

# **Overview of APS**

## **U.S.-JORDAN ELECTRIC POWER TRANSMISSION PARTNERSHIP EXECUTIVE EXCHANGE VISIT**

Bob Smith

Director Energy Delivery

Asset Management and Planning



# Agenda

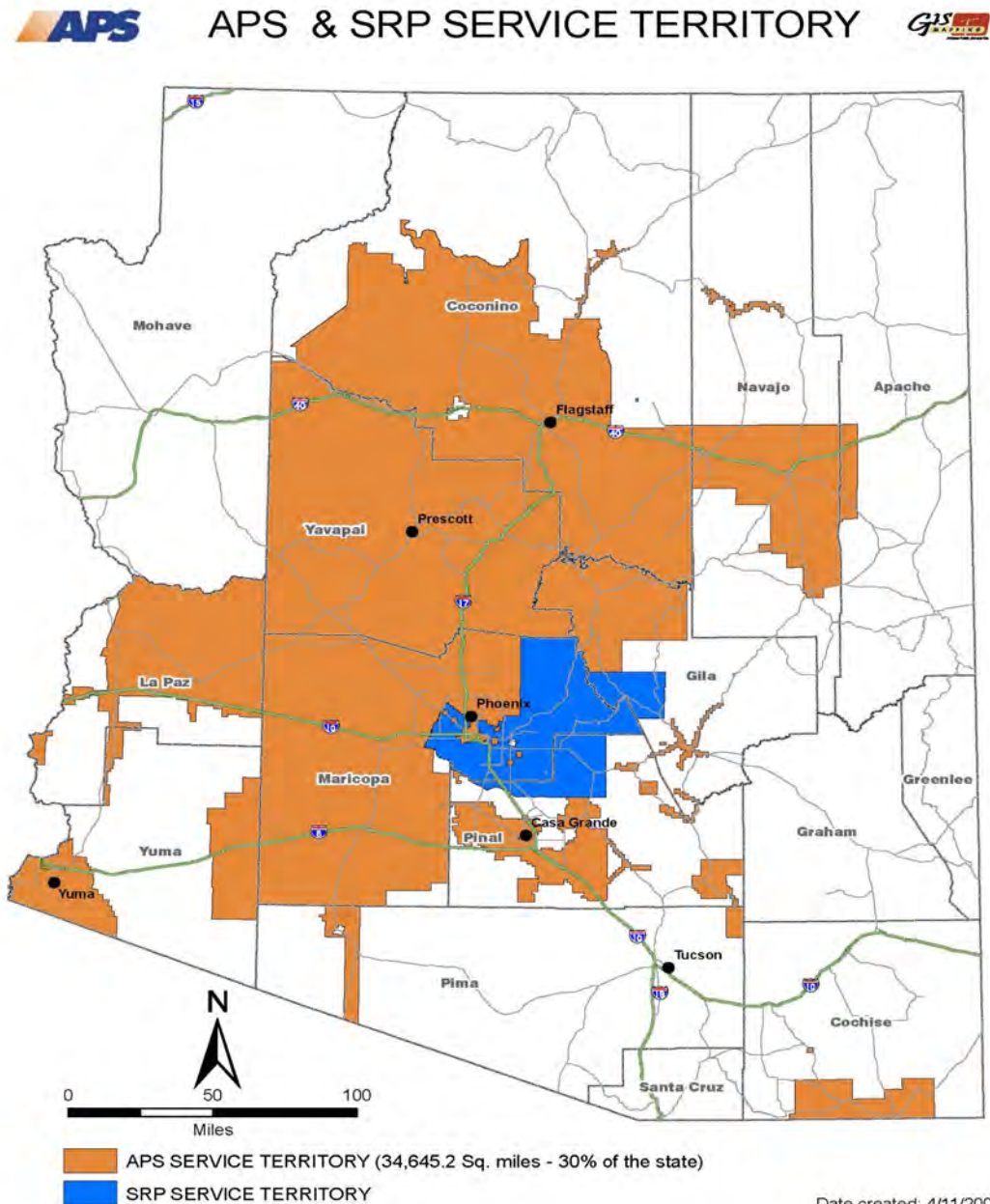
- **About APS**
- **Regional Transmission System Overview**
- **APS Transmission System Overview**
- **Industry Challenges**
- **APS Unique Challenges**

# About APS

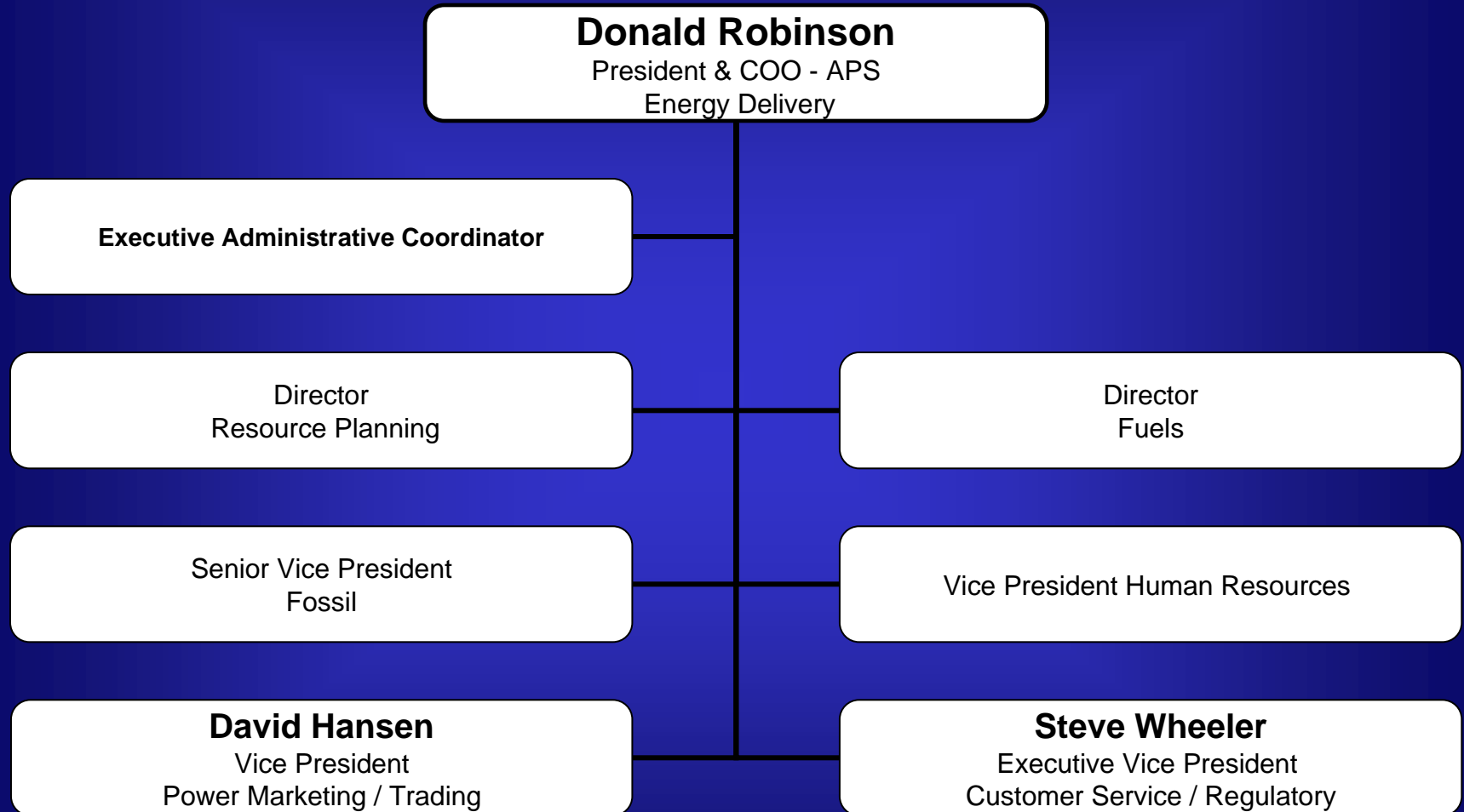
- **Service Territory and Statistics**
- **Organizational Charts**
- **Financial structure and health**
- **Cost structure and pricing**
- **Resource and fuel mix overview**
- **APS Customer Initiatives**

# APS Service Statistics

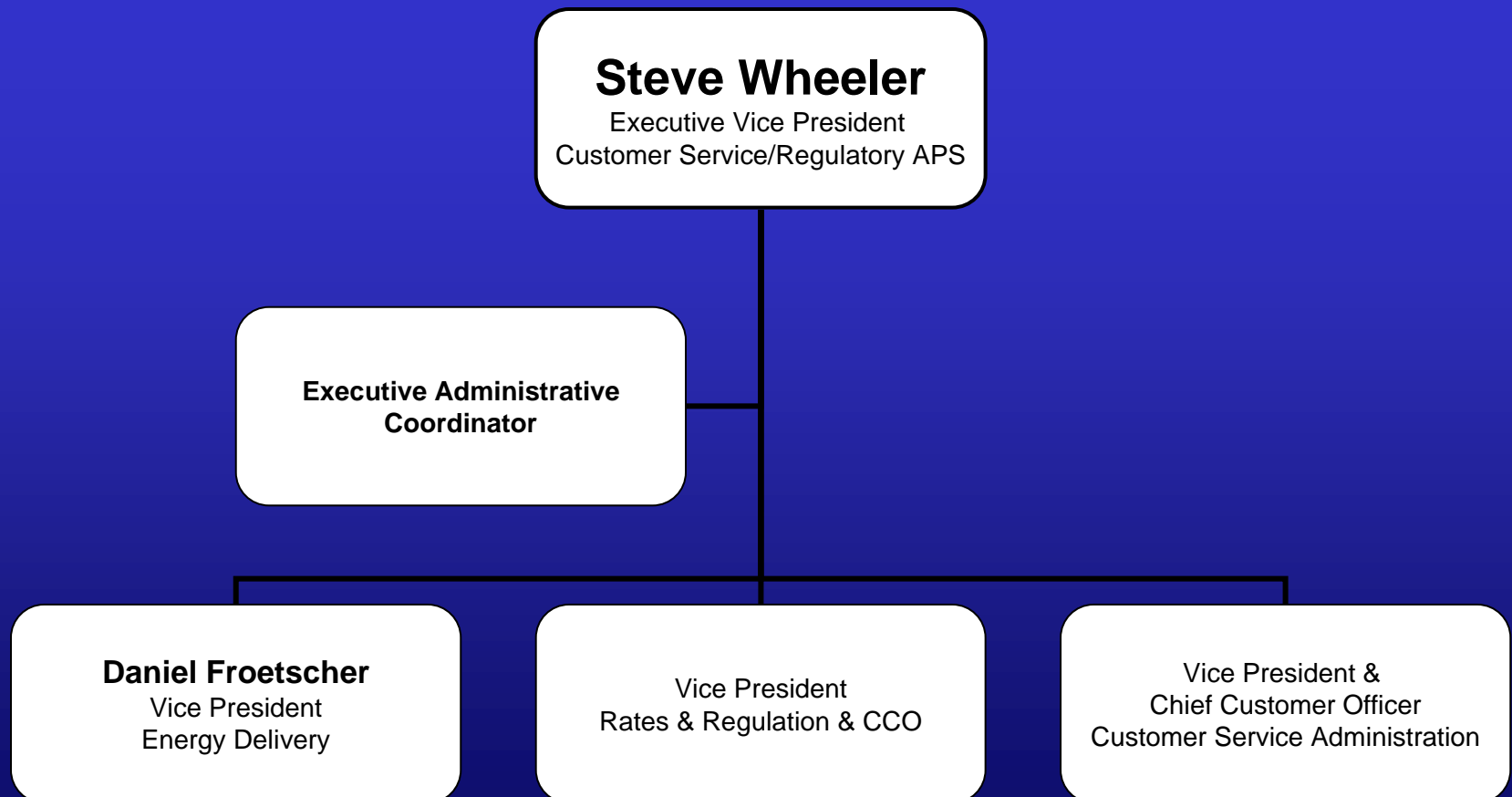
- 11 counties
- 34,645 sq. mi.  
CC&N area
- 1.1 million  
customers
- 411 substations
- 28,022 distribution  
line miles
- 5,234 transmission  
line miles
- 54 generation units



# APS OPERATIONS ADMINISTRATION



# TRANSMISSION OPERATIONSS, REGULATORY & PLANNING ADMINISTRATION



# APS ENERGY DELIVERY

**Daniel Froetscher**

Vice President  
Energy Delivery

**Paul Atwell**

Director  
Transmission & Distribution  
Operations

**Tom Glock**

Director  
Power Operations

Director  
Northern Arizona Delivery

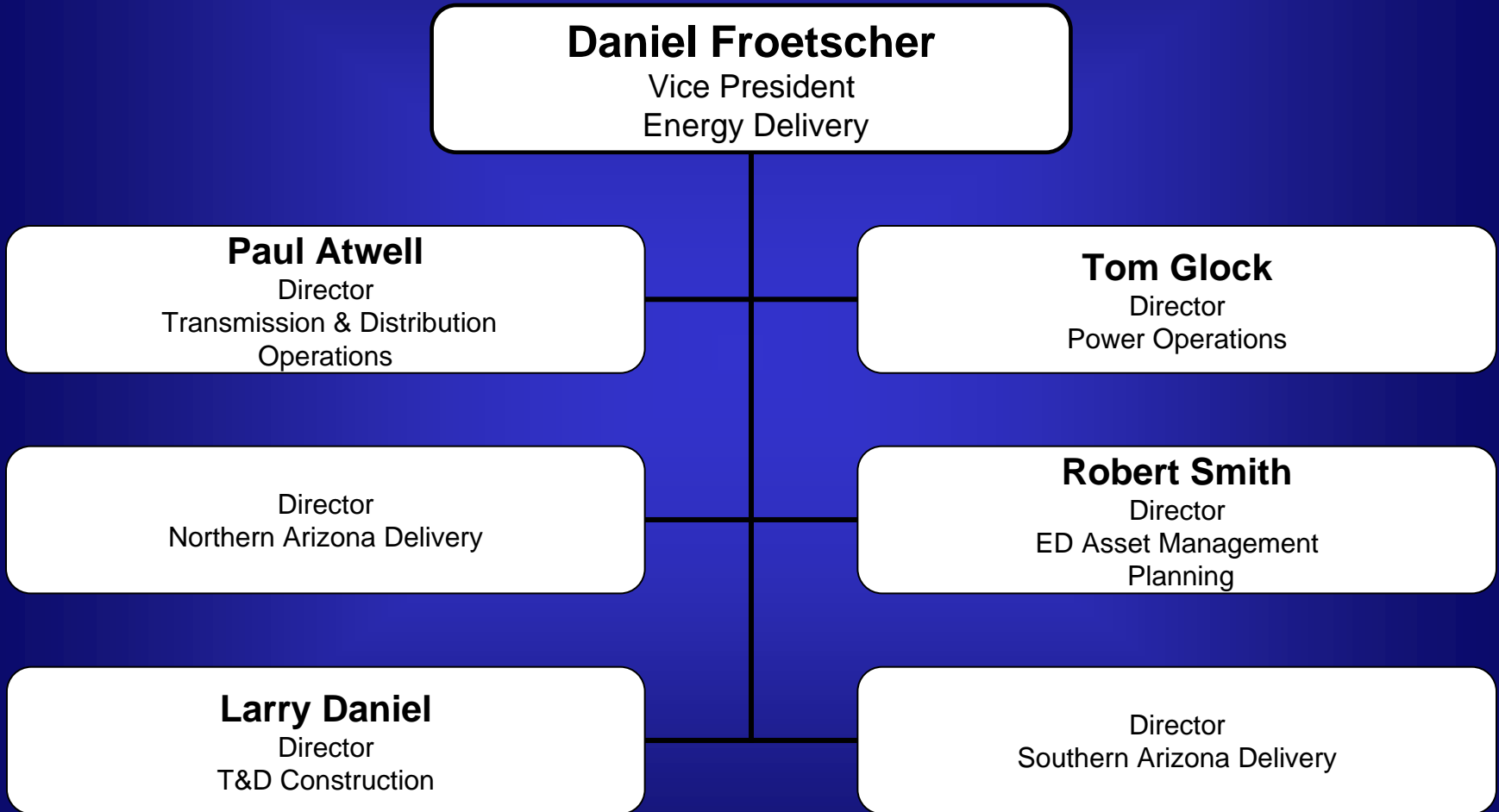
**Robert Smith**

Director  
ED Asset Management  
Planning

**Larry Daniel**

Director  
T&D Construction

Director  
Southern Arizona Delivery



# ED ASSET MANAGEMENT PLANNING

**Robert Smith**  
Director  
ED Asset Management  
Planning

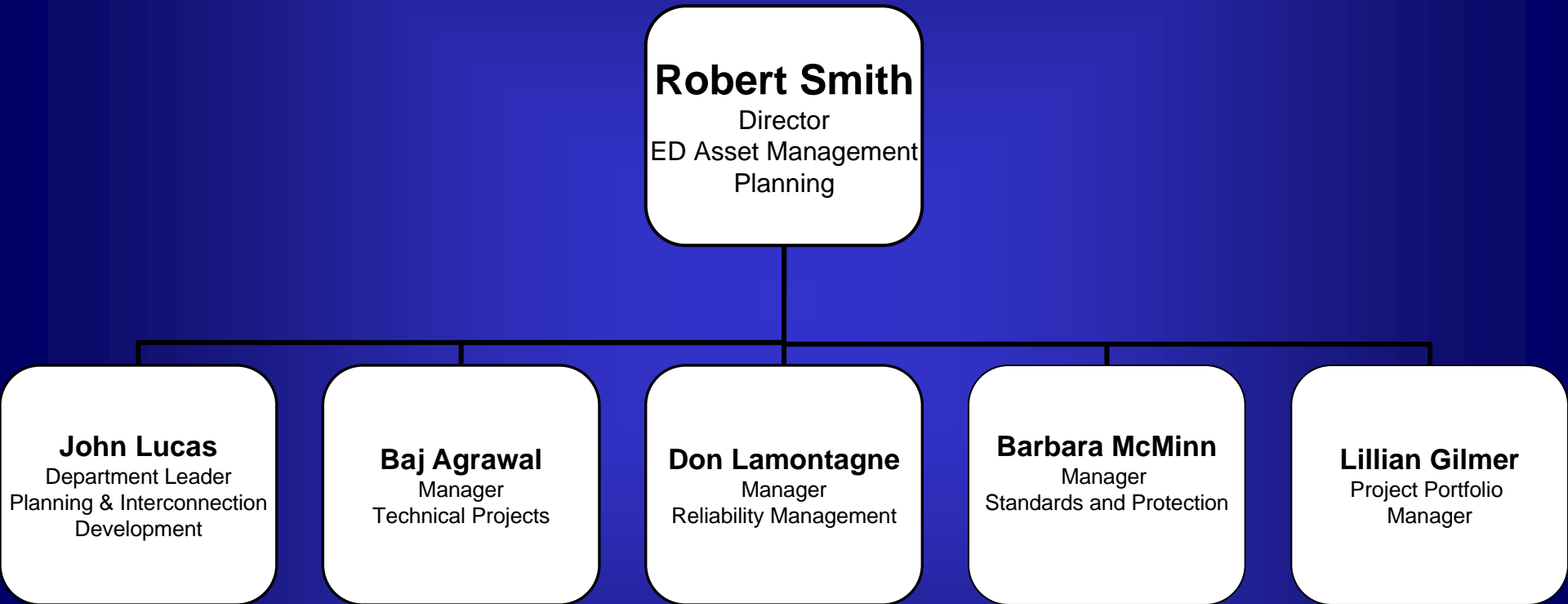
**John Lucas**  
Department Leader  
Planning & Interconnection  
Development

**Baj Agrawal**  
Manager  
Technical Projects

**Don Lamontagne**  
Manager  
Reliability Management

**Barbara McMinn**  
Manager  
Standards and Protection

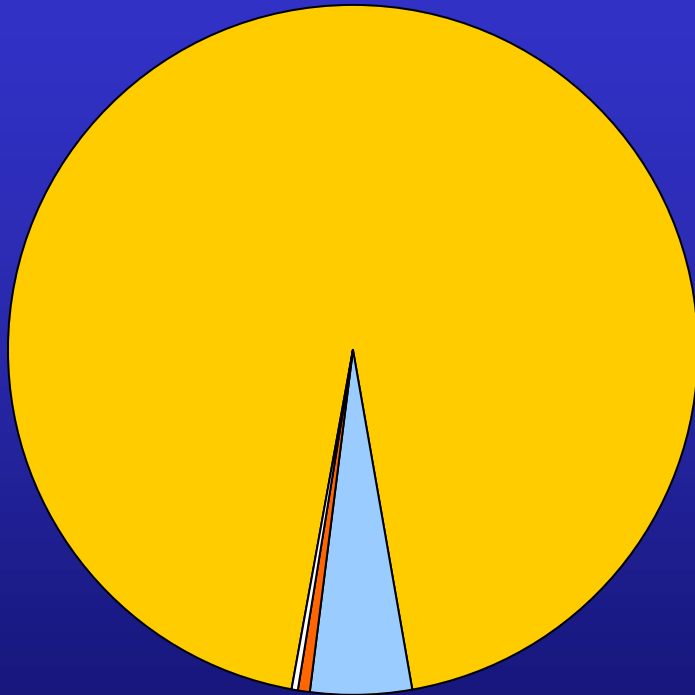
**Lillian Gilmer**  
Project Portfolio  
Manager





# Pinnacle West Financial Snapshot

***\$12 Billion Assets  
December 31, 2008***



■ APS ■ SunCor ■ APSES ■ El Dorado

- ✓ Approximately \$3 billion market cap
- ✓ 4<sup>th</sup> largest employer headquartered in Arizona
- ✓ S&P 500 Index member
- ✓ Approximately 75% of shareholders are institutional investors
- ✓ \$11 billion utility assets
- ✓ \$242 million net income
- ✓ \$2.10 per share annual dividend

# Stock Price Comparison

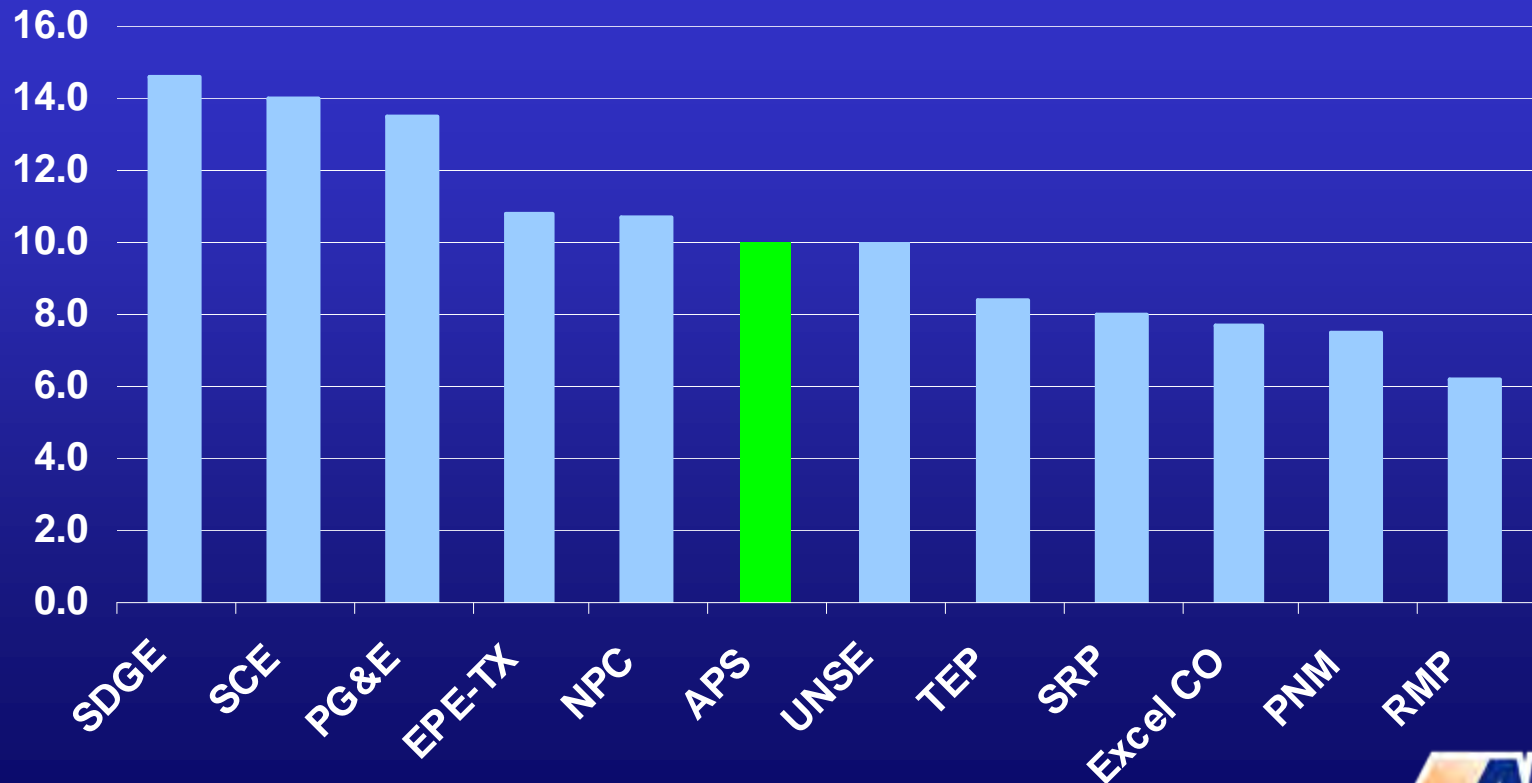
## December 31, 2007 – March 27, 2009



# APS Prices Compared to Other Utilities

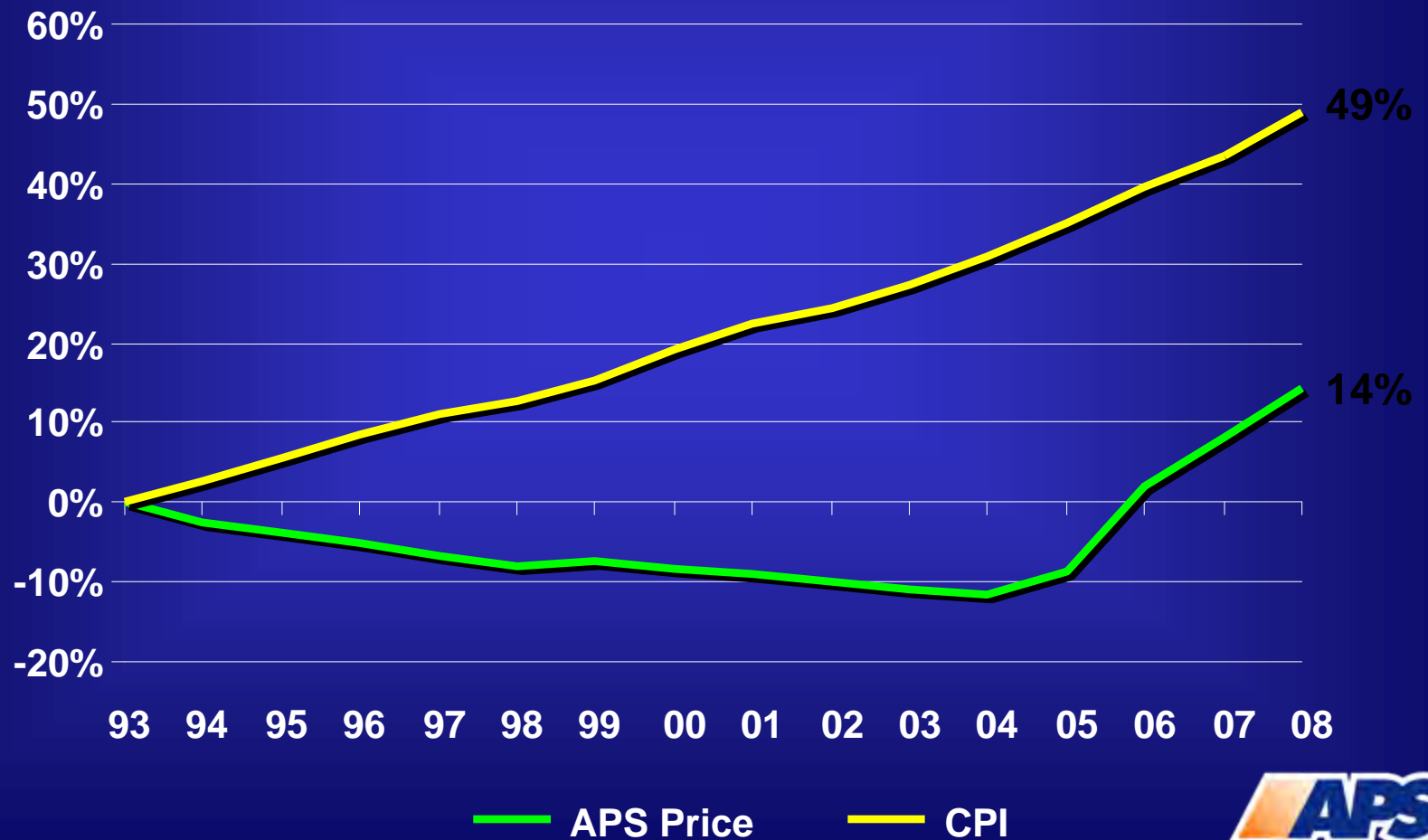
June 2008 Average Electric Prices (¢/kWh)

Selected Western Electric Utilities

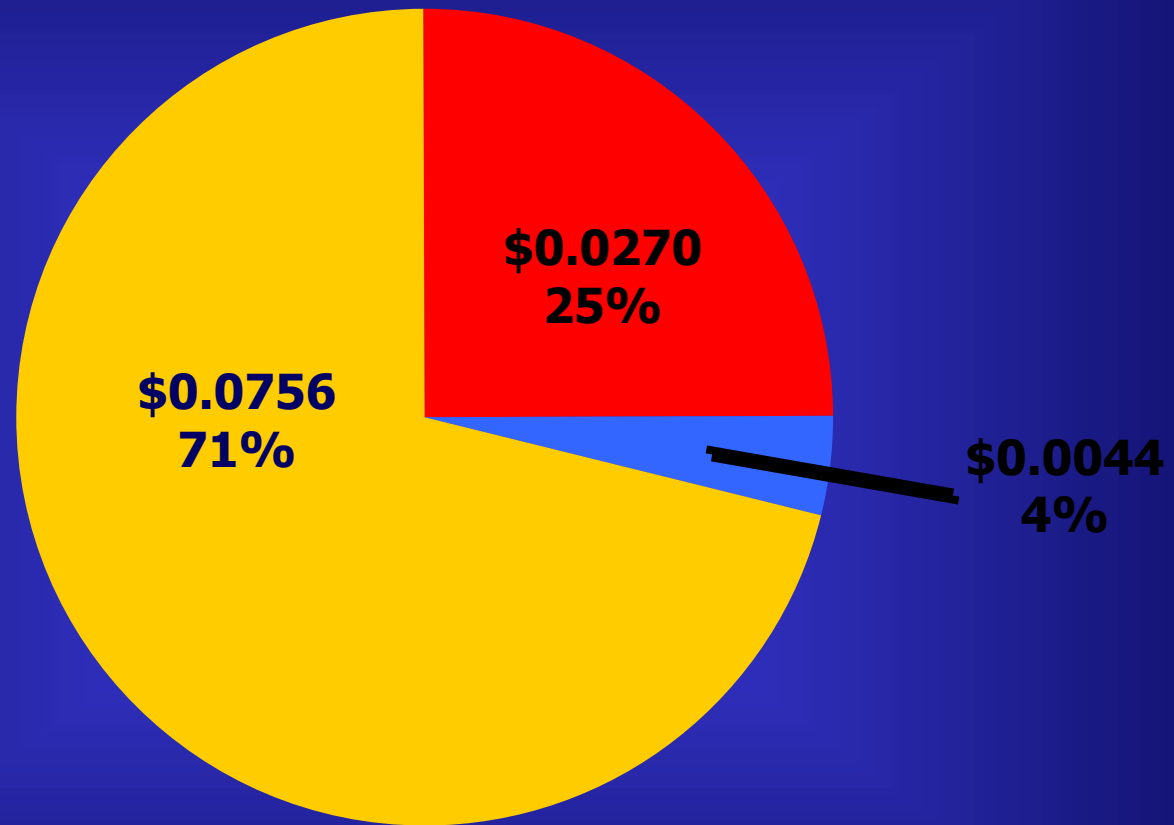


# Compared to All Other Prices

## APS Average Retail Price and CPI

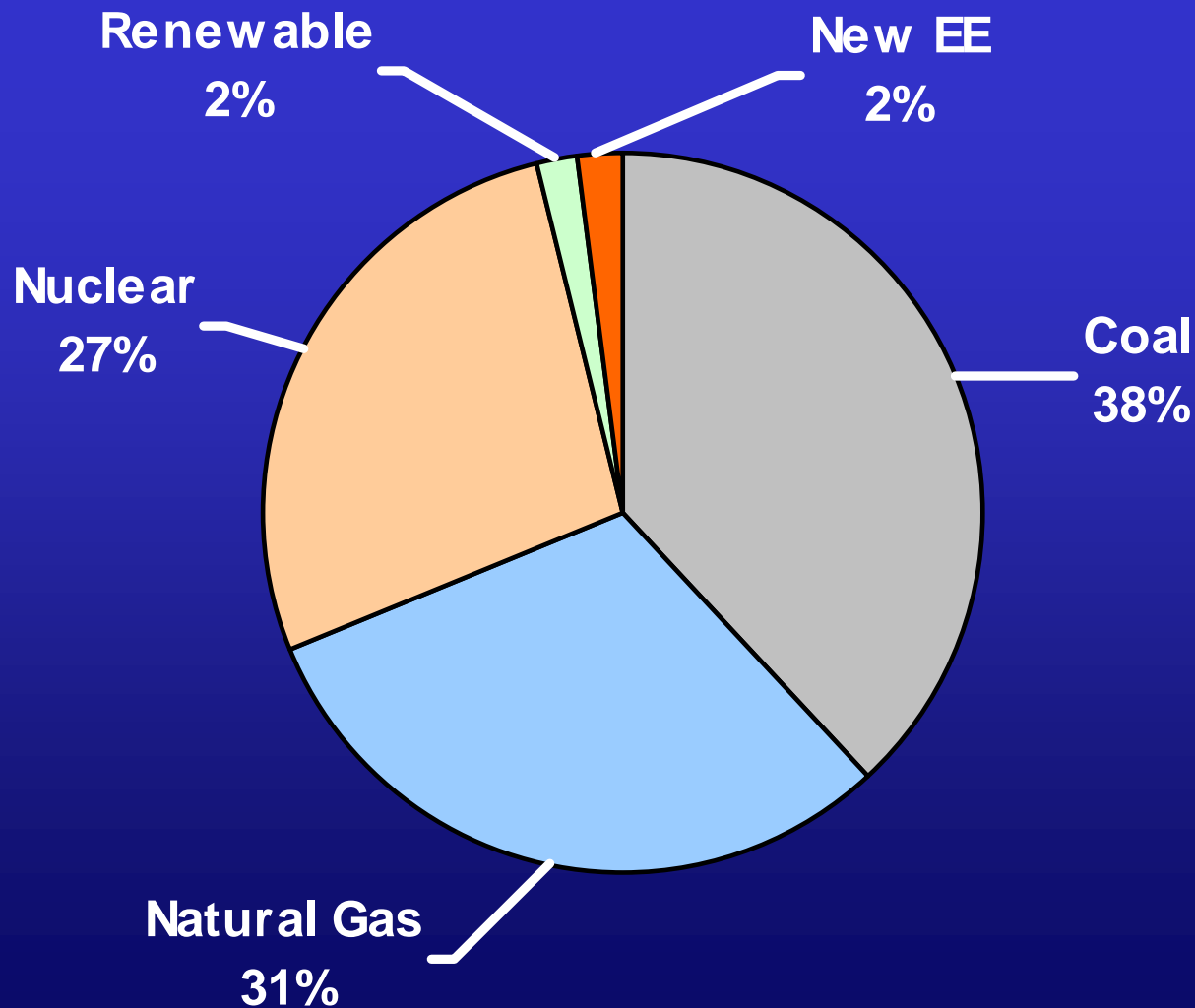


# APS Cost Components



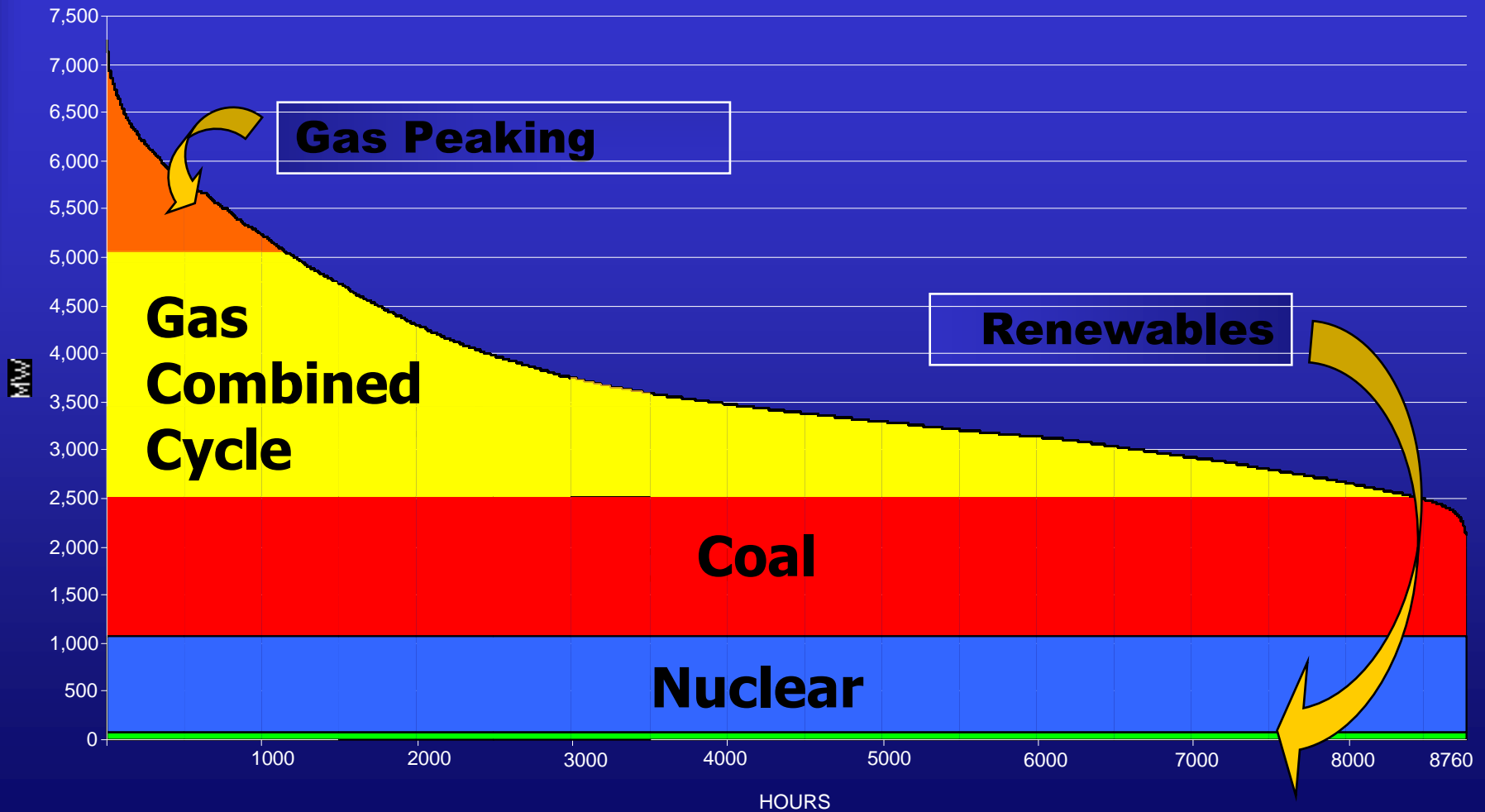
■ Distribution ■ Transmission ■ Generation

# 2009 Projected Energy Mix



# Load Duration Curve

The “guts” of utility supply



# **APS Customer Initiatives**

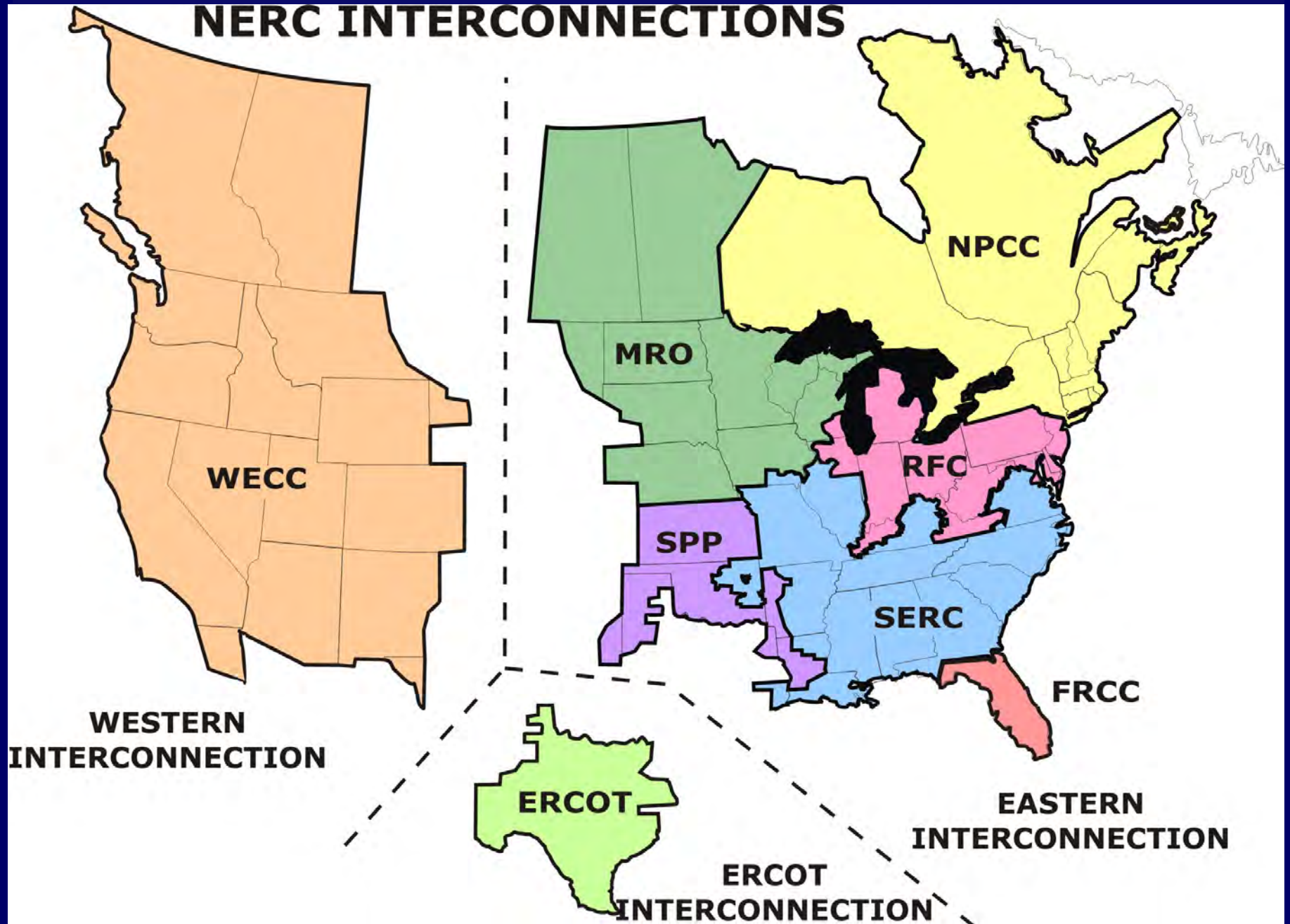
- **Renewable energy development**
- **Energy efficiency programs**
- **“Smart Grid” development**
- **Pricing options**
- **Customer “experience” enhancements**



# **Western Interconnection System**

- **US Electric Grid**
- **NERC and Regional Reliability Organizations**
- **Three US Interconnections**
- **WECC**
- **Major Western Interconnection Transmission**
- **Planning and Operational Issues**
- **DOE Congestion Study**

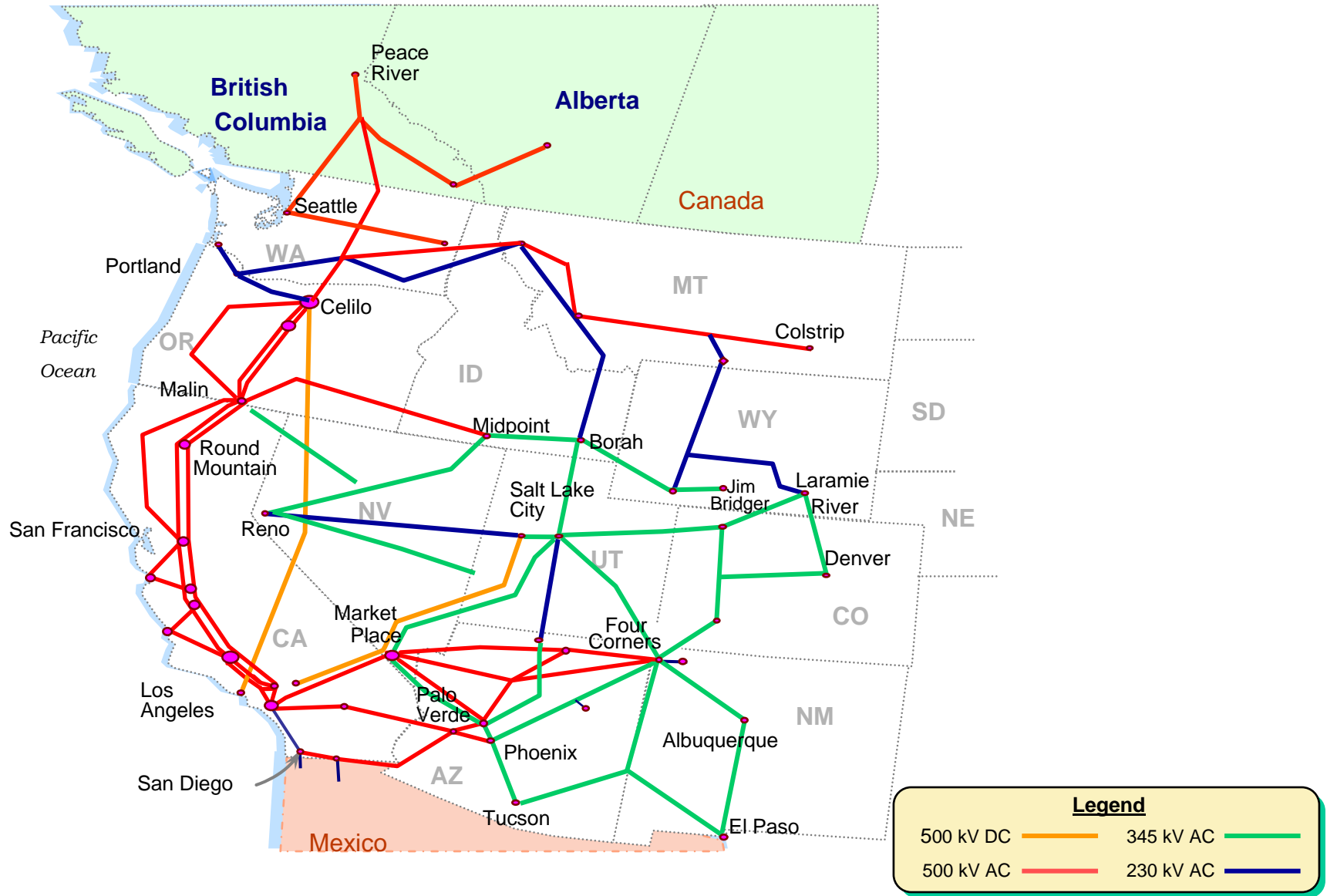
# NERC INTERCONNECTIONS



# **WECC**

- **Historical Reliability Coordination Organization for Western US, Canada, Mexico**
- **Ensure Reliable Operation and Planning Coordination**
- **Provide Reliability Coordination Centers**
- **Delegated Compliance Monitoring from NERC**
- **Issues:**
  - **Transmission Planning**
  - **Delegation model**
  - **Regional deference**
  - **Tensions between CAISO, BPA, rest of Interconnection**

# Western Transmission Grid



# Planning and Operating Issues

- **Planning**

- **Sub-Regional vs Regional (WECC)**
- **Who**
  - **Decides**
  - **Builds**
  - **Pays**

- **Operations**

- **Relay misoperations**
- **Right of way maintenance difficulties**

# **DOE Congestion Study**

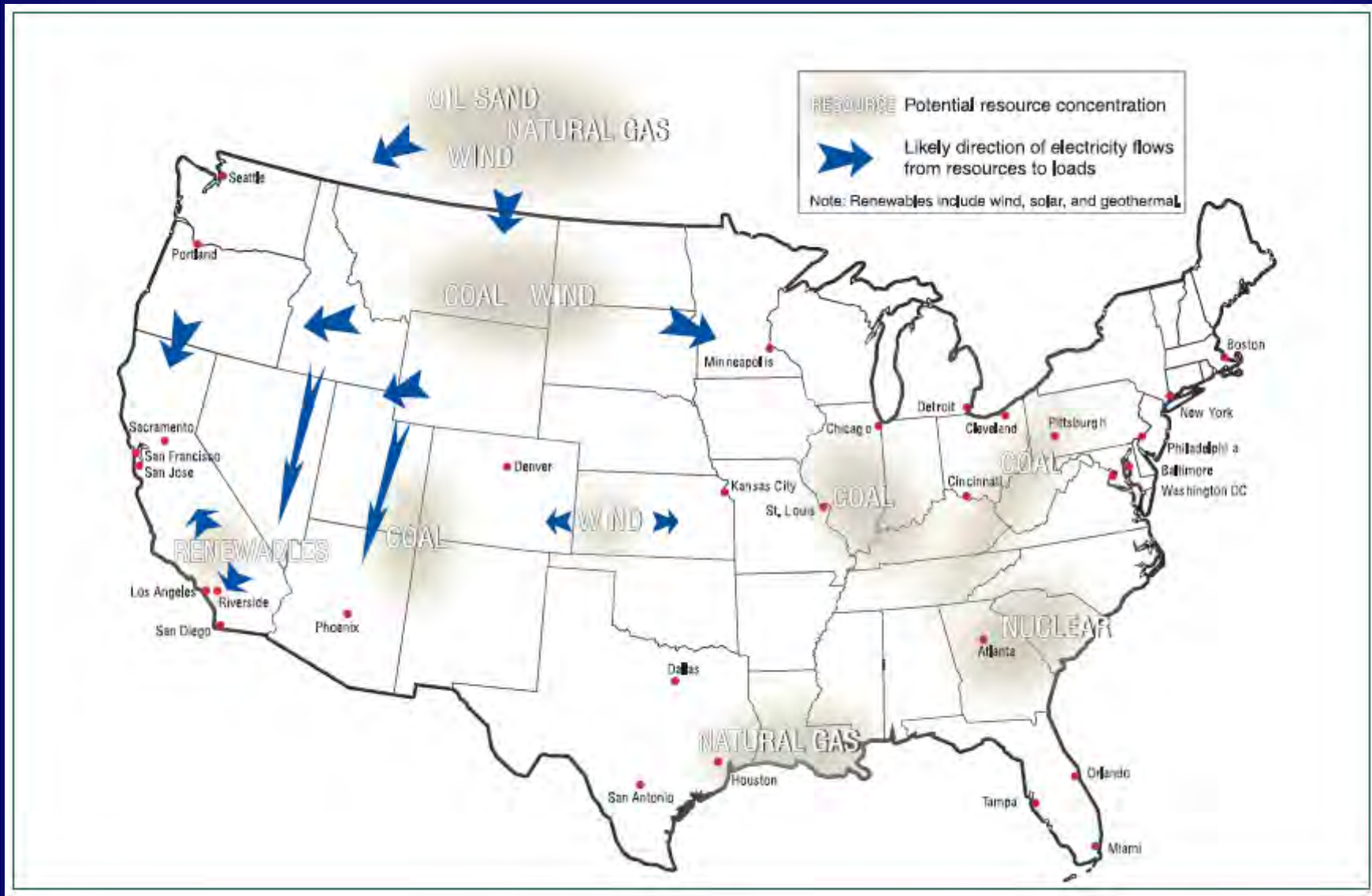
# Critical Congestion and Areas of Concern in the Western Interconnection



Source:  
Figures ES-3 & 5-2  
U.S. Department of Energy  
National Electric Transmission  
Congestion Study  
2006



# Conditional Constraint Areas

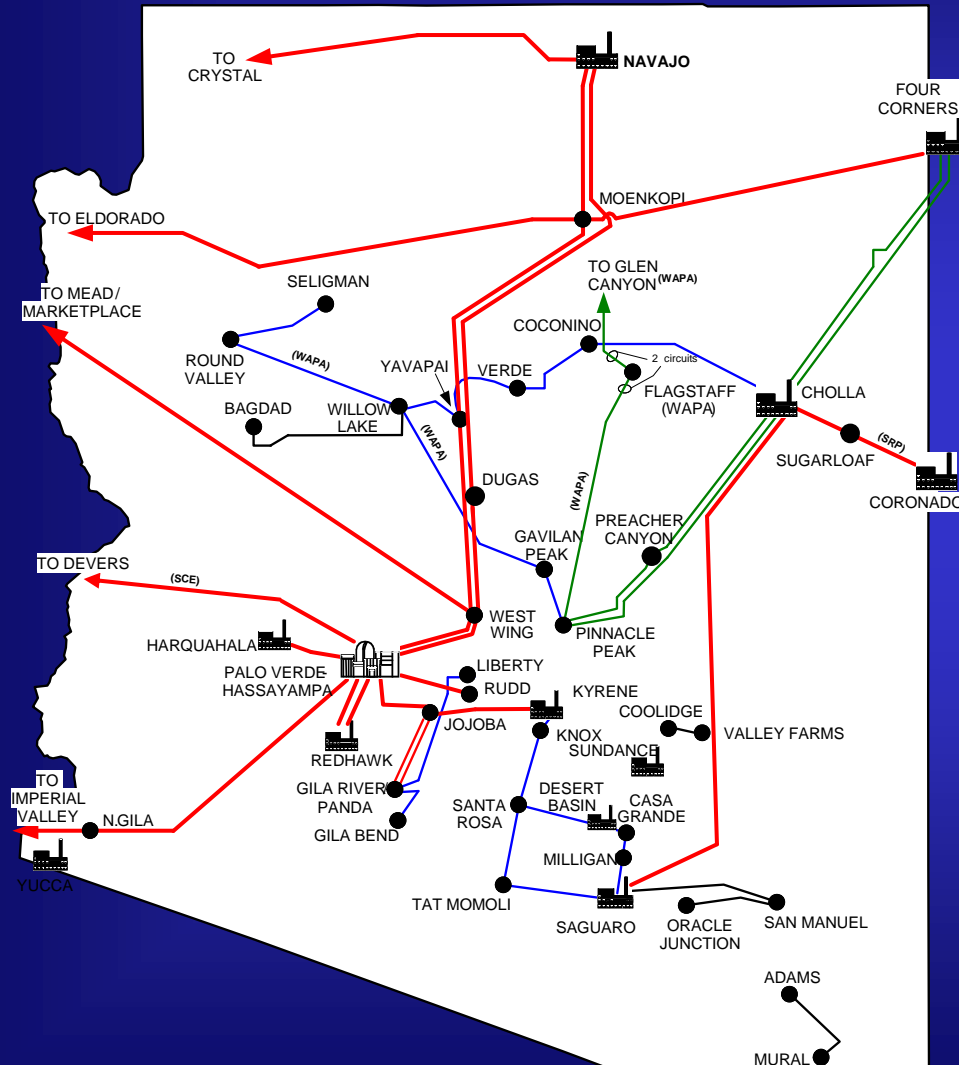


Source: Figures ES-4 & 5-5, U.S. Department of Energy, National Electric Transmission Congestion Study, 2006



# **APS Transmission System**

# State Area Transmission



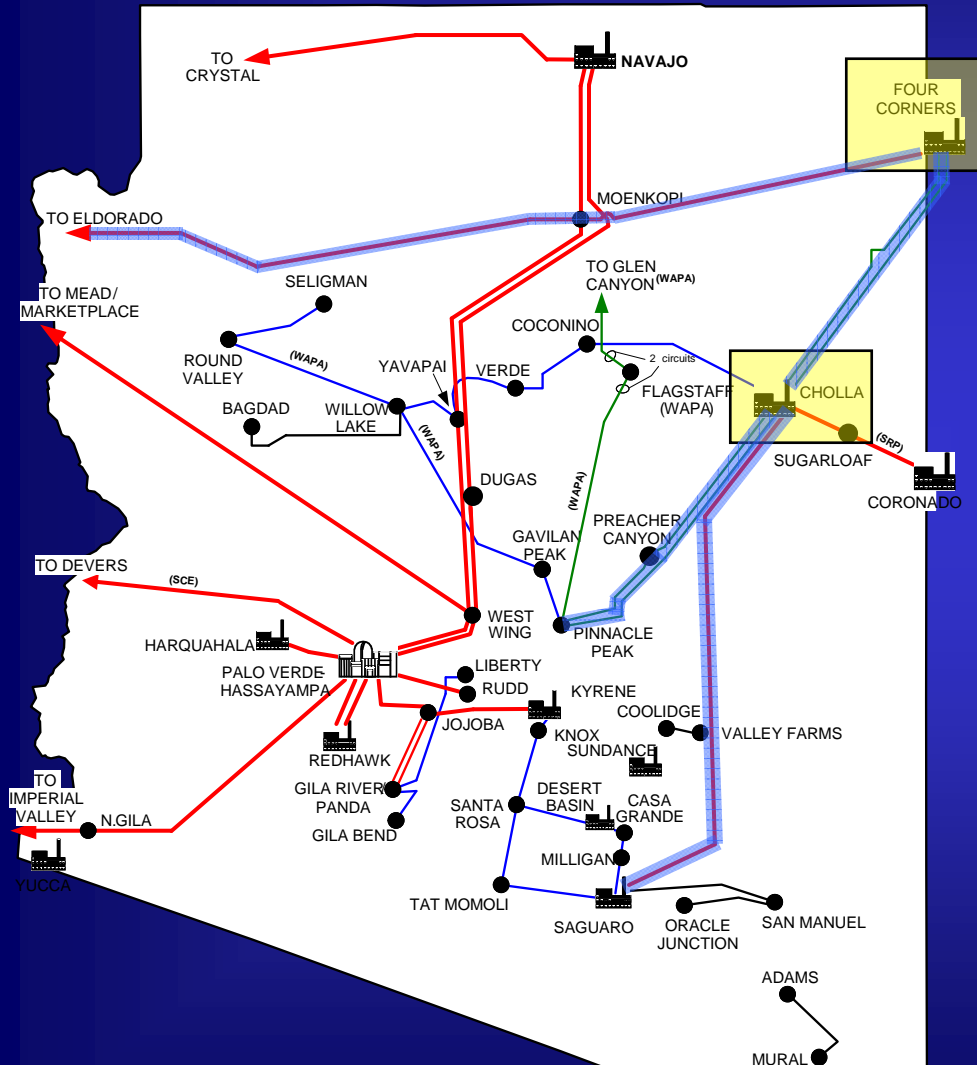
Red = 500 kV

Green = 345 kV

Blue = 230 kV

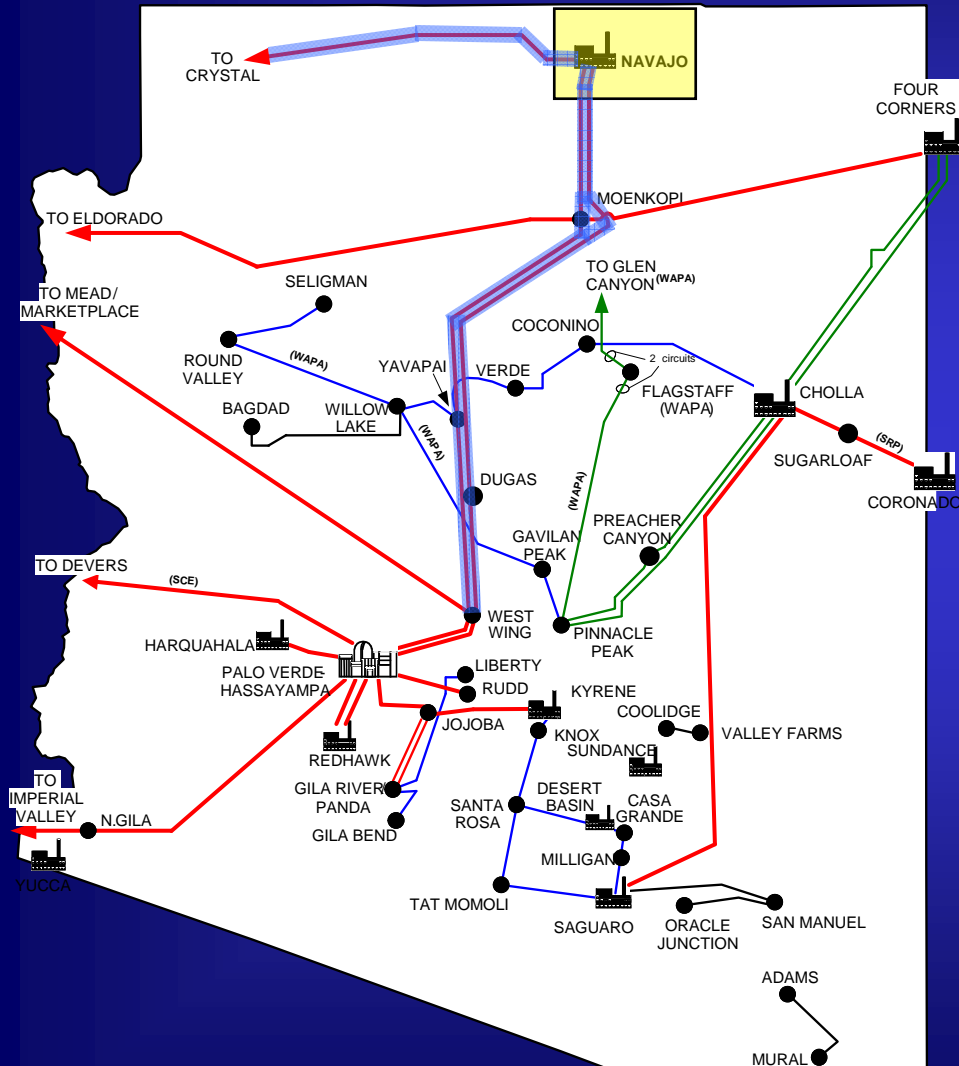
Black = 115 kV

# Four Corners/Cholla System Transmission



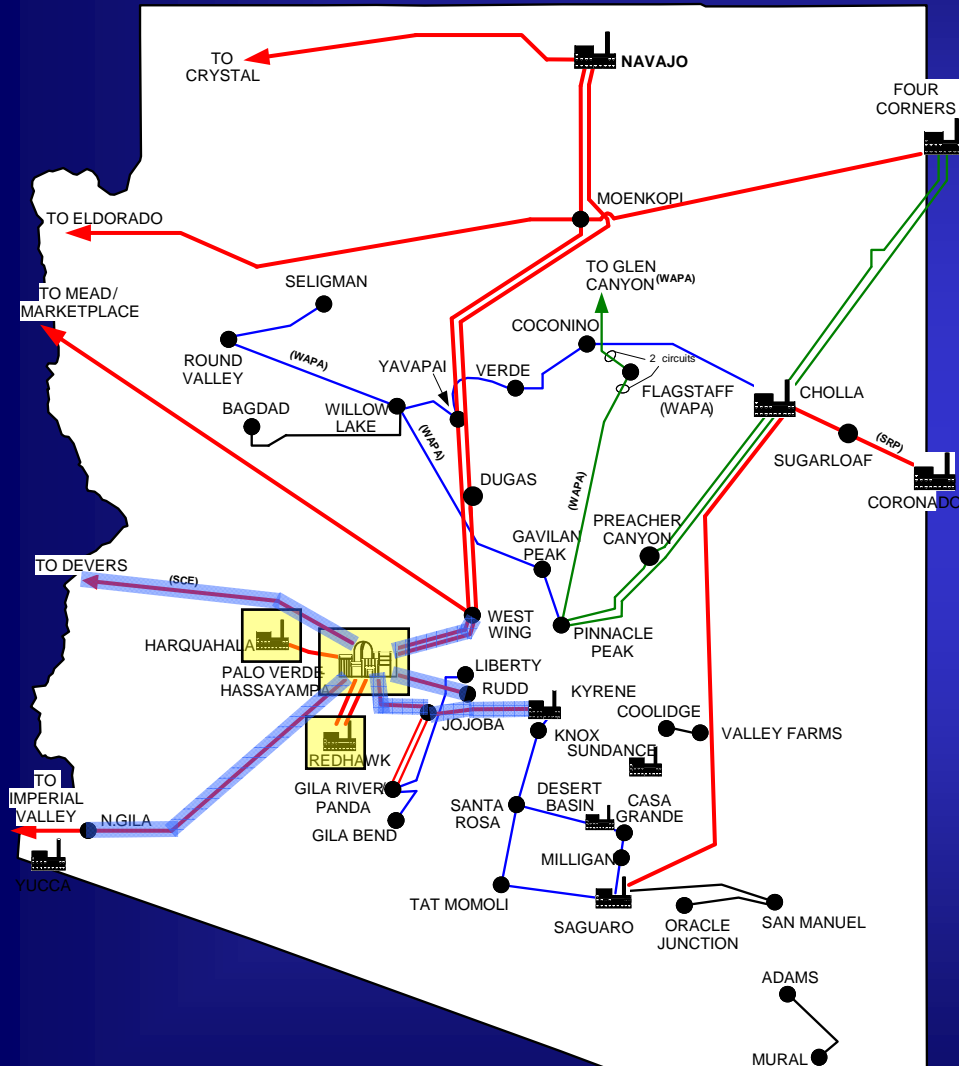
- Four Corners and Cholla Power Plants
- Four Corners-Moenkopi-Eldorado 500kV line
- Four Corners-Cholla 345kV lines
- Cholla-Pinnacle Peak 345kV lines
- Cholla-Saguaro 500kV line

# Navajo System Transmission



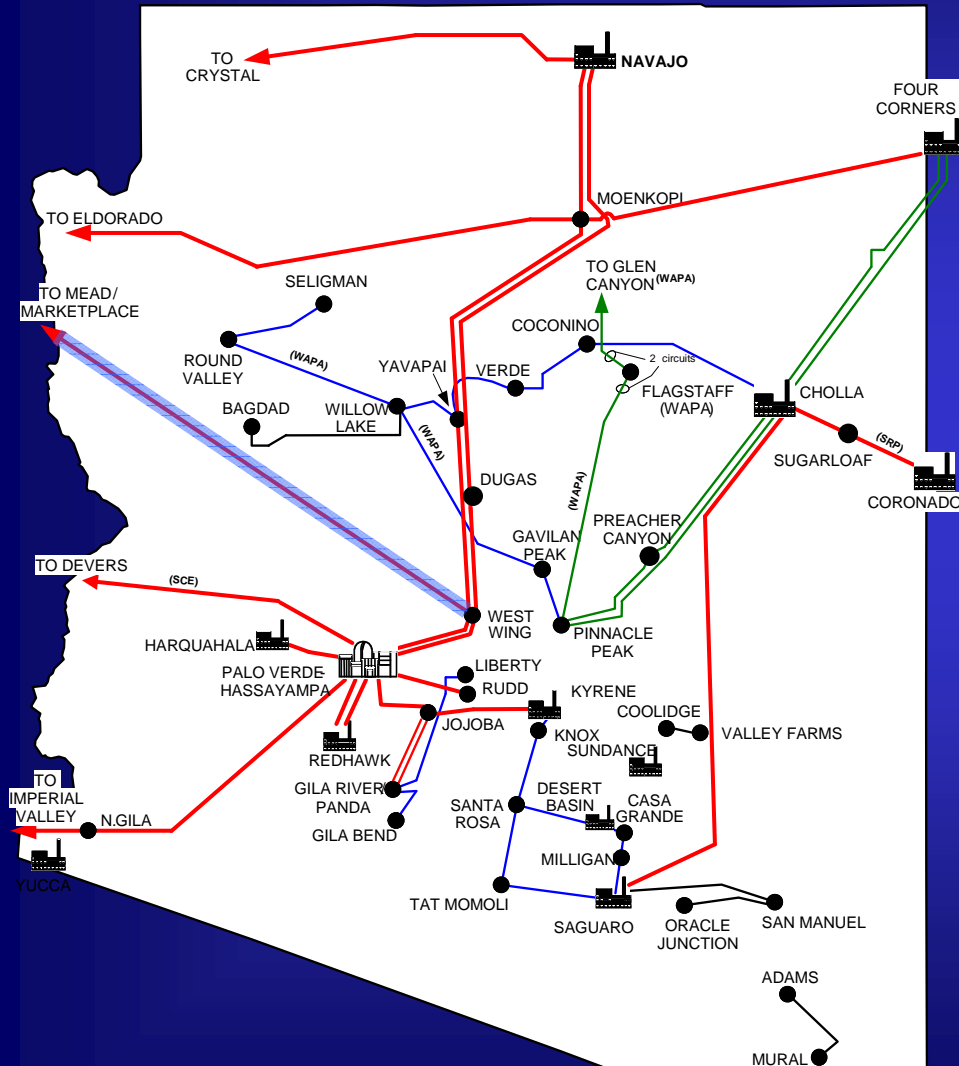
- Navajo Power Plant
- Navajo-Crystal 500kV line
- Navajo-Westwing 500kV lines

# Palo Verde Hub Transmission



- Palo Verde Nuclear Plant and Hassayampa Gas Power Plants
- Palo Verde West
  - PV-Devers 500kV line
  - Hassayampa-North Gila 500kV line
- Palo Verde East
  - PV-Westwing 500kV lines
  - PV-Rudd 500kV line
  - Hassayampa-Jojoba-Kyrene 500kV line

# Mead-Phoenix Transmission



- Mead-Phoenix 500kV line

# APS Coal Fired Plants

2008 Data



Four Corners 2,060 MW  
597 employees

**28% APS CAPACITY**

**47% MWH**

**33% FUEL \$**



Cholla 1,021 MW  
290 Employees



Navajo 2,250 MW  
545 Employees



# APS Gas Fired Plants

2008 Data

**53% APS CAPACITY**



Redhawk 984 MW  
48 Employees

**23% MWH**



West Phoenix 988 MW  
56 Employees

**61% FUEL \$**



Ocotillo 330 MW



Saguaro 399 MW  
Douglas 16 MW  
20 Employees



Yucca 340 MW  
25 Employees

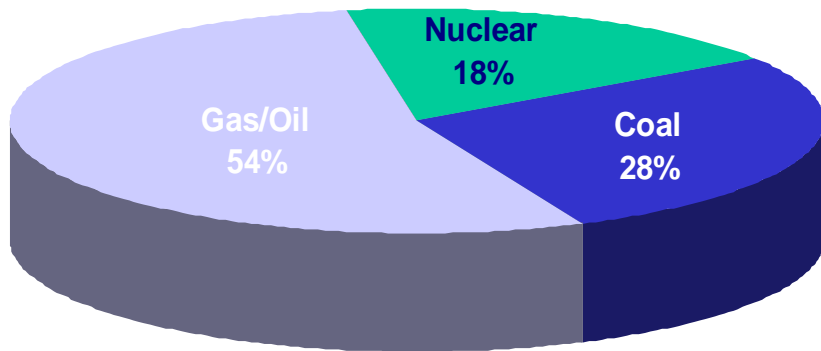


Sundance 420 MW  
11 Employees

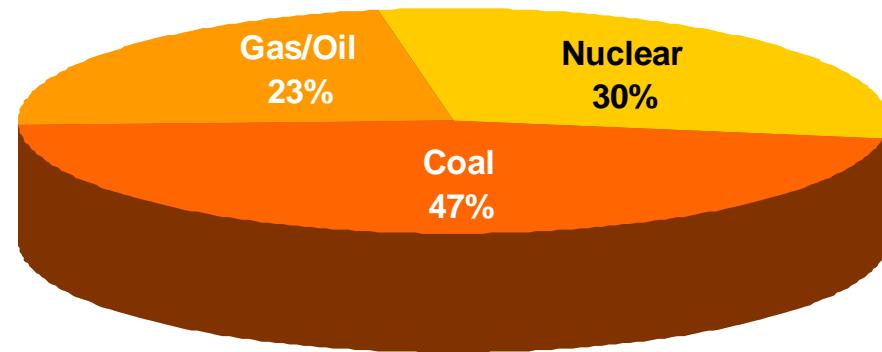


# Fossil Generation Plays a Key Role

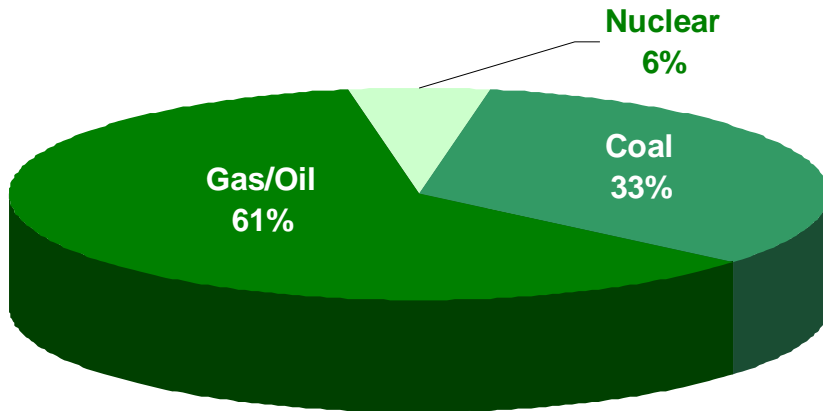
**APS OWNED CAPACITY**



**APS GENERATION**



**APS FUEL EXPENSE**



**2008 ACTUALS - APS OWNED GENERATION**

FUEL	CAPACITY	GWH	FUEL EXP
Nuclear	1,146	8,512	\$ 41,591
Coal	1,741	13,166	252,651
Gas/Oil	3,380	6,346	461,204
Renewable	6	10	0
Total	6,273	28,034	\$ 755,446

**7.2 Million Tons of Coal**

**47.6 BCF Natural Gas**

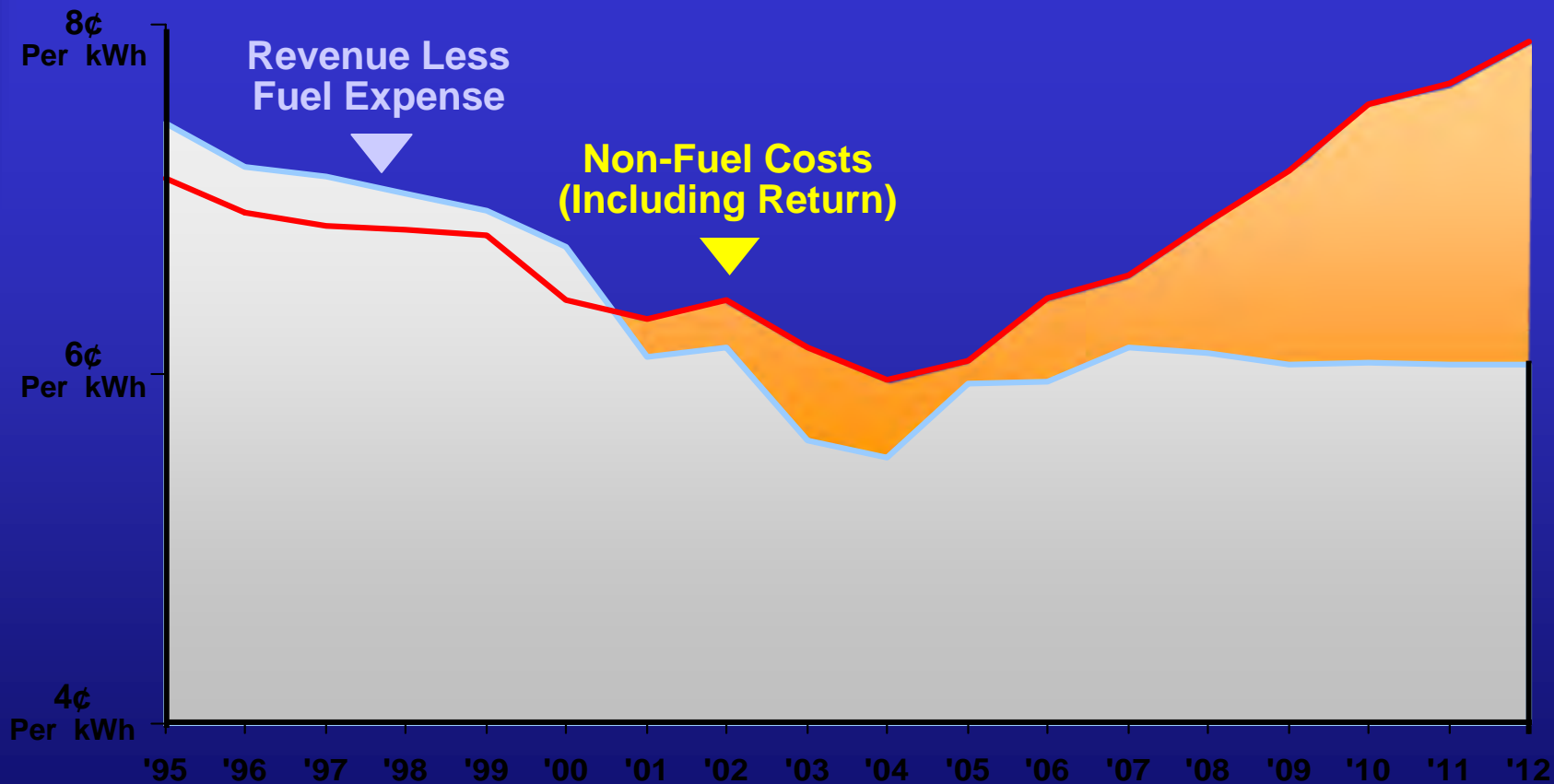
# **Major Challenges Confronting APS and the Utility Industry**

- **Infrastructure investment**
- **Capital Access**
- **Financial Health**
- **Technology**
- **Economic Turmoil**
- **Aging Workforce**
- **Regulatory Uncertainty**
- **Climate Change**
- **Upward pressure on pricing**

# **APS – Unique Challenges**

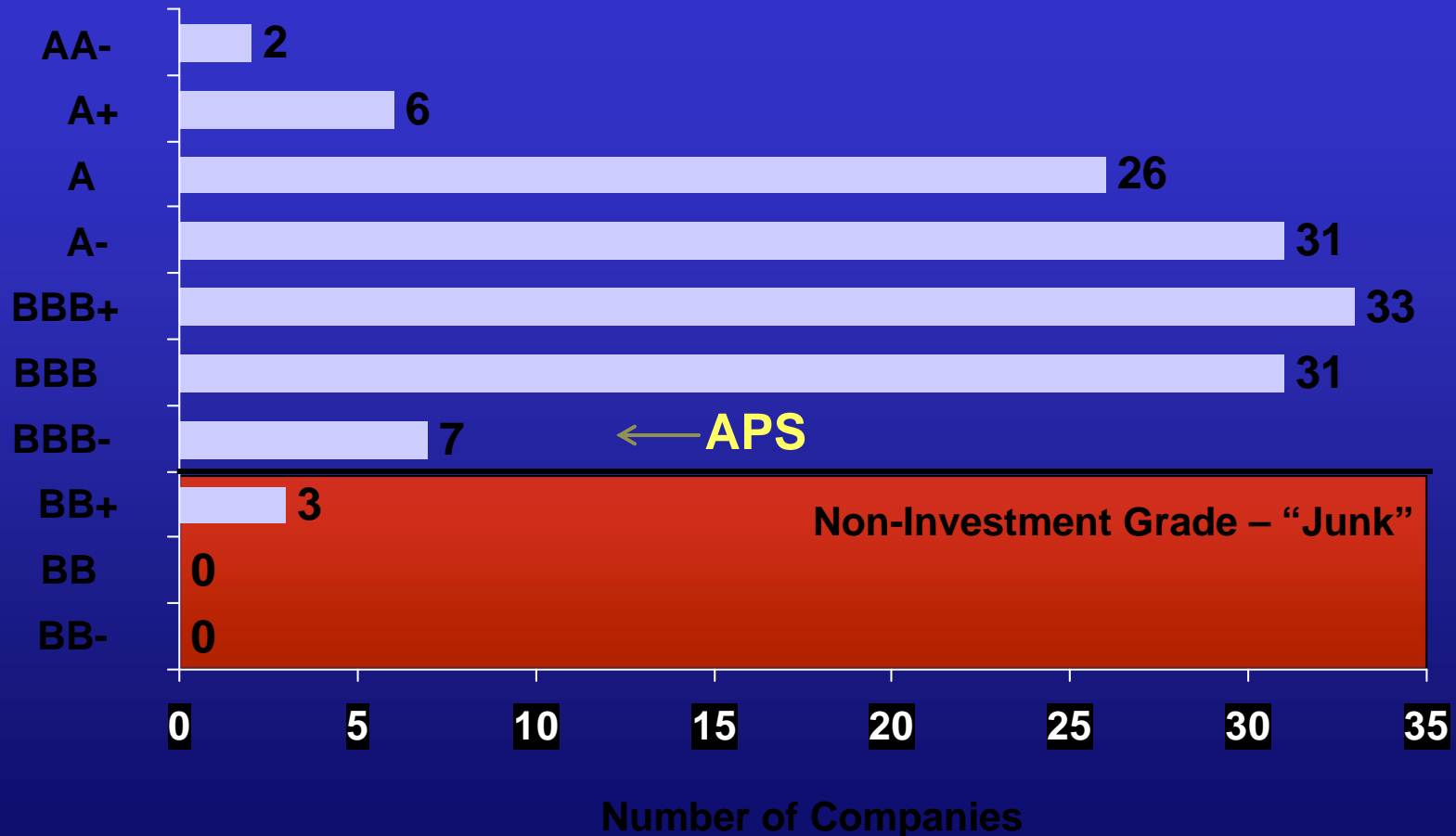
- **Cost Recovery**
- **Desert Climate**
  - **Heavy summer peak loading**
  - **Low load factor**
  - **Heavy inductive air conditioner load**
- **Expansive Service Territory**
- **Transmission Line Permitting**
- **Increased System Utilization**
- **Monsoon Storm Season**

# APS Rates Have Become Noncompensatory



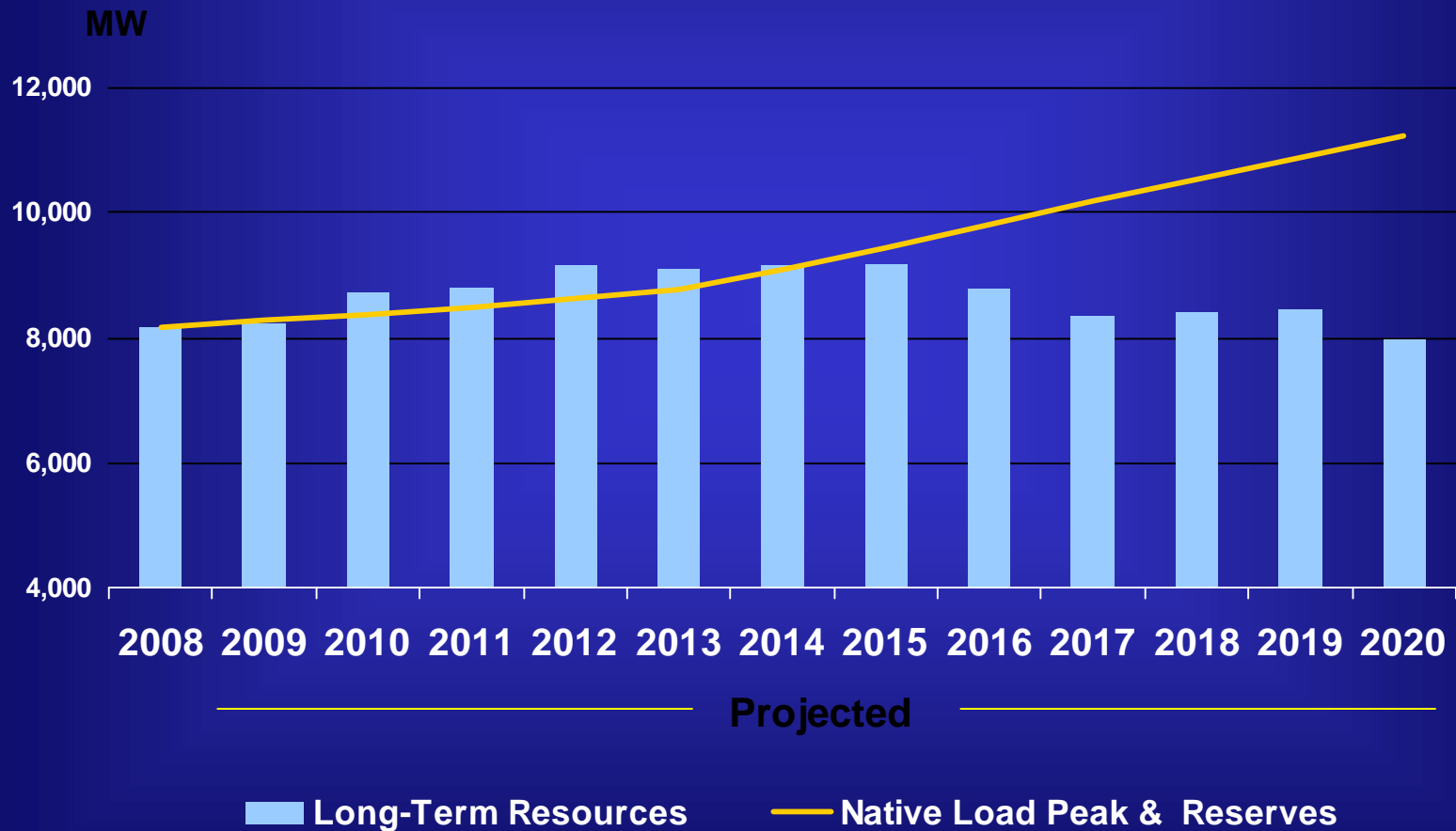
# Credit Ratings Distribution Investor-Owned Electric Utilities

Standard & Poor's  
Ratings



# Meeting Challenges of Peak Load Growth

*2008 - 2020 Average Annual Load Growth 2.7%*



# Transmission Line Permitting



[http://www.aps.com/general\\_info/Siting/siting\\_38.html](http://www.aps.com/general_info/Siting/siting_38.html)

# Maintenance

- Predictive Maintenance
- Preventative Maintenance
- Line inspections
- Right of Way Maintenance
  - LIDAR
- Remote Equipment Monitoring







# EEI Award



# Emergency Equipment

- Mobile 69/12kV Transformers
- Emergency Towers - two Lindsey towers
- Generator – 1,500 KW Mobile Unit
- Mobile Command Center



# Mobile Transformer



# Lindsey Towers





# Mobile Generator



# Mobile Command Center



# **Storm Response**





# Questions.....

