

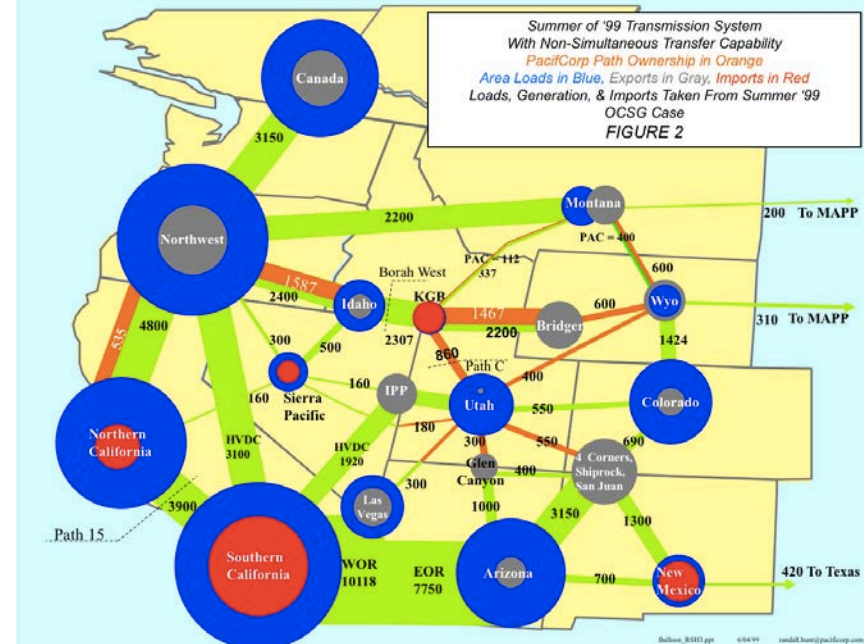
Overview of the Western Grid

Don Furman

Today

- Some Grid Basics
 - Physics Versus Commerce
 - Brief History of the Western Interconnection
 - State of Play
- Key Issues
- Some Observations for Off-Shore

Physics versus Commerce



A Brief History of the Western Interconnection

- Expansion and Public Power Movement (until mid-70s)
- Nuclear Over-Supply (1980s)
- Deregulation and the California Energy Crisis (90s)
- Dark Ages and Renaissance (2000 – 2015)
- Market Redux and 100% Clean Aspiration

Western Grid Today

California

- Modernized grid operator
- Big solar bet = duck curve
- High prices

Everyone Else

- Emerging into modern era
- Greater acceptance of markets
- Low prices

Western grid: High rate of change and disruption, extremely low market prices, extremely inefficient ***when viewed collectively***

Key Issues

- PTSD
- California's Big Solar Bet
- Distributed Versus Utility Scale
- Regionalization
- Loss of wholesale revenues for generation, especially hydro

Observations

- California's dysfunctional at the policy level, especially procurement
- 100% clean/renewable will be hard; off-shore will be needed
- Deregulation and the energy crisis destroyed regional cooperation
- Without regional coordination, 100% will be very expensive

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Don Furman
(503) 705-2801
don@donaldfurmanll.com