

# Distributed Resource Integration

## A Part of a Bigger Picture

Burbank Water and Power

Fredric Fletcher

# Burbank Water and Power

- Burbank Water and Power (BWP) is a full service, vertically integrated municipal utility, not part of the CA ISO, with typical daily peak of 170MW, and an annual peak of 300MW
- Power mix composed of coal, natural gas, nuclear, large hydro, bio gas, small hydro, with geothermal and grid solar projects underway
- BWP responsible for generation-load balancing
- BWP operates 465MW of plants in Burbank and in the State of Washington, for itself and the Southern California Public Power Authority
- BWP customer solar growing rapidly, 2MW with 4MW planned by 2016
- Currently 25% renewable, achieved with rate increases less than the rate of inflation since 2007 when this goal was established
- IRP process underway

# BWP Smart Grid Efforts

- THANK YOU DOE FOR YOUR GRANT
- Began the business planning, operational mechanics, and architecture in 2006
- Elements
  - High capacity, low latency IPv6 network that extends to each customer
  - Employs wireless mesh networks, and high speed fiber network fail over schemes
  - Security designed into the system from the beginning
  - Open standards employed
  - Integrated Automated Dispatch System developed
  - Full AMI deployment with Meter Data Management and Distributed Energy Resource
  - State of the art billing system
- Designed to handle 33% RPS

# Integrated Automated Dispatch System

- Integrated ADS is the brain of the BWP system operations
- System unit commit with attention to DER and variable grid connected generation
- Day ahead scheduling with DER, solar/wind forecasted response, and variable generation
- Current day look ahead for load, DER, variable generation refinement
- Current hour adjustments at 5-minute intervals

# Integrated Automated Dispatch System

- Computes the cost of:
  - Energy
  - Regulating
  - Spin and Non-Spin Contingency Reserves
- Computes volatility of load and variable resources
- Manages Demand Responses and confirms DR
- Can evaluate effects on distribution system

# Integrated Automated Dispatch System

- Integrated ADS is composed of
  - SCADA system
  - Automated Generation Control
  - Dynamic schedule operations and management
  - Scheduling and Dispatch computer tools
- Open Access Technology International
- Schneider Electric-Telvent
- IPKeys

# Business Planning and Operational Mechanics

- Electric utility role similar to that of telephone
- Flexibility is needed
- Security is needed
- Market issues are complex
- Regional solutions and cross regional solutions
- Change is the local space most noticed
- Rates vital

# Going Beyond 33%

- Use Remote Bulk Energy Storage
  - Pumped Hydro
  - Compressed Air Energy Storage
- Collect grid connected RE and shape it into a high capacity factor flow of RE electricity that can flow to urban area
- Use Local Energy Storage with DER, DR, and urban generation to meet load requirement

# Schulte Associates' Study

- Leveraged the Iowa CAES study
- Found CAES could shape wind energy into a product that was very much like base load coal
- Used the wind basins in Utah and Wyoming
- Crude spreadsheet study-results hopeful
- Raised the hope that CAES might be cost-effective for shaping wind energy
- CAES could also provide other values that are more generally recognized ... those values were not taken into account in the Schulte study

# Local Storage and DER Role

- Fitting a high capacity stream of high RE content electricity to load requires coordination
- Solar can reduce system loads in mid-day ... allowing for recharging local storage
- Demand response can locally balance generation and load
- Urban generation can be scheduled to meet needs
- Local storage investments can be kept to a minimum

# Integrated ADS

- Integrated ADS solves this process through successive iterations
- Next step: need a bigger, better study of CAES that will fully evaluate its value
- Need the operational mechanics to capture those values
- By 2016, BWP is expecting to have a lot of solar in power supply at solar noon on a light load day

# Beyond Storage and RE Integration

- Project Blackstart
  - Early recognition of BES breakup
  - Separation and successfully islanding of local grid
  - Failure to island
    - Generation microgrid to avoid Black Trip
    - Restart generation using local power plants
    - Restore island
  - Reconnect to BES
  - Reconnect to other microgrids

**THANK YOU**