NCSL Energy Supply Task Force

Utility Resource Planning Fundamentals

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Tri-State Generation and Transmission Association, Inc.
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Tri-State is a not-for-profit, wholesale power supplier owned by 44 electric cooperatives and public power districts serving a population of approximately 1.5 million people.
Tri-State At a Glance

- Annual operating revenue: $1.2 billion
- Assets: $4.2 billion
- Average wholesale rate: 6.5 cents/kilowatt-hour
- Member peak demand: 2,654 megawatts
- Member service territory: 250,000 square miles
- Employees: 1,475
**Tri-State resource planning**

- **Purpose:**
  
  To ensure that the lowest cost resources, DSM projects, and/or purchase power options are available on time to meet Tri-State member load requirements in a reliable, robust manner.
Utility Planning

Regulatory Context

- Local
  - Siting
- State
  - Siting appeal
  - CPCNs
  - PUC rules and regulations
  - Environmental: State health departments
- Federal
  - Resources: WAPA, RUS
  - Transmission: FERC
  - Reliability: WECC, NERC, FERC
  - Environmental: NEPA
Federal Regulatory Context

- Environmental
  - National Environmental Policy Act (NEPA)
    - Required when siting facilities on federal land or using federal funding
  - National Ambient Air Quality Standards (NAAQS)
  - Cross-State Air Pollution Rule

- Resources
  - Integrated Resource Plan (IRP)
    - Western Area Power Administration requirement
    - Rural Utilities Service funding requirement
Federal Regulatory Context (cont.)

- Transmission
  - Federal Power Act (FPA)
  - Federal Energy Regulatory Commission (FERC)
    - 201(f) Exempts cooperatives
    - 211 Open access
    - 211A Comparability
    - 212 Interconnection
    - 215 Reliability

- Reliability
  - Western Electricity Coordinating Council (WECC)
  - North American Electricity Reliability Corporation (NERC)
  - Federal Energy Regulatory Commission (FERC)

- Public Utility Regulatory Policies Act (PURPA)
Role of State Policies

- Reliability standards – service quality, determination of need
- Applicability – IOUs, municipalities, cooperatives
- Service territories
- Ratemaking standards – fair and equitable; just and reasonable; definitions of test years; financial oversight; approval of returns
- Resource plan filing requirements – frequency, modeling requirements, third party participation
- Efficiency standards – demand side management; demand response
Role of State Policies (cont.)

- Renewable portfolio standards – RECs, multipliers
- Consideration of new technologies
- Environmental considerations; Nox, Sox, carbon, particulates
- Treatment of externalities
- Customer usage privacy issues
- Retail choice, municipal aggregation
- Treatment of construction costs – construction work in progress
- Low income considerations
Tri-State’s Resource Planning Objectives

- Adequacy/reliability
  - Capacity and energy
  - Renewable portfolio standards
- Low cost
- Manage uncertainty/risks
  - Exposure to price volatility
  - Regulatory and environmental requirements
- Operable – will it work?
- On time, right location, robust
Basic Elements of Utility Resource Planning

- Assess current load/demand
- Forecast load growth
- Assess existing resources and delivery infrastructure
- Determine “resource gap” to be filled
- Identify resource constraints, policy obligations and mandates, modeling requirements and filing requirements
- Determine alternative resource options and costs
- Forecast future prices
- Develop alternative resource plans, related costs and risk assessments
- Decide on which alternative portfolio is preferable
Load Forecast Process

End-users by Class
Nine classes – 44 members

Data from member

Data from outside

Forecast development

Projections of number of customers

Projections of use per customer

Projections of energy – each class

Nine classes – 44 members
Load Forecast Process

Total loads for each member

Projections of energy
Each class

Historical monthly and hourly load patterns

Changes to monthly and hourly load patterns

Load shaping models

Projections of energy
Total Member

Projections of demand
Total Member
Hourly Patterns in December Demand

Hourly Average Demand (MW)

Total System
East Colo
West Colo
New Mexico
Wyoming
Nebraska
Monthly Patterns in Annual Energy

- **Total System**
- **East Colo**
- **West Colo**
- **New Mexico**
- **Wyoming**
- **Nebraska**
Utility Resource Planning Fundamentals

**Board Strategic Direction**

- **Timing Assessment**
- **Load Forecast**
- **Resource Assessment**
- **Market Assessment and Forecast**
- **Load / Resource Balance**
- **Economic Modeling**
- **Ventyx / PIRA with adjustments**
- **Member load forecast, EE / DSM, trends**
- **Existing fleet**
- **Future options: sites, transactions, DSM, technologies**
- **LREF, System Optimizer Risk Analytics**
- **Hourly dispatch (Ventyx PAR)**

**Action:**
- Short term
- Long term

**WAPA IRP**
**CPUC ERP**
**RUS LF, LREF Budget**
**What-If-Analysis**
Inputs to Hourly Chronological Production Cost Model

- Resource Characteristics
- Load Forecast
- Long Term Purchases and Sales
- Transmission Rights
- Reserve and Renewable Requirements
- Commodity Price Forecasts
- Planning and Risk / System Optimizer
Outputs to Hourly Chronological Production Cost Model

- Resource Characteristics
- Long Term Purchases and Sales
- Transmission Rights
- Reserve and Renewable Requirements
- Load Forecast
- Commodity Price Forecasts
- Generation Dispatch
- Generation Emissions
- Line Loading
- Commodity Usage

Planning and Risk / System Optimizer
## Resource Plan Scenario Summary

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<th>Scenario</th>
<th>BAU</th>
<th>BAU High Load</th>
<th>BAU Low Load</th>
<th>BDS</th>
<th>BDS - GEO CAP limited Wind</th>
<th>WRA Data</th>
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Renewable Portfolio Standard Compliance
January 27, 2012
(MW output vs. Hour of Day)
Finding Balance

- Reliability
- Resource mix – fuel diversity
- Cost of resources
- Impact on environment
- Rate stability
- Bill stability
- Sustainability
- Affordability
Questions?