TRI-STATE G&T
A Touchstone Energy® Cooperative

Wholesale Power Supply
Socorro Electric Cooperative, Inc.

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Outline

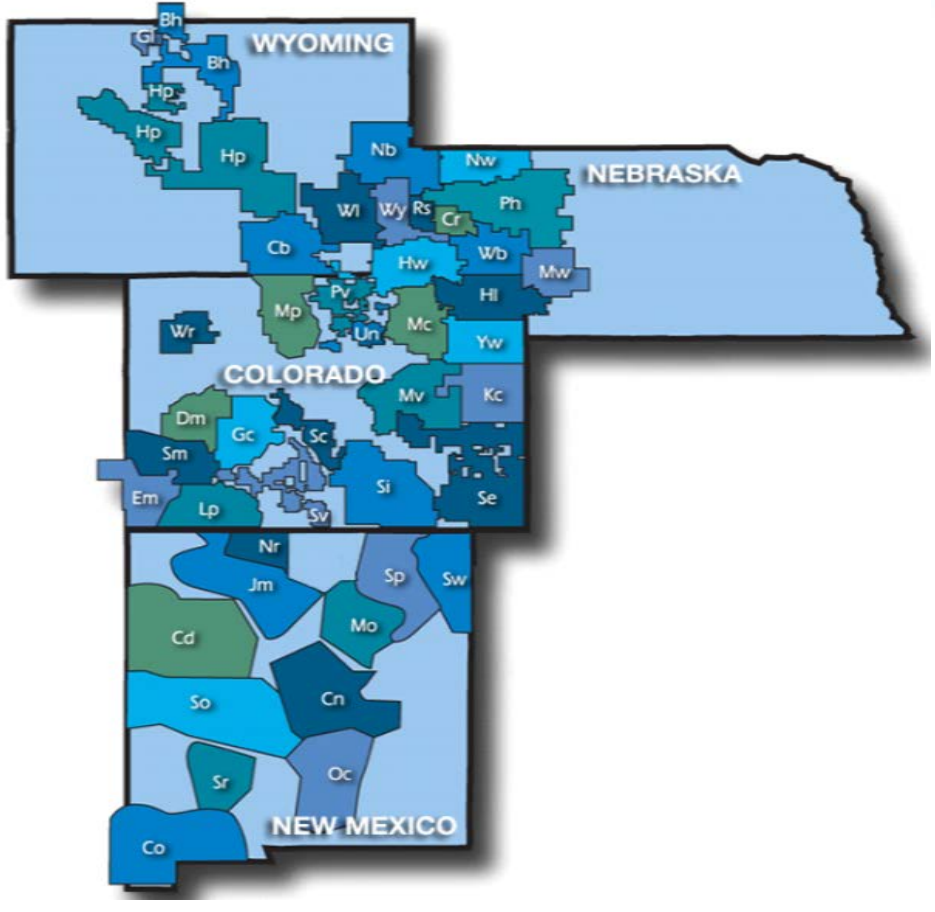
- Tri-State Background
- Tri-State Generation Mix
- Power Delivery
- Wholesale Electricity Markets

Tri-State Background

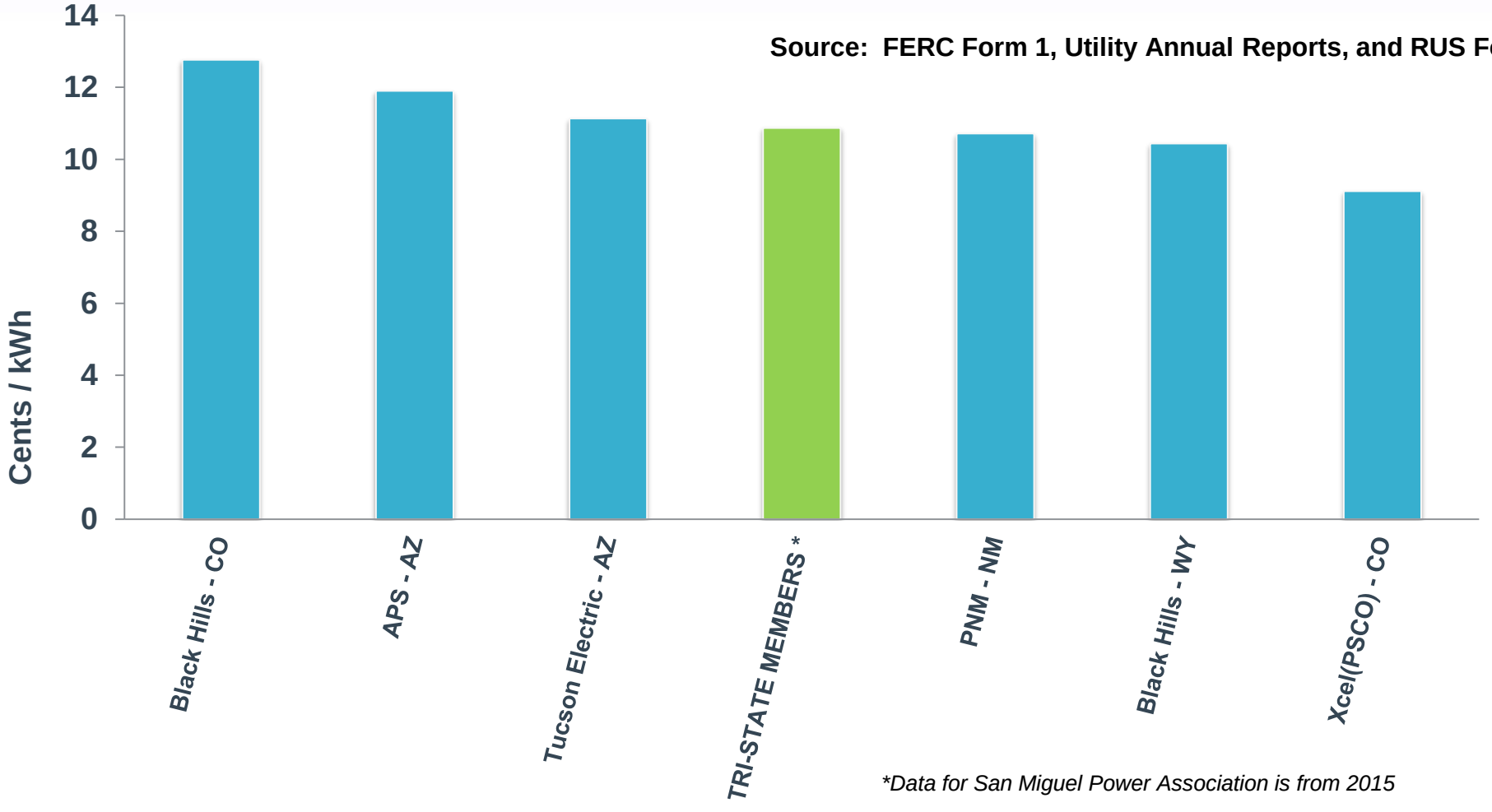
- Founded in 1952. 65th Anniversary Year
- Not-for-profit, cooperative wholesale power supplier owned by the 43 distribution cooperatives it serves
  - Diverse: Residential, Industrial, Irrigation, Tourism
- Serve >1.5 Million Customers (Rural & lower income)
- Generation & Purchased Power Portfolio
  - 4,000 MW including coal, gas, oil, wind, solar & hydro
- Transmission: > 5,500 Miles of 115, 230 & 345 kV
- Employees: 1,585

Tri-State 2016 Financial Data

- Revenue: $1.4 Billion
- Assets: $4.9 Billion
- Liabilities: $3.8 Billion
- Equity: $1.1 Billion

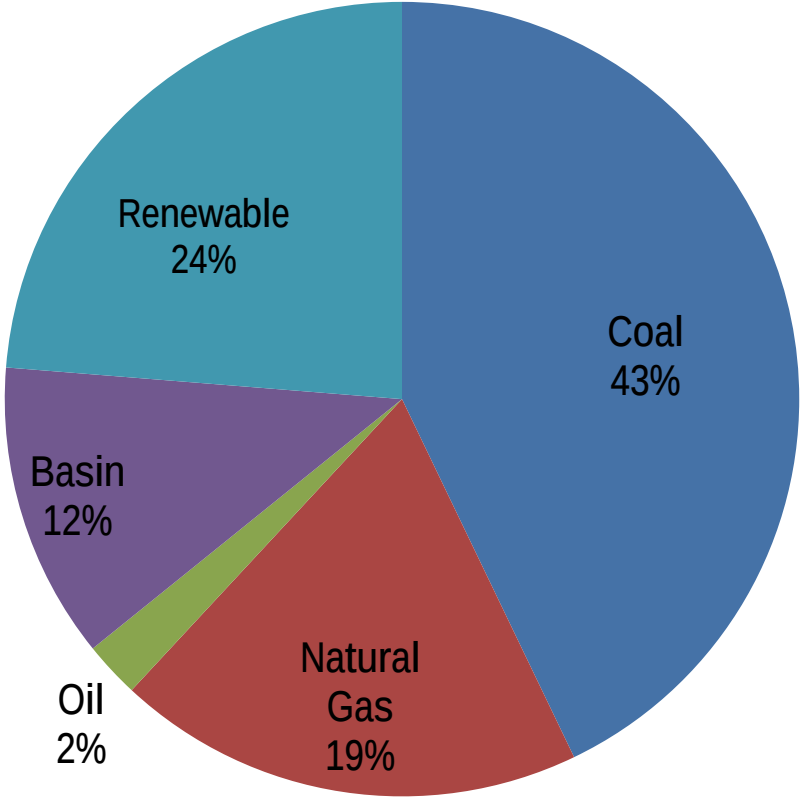


2016 Average Retail Rates



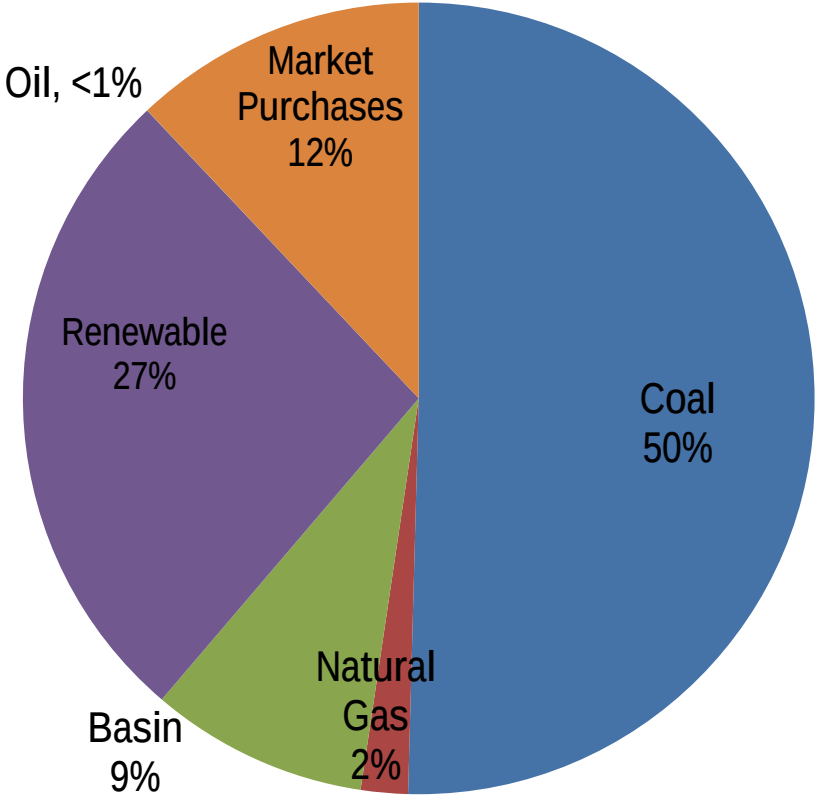
2016 Tri-State Resource Mix

2016 Capacity (%)

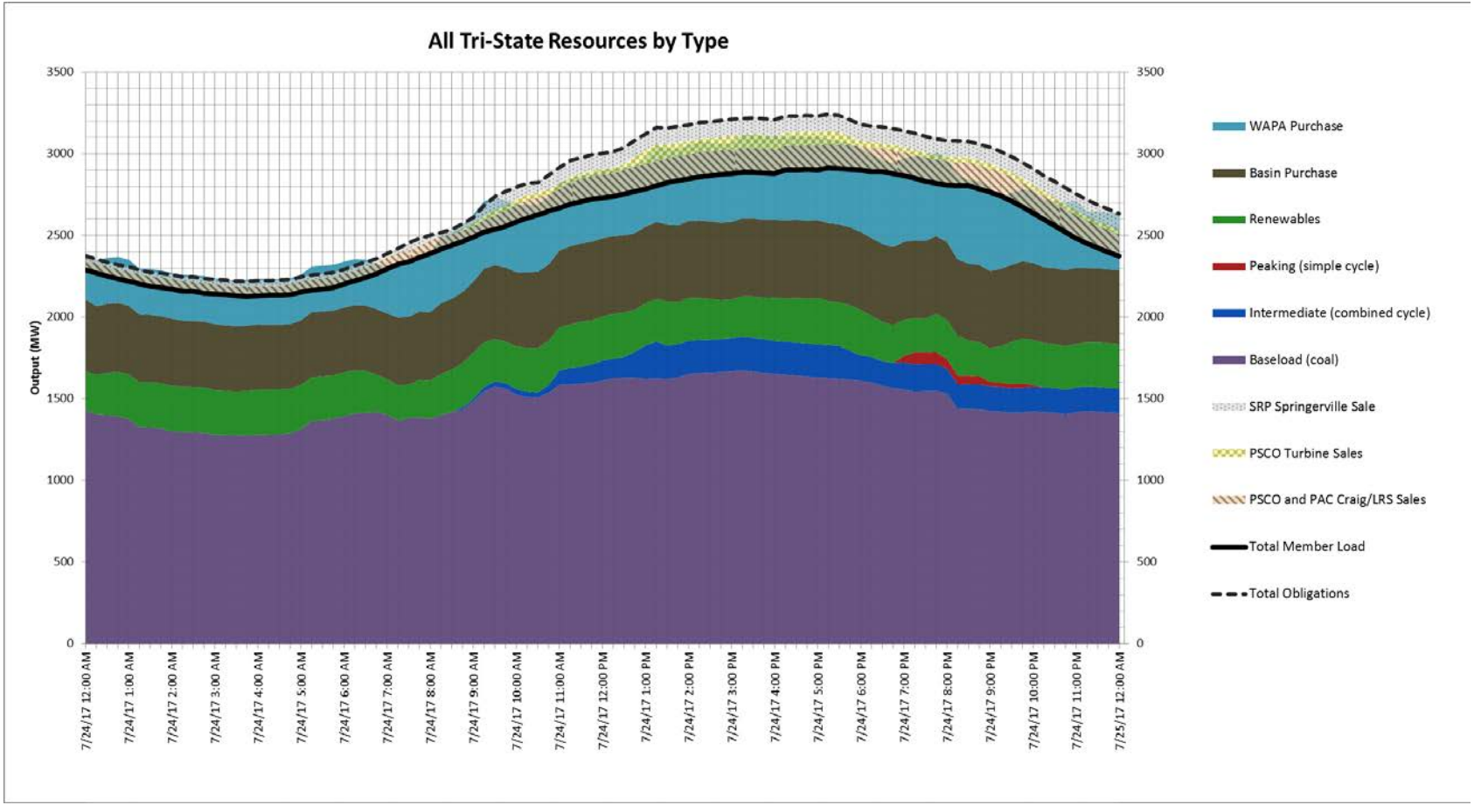


2016 Energy

As a % of Gross Member Sales

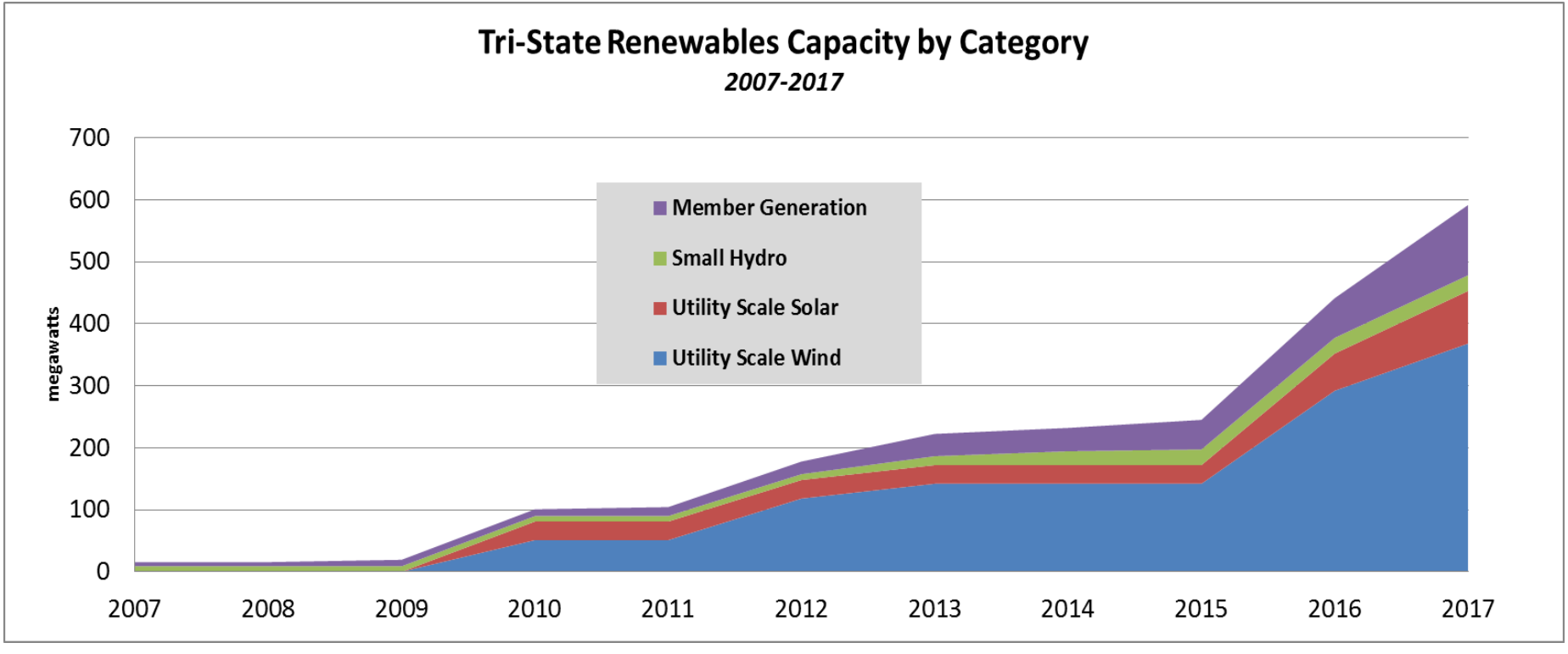


July 25, 2017 Resource Mix

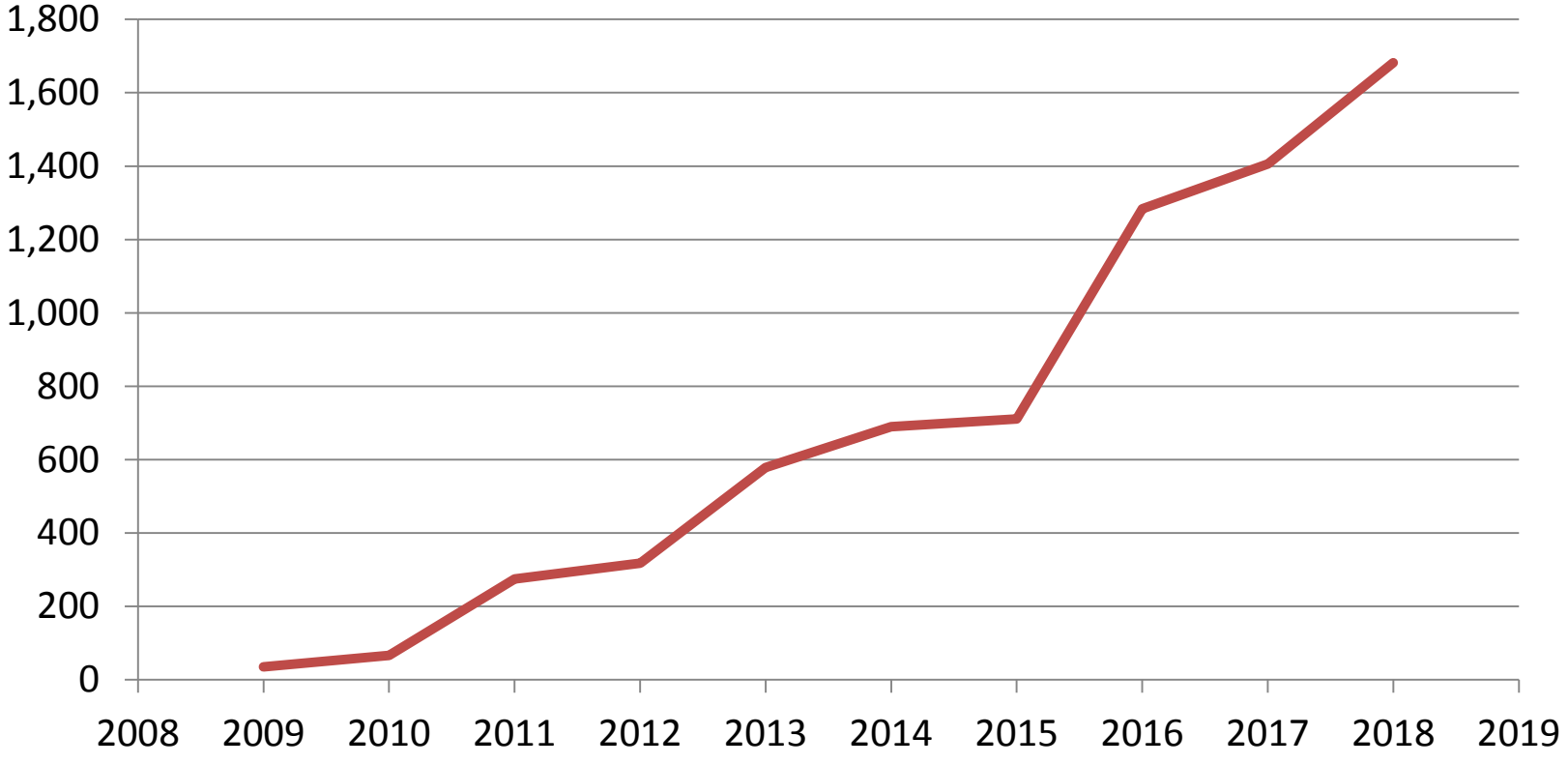


Growth of Tri-State and Member Renewable Generation

(Excludes WAPA Hydropower)



Growth in Tri-State Wind and Solar Energy Generation (GWH/Yr)



Alta Luna Solar Project

- 25 MWac
- Single-axis tracking
- Northeast of Deming, NM
- Completed January 2017
- 25 year PPA
- Annual output will serve approx. 8,000 homes

Renewable Integration

- Wind and solar need to be supplemented and “backed-up” with conventional hydro, coal and gas generation
- Today, you cannot realistically replace coal 1:1 with intermittent renewables
- Battery or other storage technology could change this situation

Coal Retirements & Renewables

- Three Announced Coal Unit Retirements
- Employee and community transition
- Cost
  - Incremental cost of baseload generation is cheaper than variable renewables
  - Accelerated depreciation

Tri-State Federal Hydropower

- Two Purchased Power Agreements
  - Colorado River Storage Projects
    - Glen Canyon, Blue Mesa, Flaming Gorge, Elephant Butte
  - Loveland Area Projects
    - Mount Elbert, Yellowtail, Flatiron, Guernsey, Seminoe

- 2016 Data
  - $82.4 Million Power Purchase Expense
  - Approximately 600 MW, 2,350 GWH/Yr
  - Served 15% of Tri-State Member Load

Renewable Generation Pricing Trends

- Price of new renewable generation is heavily impacted by federal tax credits
- “Utility-Scale” Projects
- Transmission is a major issue for wind

Wholesale Power Delivery

- Generation, Transmission, Metering, Billing

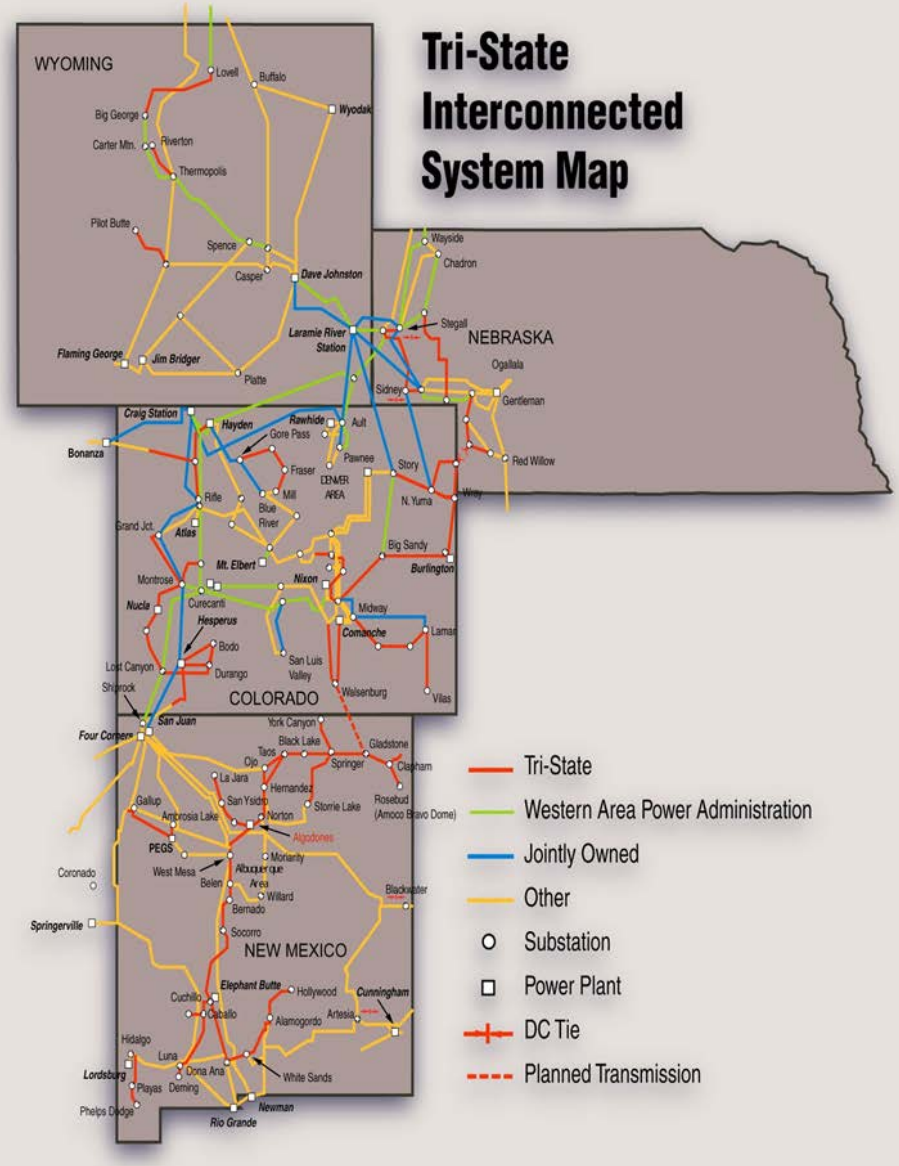
- Necessary Contracts and Structures

Generation / Load Balance

- Generation must balance customer load demand
- Electricity cannot be stored at grid-level volumes
- Power is scheduled
- Deliveries are coordinated among generators, transmission providers and load-serving entities
- 24 x 7 Operation
- Prepare for routine and upset conditions

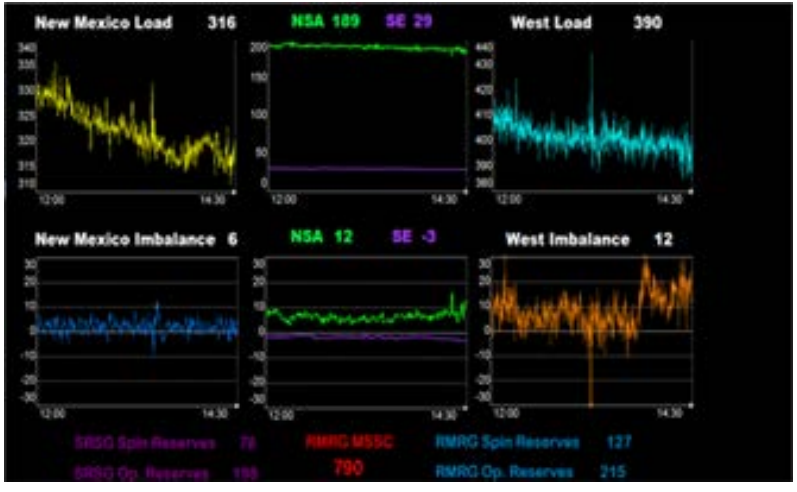
Rules of the Road

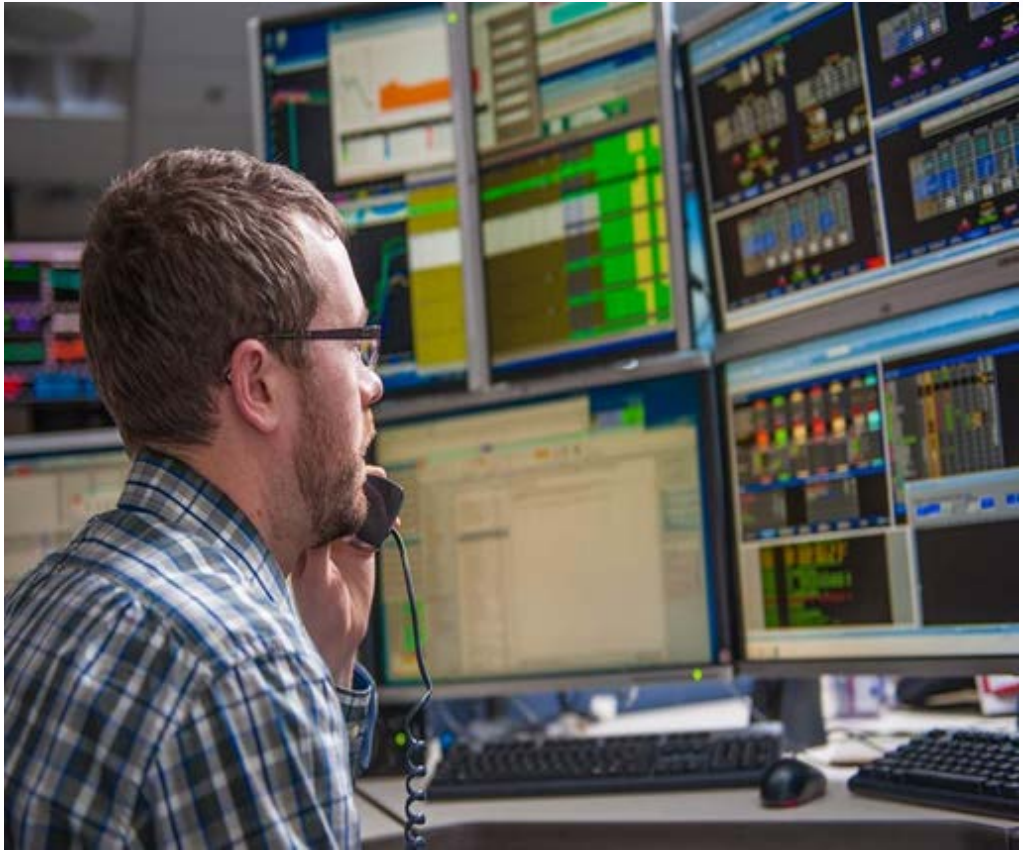
- Federal Energy Regulatory Commission (FERC)
- North American Electric Reliability Council (NERC)
- Western Electricity Coordinating Council (WECC)
- New Mexico Public Regulation Commission (PRC)
- Balancing Authority (Public Service Company of New Mexico)
- National Electric Safety Code (NESC)


Tri-State Interconnected System Map
WYOMING
NEBRASKA
COLORADO
NEW MEXICO
Lovell
Buffalo
Wyodak
Big George
Carter Mtn.
Riverton
Thermopolis
Pilot Butte
Spence
Casper
Dave Johnston
Laramie River Station
Flaming George
Jim Bridger
Platte
Wayside
Chadron
Stegall
Ogallala
Sidney
Gentleman
Red Willow
Craig Station
Hayden
Rawhide
Gore Pass
Ault
Bonanza
Pawnee
Fraser
DENVER AREA
Story
Rifle
Mill
Blue River
N. Yuma
Grand Jct.
Atlas
Big Sandy
Burlington
Mt. Elbert
Nixon
Montrose
Curecanti
Nucla
Hesperus
Midway
Comanche
Lamar
Bodo
Lost Canyon
Durango
San Luis Valley
Shiprock
Walsenburg
Vilas
San Juan
Four Corners
York Canyon
Black Lake
Gladstone
Taos
Ojo
Springer
Clapham
La Jara
Hernandez
Gallup
San Ysidro
Stornie Lake
Rosebud (Amoco Bravo Dome)
Ambrosia Lake
Norton
Algodones
PEGS
Moriarity
Coronado
West Mesa
Belen
Albuquerque Area
Willard
Blackwater
Bernado
Springerville
Socorro
Elephant Butte
Hollywood
Cunningham
Cuchillo
Caballo
Alamogordo
Artesia
Hidalgo
Luna
Lordsburg
Dona Ana
White Sands
Playas
Deming
Phelps Dodge
Newman
Rio Grande
Tri-State
Western Area Power Administration
Jointly Owned
Other
Substation
Power Plant
DC Tie
Planned Transmission

Power Scheduling

- 24/7 Staffing
- Technology
- Software
- Communications





Necessary Contracts and Structures

- Power Supply
  - Power Purchase Agreement
  - Generation Ownership
- Transmission
  - Network Integration Transmission Service Agreement (NITSA)
  - Ownership
- Load Serving Entity
  - Cooperative, Municipal, Investor-Owned Utility

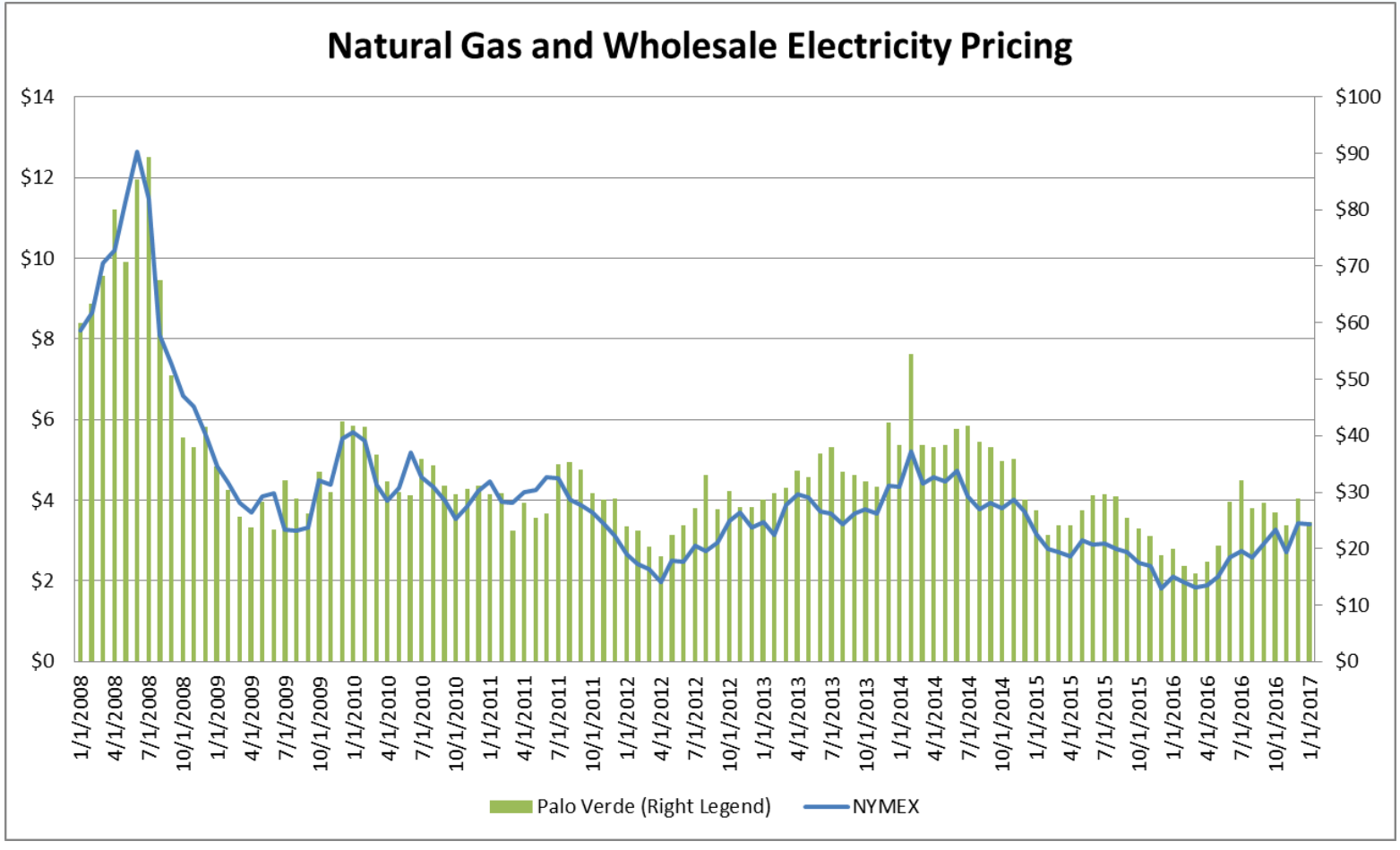
Power Purchase Agreements

- Typical Terms and Conditions
  - Term and Termination
  - Price
  - Firmness
  - Credit Provisions / Security / Triggers
  - Point of Delivery / Point of Receipt
  - Load Forecasting
  - Metering
  - Dispute Resolution
  - Rollover / Extension
  - Default and Remedies

Transmission Service Contracts

- Application for Service
  - Identify Load and Generators
- Study Process to Establish Availability or Required Upgrades
- Establish NITSA
- Establish Network Operating Agreement
- Ancillary Services
  - Voltage Support, Reserves, System Dispatch, Energy Imbalance, Regulation and Frequency Response

Natural Gas (Left Axis, Blue Line, $/MMBTU)
Wholesale Electricity (Right Axis, Green Bars $/MWH)



Sample Economics of Alternate Supply

Service	Estimated Cost $/MWh
Market Price of Block Power (PV ATC 2018-23)	$30
Shaped Power + Ancillary Services	$5
Upstream Transmission (El Paso $5 or PNM $7.50)	$6
Tri-State Transmission	$9
Socorro Distribution (?)	$5
Supplier Margin	$5
Estimated Delivered Cost To Socorro Meter	$60

Distribution Functions

Equipment Procurement, Warehousing, Spares

Replacements

- Transformers
- Wire
- Meters
- Poles

Line Crews – Training, Specialized Equipment

Metering, Billing, Collections, Budgeting, Accounting

Rate-Making, PRC Filings, Reporting

Emergency Response

Maintenance, Construction, Interconnections, ROW

Looking to the Future

- Organized Markets
  - Southwest Power Pool (SPP)
  - California Independent System Operator (CALISO)
- Distributed Generation
- Energy Storage
- Carbon Regulation

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