RADICAL THOUGHTS: Providing value amid a changing energy landscape

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Big 10 and Friends Utility Conference

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WAPA: Who we are
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
Micro-grid circa 1880

1882 First electric station built by Edison on Pearl Street
Dot Com circa 1880: Electricity

• Industry began in support of other enterprises
  – Industrial
  – Telegraph, telephone
  – Street cars

• Wild West of the east coast
  – 20 companies providing service in NYC
  – 18 deaths in 1889
Key issues

• Cyber and physical
• Asset management
• Lifecycle management
• Capital planning
• Markets
Change brings opportunities

- Infrastructure considerations
- Increased regulation
- Intermittent resources
- Varying hydro production
- Customer-side resources
- Changing markets
- Security
Fundamental change

The challenge for the utility of today is not only what is real but what is perceived as real.
Societal changes
Blockchain trading
The future nexus
Economic challenge

How can we manage in a Twitter–centric world?
Megatrend: Carbon/capacity conflict

We are on track for the “t***n w***k” of expectations vs. carbon et al.
Carbon constraints/capacity conflict

• Demand for new power sources will outstrip capacity
• Demand for clean energy will outstrip the capacity
• Public perception contrasts with reality of the system
• Renewables are being promoted the only answer
The solar/peak conundrum (even in Arizona)
Solar consideration
Destiny of intelligent infrastructure

- $50 B spent in next five years in T&D
- How smart grid will change load profile is critical
- Enabler for energy efficiency and demand response
- Customer interaction is key
My unpopular smart grid theory

- 80% of benefits will accrue to the utility
- Consumer participation will be initially low
- Hype will hurt the efforts
- Utilities will move to smart grid because it makes sense
- Utilities will not get benefits unless they make major process changes
Customers want choice but not risk; they do not make economic choices.
Markets in a hydro world
And over in Germany...

- Energiewende to eliminate coal and nuclear as a social policy
- Wholesale prices down while consumers bear the impact: 40 cents per kWh
- Blown up the utility business
- 800-900 DSOs
- 4 TSOs (owned by foreign entities)
- 1.8 million generators
- Relies on assets of other countries
Radical thoughts

The kilowatt-hour is dead

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

All-you-can-eat energy
Key takeaways

Partnership and innovation are key to maximizing resources and keeping the lights on.
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Gavins Point Dam – Yankton, SD – Photo by Army Corps of Engineers