FTC Solar Workshop
Facts on the Ground: Operational, Planning and Portfolio Considerations

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June 21, 2016
Public Power Utility Profile

- Business model: community/state owned, not-for-profit
- Assets: distribution; some own generation and transmission as well
- Size: small towns to large urban centers; median 2,000 customers
- Services: obligation to serve; bundled retail service
- Rates: cost-based
- Regulation: city council or governing board
The Bulk Power System in North America

**Generation**
- Over 5,000 plants
- Over 1,000,000 MW Total Peak Capacity
- Peak Natural Gas Capacity – 42%
- Peak Coal Capacity – 27%
- Peak Renewables – 3%

**Transmission**
- Over 483,000 circuit miles
- 320 Transmission Operators
- Over 2,000 Substations
- 115kV – 735kV (AC), Some DC

**Distribution**
- Over 2,200,000 miles
- 430 Distribution Providers (NERC Registered)
- Over 980,000 MW Peak Demand
- <1% Peak Demand Annual Growth
- ~10 GW Solar PV
U.S. Utility Renewable Generation by Fuel Type

- **Hydro**: 47.6%
- **Wind**: 34.1%
- **Biomass Fuels**: 12.0%
- **Geothermal**: 3.0%
- **Solar**: 3.3%
U.S. Utility Capacity Additions by Fuel Type, 2015

- Wind: 46.38%
- Natural Gas: 37.49%
- Solar: 12.39%
- Other: 2.76%
- Coal: 0.02%
- Hydro: 0.96%
Scale Matters: Solar PV Prices

Q1 2016 Quoted PV Prices

Source: Solar Energy Industries Association
Solar PV Variability Matters

River Falls Electric Utility
Comparison of Total Load to Community Solar Output
June 6 & 7, 2016
The Need For Flexibility: A Future, Not a Scenario

CAISO Load, Wind & Solar Profiles — Base Scenario
January 2020

Load & Net Load (MW)

0
1,000
2,000
3,000
4,000
5,000
6,000
7,000
8,000
9,000

14,000
16,000
18,000
20,000
22,000
24,000
26,000
28,000
30,000
32,000
34,000

01:00 02:00 03:00 04:00 05:00 06:00 07:00 08:00 09:00 10:00 11:00 12:00 13:00 14:00 15:00 16:00 17:00 18:00 19:00 20:00 21:00 22:00 23:00

Load & Net Load (MW)

6,700 MW in 3-hours
7,000 MW in 3-hours
12,700 MW in 3-hours

Net Load = Load - Wind - Solar

Net_Load  Load  Wind  Total Solar
Anatomy of a Frequency Excursion with Recovery

For illustrative purposes only. This is not real data. Actual trip settings and operational modes are different for each interconnection and not fixed at the levels shown.
Factors Driving Industry Change

- Renewables poised for significant growth
- Energy storage and other technologies not yet commercially viable (but coming!)
- Emerging suite of conventional and advanced customer-side technologies
  - smart thermostats and grid-connected appliances *that can*
  - save customers money *and*
  - make more efficient use of the grid
The Public Power Forward Strategy

Public Power Community Grid Modernization Plan

- Exogenous policy directives (federal and state)
- Market forces - Prices/availability, alternative supply - Bulk power system access/constraints
- Customer and community preferences
- Utility strategic risk management strategy

Services offerings

Business partnerships

Resource planning

Distribution system planning and operations

Consumer education and community outreach

Rate design and customer expectations
Rate Design Principles:

Rates should be:
• Fair and non-discriminatory across classes
• Simple enough for customers to understand
• Encourage economic efficiency
• Avoid cross-subsidies
• Achieve rate and revenue stability and adequacy
• Allocate risk efficiently

Each utility needs to make its own choices based on community preferences and goals
Marketing Versus Consumer Protection

Allen,
Now It Pays to Go Solar
Just Like Your Neighbors On Coach St

3 Tips for Converting to Solar
3 Sugerencias para Convertir a Solar

1. Know Your Energy Usage
Conozca su Uso de Energía
Visit coltononline.com and download the last 12 months of your utility bills
Visite coltononline.com y descargue los últimos 12 meses de sus facturas de servicios

2. Get Multiple Quotes
Obtenga cotizaciones múltiples
Obtain quotes from different Solar vendors
Obtenga cotizaciones de diferentes proveedores solares

3. Call Colton Electric Utility
Llame a Colton Electric Utility
Schedule a meeting with your Colton Electric Solar Advisor
Haga una cita con su asesor Solar Electric Colton

(909) 514-4214 www.coltononline.com

www.BecauseTomorrowMatters.com
For more information:

• **See the APPA Public Power Forward page:**
  http://www.publicpower.org/Topics/Landing.cfm?ItemNumber=45624

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