WAPA: Who we are

- Part of DOE
- One of four PMAs
- $4.3 billion in assets
- 177,000 structures
- 17,231 miles of transmission line
WAPA: What we do

Federal Hydropower
- Market 10,503 MW of power from 56 dams
- Buy and sell power to provide firm electric service

Transmission System & Service
- 17,000+ miles of transmission lines
- Operate 3 balancing areas
- 15-state operating region

Transmission Infrastructure Program
- Separate $3.25 B borrowing authority
- Projects must facilitate renewables
- Projects must have a terminus in WAPA’s footprint
Carr fire
Carr fire  (7/30, 12 pm MST update)

- N-15
- 98,724 acres
- 20% contained
- 10 transmission lines out of service
Carr fire
Microgrids

A **microgrid** is a local energy grid with control capability, which means it can disconnect from the traditional grid and operate autonomously.

U.S. Department of Energy
USVI solar farm (before)
USVI solar farm (after)
Medallion value has dropped more than 85% since 2013.
Changes in the Top 10 (revenues)

1990
- General Motors
- Ford
- Exxon
- IBM
- General Electric
- Mobil
- Philip Morris
- Chrysler
- DuPont
- Texaco

2000
- General Motors
- Wal-Mart
- Exxon Mobil
- IBM
- General Electric
- Citigroup
- AT&T
- Philip Morris
- Boeing

2010
- Wal-Mart
- Exxon Mobil
- Chevron
- General Electric
- Bank of America
- ConocoPhillips
- AT&T
- Ford
- J.P. Morgan Chase
- Hewlett Packard

2017
- Wal-Mart
- Exxon Mobil
- Berkshire Hathaway
- Apple
- UnitedHealth Group
- McKesson
- CVS Health
- Amazon.com
- AT&T
- General Motors
Blockbuster

2004: 9,000 outlets

Today: 1 outlet remains open in Bend, OR
Change is upon us

Wind-penetration record 62.13% at 1:54 a.m. on March 31, 2018
Oahe generation

April 9th Comparison for Oahe Generation

4-second data for hours ending 1 - 24

Western Area Power Administration
Oahe generation

April 9th Comparison for Oahe Generation

MWs

4-second data for hours ending 1 - 24

2015 2016
Oahe generation

April 9th Comparison for Oahe Generation

MWs

4-second data for hours ending 1 - 24

2015, 2016, 2017
Oahe generation

April 9th Comparison for Oahe Generation

4-second data for hours ending 1 - 24

- 2015
- 2016
- 2017
- 2018
ERCOT demand

ERCOT Demand and Wind Generation Forecast for Sunday 7/22 - Monday 7/23

- ERCOT Demand Forecast
- Net Demand
- ERCOT Wind Generation Forecast
Economic challenge

How can we manage in a Twitter–centric world?
Change brings challenges

- Intermittent resources
- Decreased hydro production
- More customer-side resources
- Changing markets
Societal changes
The future nexus
Radical thoughts

The kilowatt-hour is dead

Time-of-purchase vs. time-of-use

All-you-can-eat energy
What are we doing about it?
Mountain West / SPP

SPP & Mountain West Footprint

- Miles City 200 MW
- Rapid City 200 MW
- Stegall 220 MW
- Sidney 200 MW
- Lamar 220 MW
- Blackwater 200 MW
- Oklaunion 220 MW
- Eddy Co 200 MW
- Welsh 600 MW

<table>
<thead>
<tr>
<th>SPP</th>
<th>MW</th>
<th>MTG</th>
</tr>
</thead>
<tbody>
<tr>
<td>Square miles</td>
<td>546,000</td>
<td>165,000</td>
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<tr>
<td>Miles of transmission</td>
<td>65,755</td>
<td>16,000</td>
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<tr>
<td>Population</td>
<td>17.5 mil</td>
<td>6.4 mil</td>
</tr>
<tr>
<td>Generating capacity</td>
<td>83,945 MW</td>
<td>21,000 MW</td>
</tr>
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</table>
Transmission buildouts in the west

Public-Private Partnerships in action

- **Duke American**
  - 85-mile, 230-kV line
  - Northern CA
  - Will power Reclamation’s San Luis Pumping Plant
  - 600 MW

- **Hunt Power**
  - 360-mile line
  - New 345-kV line
  - Upgrade 115 to 230
  - Interconnects with 14 existing substations
  - Between NM and AZ
  - 1,000 MW

- **SunZia**
  - 500-mile, 500-kV line
  - Enables delivery of primarily wind energy
  - From NM to AZ
  - 3,000 MW
“Historically, utilities have evolved at the speed of regulation bounded by strict laws of physics. Think new rates, new methodologies and new streams of revenue. Think about how the kilowatt-hour measure will be replaced.”

Mark Gabriel
“The Kilowatt-hour is Dead”
Public Utilities Fortnightly, April 2018
Key takeaways

The pace of change is fast and furious. Be prepared to respond to needs and opportunities. Tomorrow’s energy landscape will look vastly different.
Contact/follow me

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