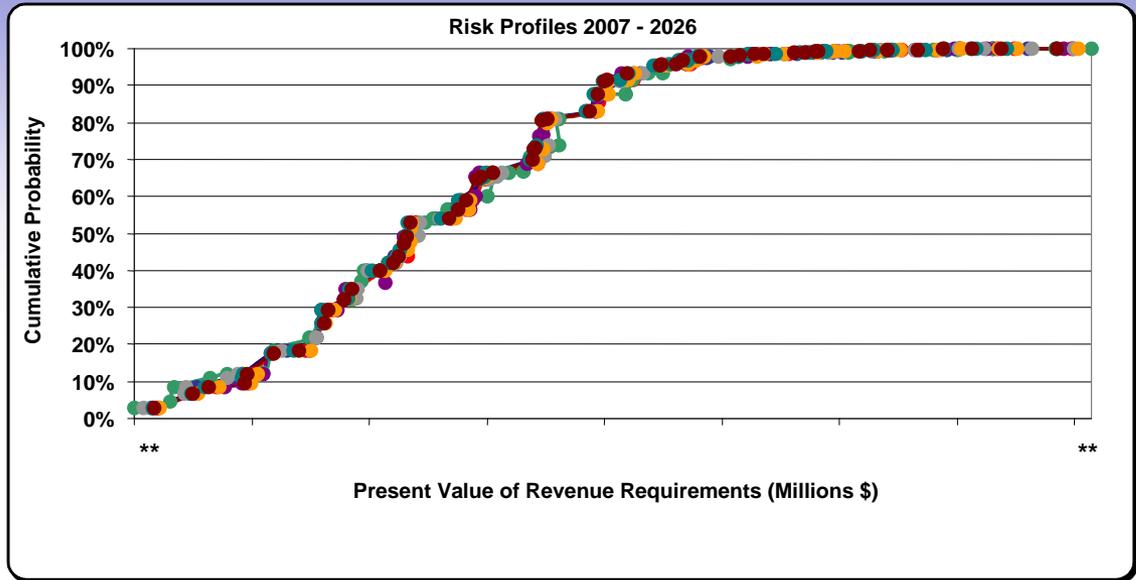
54 End Point Tree

Representing 1 of 12 potential plans for a total of 648 possible endpoints

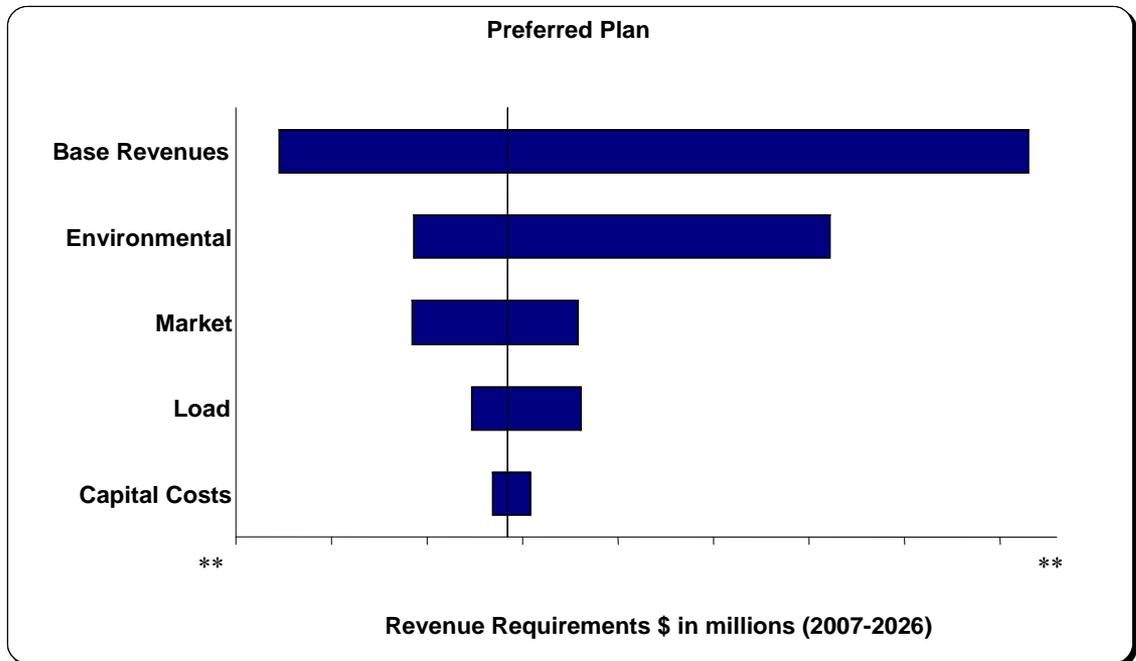


IRP Risk Analysis Examples

Risk Profiles



Tornado Charts



IRP Preferred Plan Development

- Strikes a balance over all planning objectives
- Balanced generation mix
- Cost effective, safe and reliable service
- Minimize rate impacts
- Manage risks
- Achieve and/or maintain investment grade ratings, thus providing for corporate financial stability and minimizing the financing costs included in rates paid by Empire's customers
- Develop short-term implementation plan

Closing Thoughts Concerning Future Generation Planning at Empire

- Major construction projects (wind PPA project, coal units, environmental retrofits)
- DSM (energy efficiency and demand response)
- Environmental uncertainty (potential climate change legislation)
- Potential renewable portfolio standards
- Integrated resource planning (MO, OK, AR)
- Resource planning is a fluid process, subject to the ongoing need to reevaluate modeling assumptions based on changing conditions
- Empire will kickoff a new generation planning study in July, 2008 to focus on the post-2010 timeframe
- Next formal IRP filings in 2010

Questions?

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