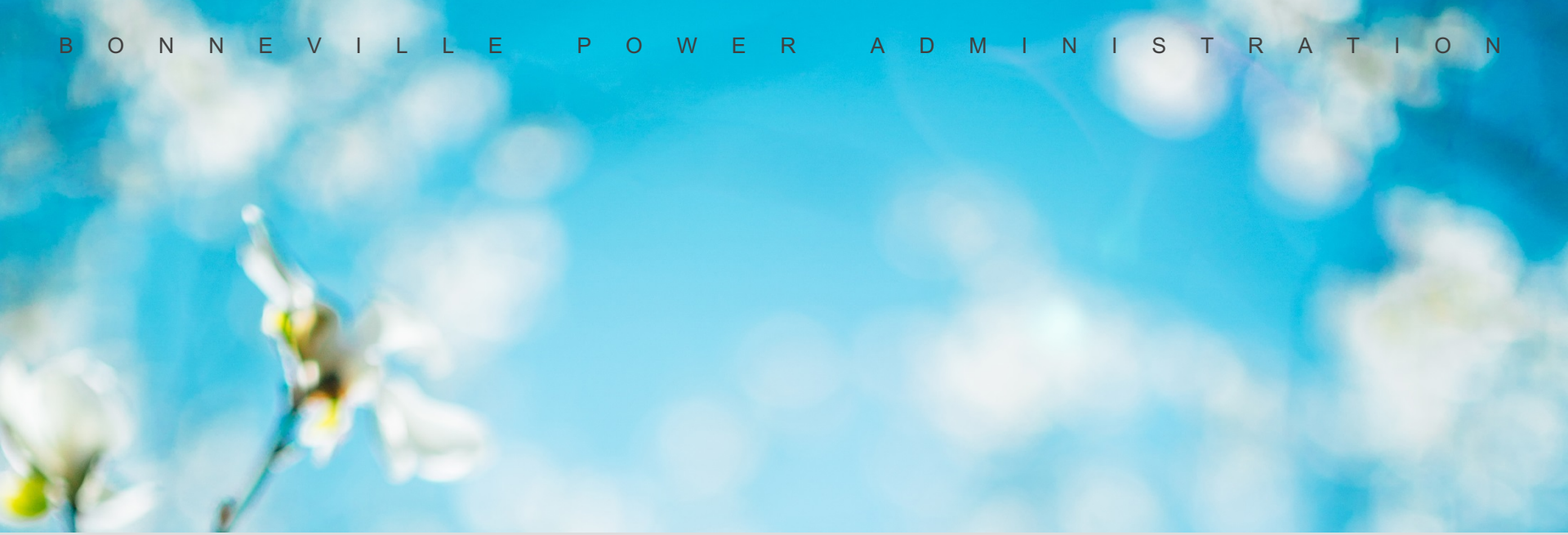

BPA'S VIEW OF THE GRID - 2050

Steve Kerns and Ravi Aggarwal

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21st CENTURY PARADIGM

Industry Structure	• More competition in market and at a faster speed of change. • Load profile changes due to increased electrification and variable energy resources. • Further development of organized markets that compensate for capacity as well as energy.
Infrastructure Modernization	• Systems and processes updated to fully realize the benefits of automation and data-driven decisions for operations and marketing. • Capitol investment strategy on the Federal Columbia River Power System is successful resulting in increased reliability and flexibility.
Environment	• Water supply and hydro production capacity will change due to expected decline in snowpack, increased glacier melting and earlier runoffs. • Increased frequency of warm and dry conditions. • Change in river operations for Endangered Species Act compliance.
Regulatory and Public Policy	• Build regional structures for collaboration and trade. • Extend regulatory standards across state borders. • Alignment of carbon policy at the state-level – perhaps even at the national level.

21st CENTURY PARADIGM

Technology	• High-volume manufacturing and smart technologies leads to lower resource costs. • Smart technologies manage loads, resources and storage. • Energy efficiency codes will mandate load reductions in future buildings and appliances.
Resource Adequacy	• Closing fossil fuel base load generators will deplete regional capacity. • Regional adequacy standard is necessary to ensure reliability and that there is capacity and energy compensation for resources.
De-carbonization	• De-carbonization goals at state and local level will impact policies and commercial transactions. • De-carbonization leads to more variable resource mix with smaller, decentralized resources.
Customer Choice	• Consumers will voluntarily adopt a range of increasingly cost-effective, load-reducing technologies behind the meter. • Qualitative and social considerations gain in importance in decision-making.

POWER 2050

Industry Structure	Resource Adequacy	Infrastructure Modernization	Environment	Regulatory/ Public Policy
• Pursue new market opportunities for clean capacity. • Adapt to changing load profiles and customer preferences.	• Effective integration of renewable resources while ensuring reliability. • Participation in a Regional RA program	• Invest in an industry-leading asset management program. • Modernize business processes, technologies and operational systems.	• Study and adapt to changing climate conditions impacting water supply and hydro capacity.	• Promote policies that increase economic efficiency and more competition.

BPA' long-term power strategy is to increase revenues through new markets for clean capacity and flexibility and invest wisely in existing resources.

TRANSMISSION 2050

Public Policy	Decarbonization	Technology	Customer Choice
• Support transmission regional planning. • Promote openness and transparency.	• Facilities for more variable and less base-load resources. • Develop grid for EVs and new electrification profiles.	• Plan for solar, wind and storage. • Smart grid technologies to optimize operations and efficiency.	• Develop more commercial product and service offerings. • Integrate services for complete customer solutions.

Future decisions will be more complex and most significant impacts will be in three areas – de-carbonization, digital technology and decentralization. BPA' long-term transmission strategy is to apply risk-informed, scalable and flexible solutions.

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