



Power Operations Asset Management

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Tennessee Valley Authority (TVA)

- Corporate agency of the United States (formed in 1933) that provides electricity for business customers and local power distributors serving 9 million people in parts of seven southeastern states
- ~34,000 MW installed capacity at 46 sites

Coal	Gas	Hydro	Nuclear	Renewables
10,660 MW	5,500 MW CT	3,660 MW Conventional	7,900 MW	1,500 MW Wind
	4,500MW CC	1,600 MW Pump Storage		

- Non-nuclear generation
- 25,920 MW @ ~250 Units
- Assets managed as one group



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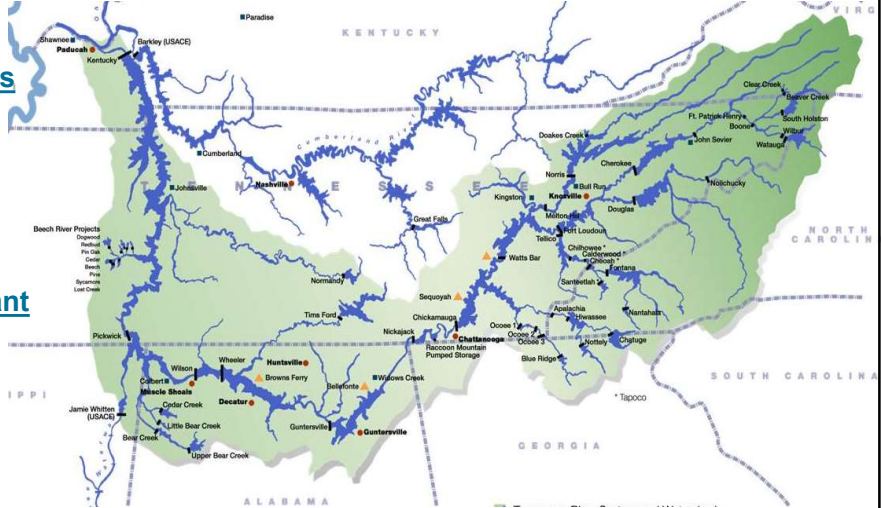
TVA Hydro System

29 Conventional Plants

- 109 Units (3,800 MW)
- Fully automated

1 Pumped Storage Plant

- 4 Units (1,600 MW)

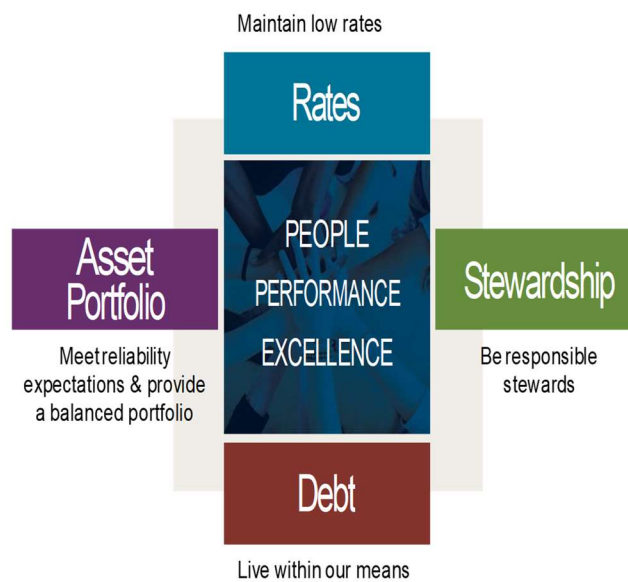


Hydro Capacity Expansion & Preservation | 3



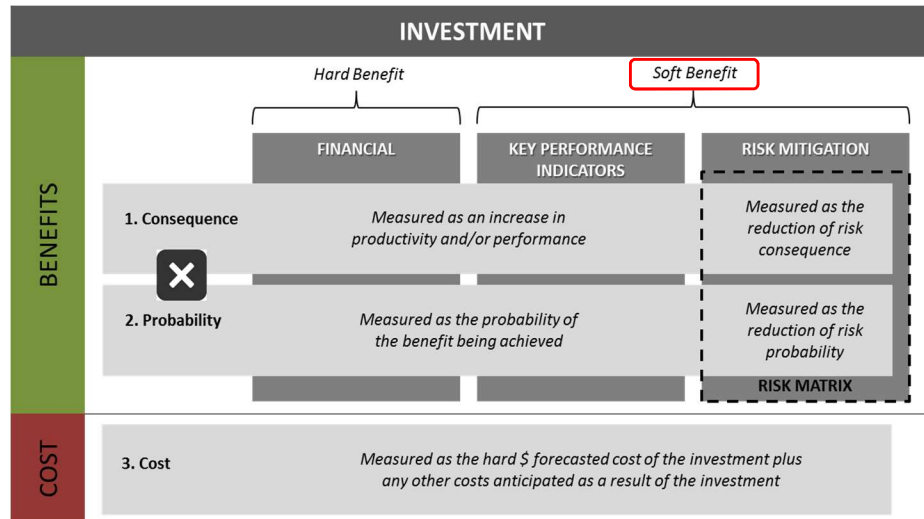
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Strategic Imperatives



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Value Basis



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Non-Generation Risks

Use a risk matrix to capture non-generation value including:

Compliance

- Water agreements/Reservoir Operating agreements with public and commercial stakeholders
- Environmental Regulations - some generating units more susceptible to environmental events
- Reliability Regulations – units that provide black start capability

Public Perception

- Scope of media coverage for an event (local, regional, national)
- Reputation impacts
- Stakeholder relationship impacts

Safety

- Employee safety
- Public safety

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River Management Value

Captures non-generation value specific to hydro assets, including:

Flood Control

- River Mgmt has models to indicate how much flood damage is averted by having the dams in place

Water Supply

- Maintaining reservoir elevations for municipal intakes

Water Quality

- Aeration to meet dissolved oxygen targets to support aquatic life, spilling or foregoing generation to maintain water temperatures to support fish hatcheries.

Navigation Impact

- Keeping the reservoir levels high enough and flows low enough to support barge traffic.

Recreation Impact

- May forego generation to support rafting (O2H); may generate more than needed at other sites to provide adequate flows for rafting/fishing (APH, NOH, SHH).

Hydrothermal

- Providing cool water from tributary dams to the main river system to cool water near nuclear and thermal generating plants

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Additional Value Considerations

Transmission Impact

- Voltage Support
- Thermal Line Limits/Transmission Congestion
- Black Start Capability

Generation Flexibility

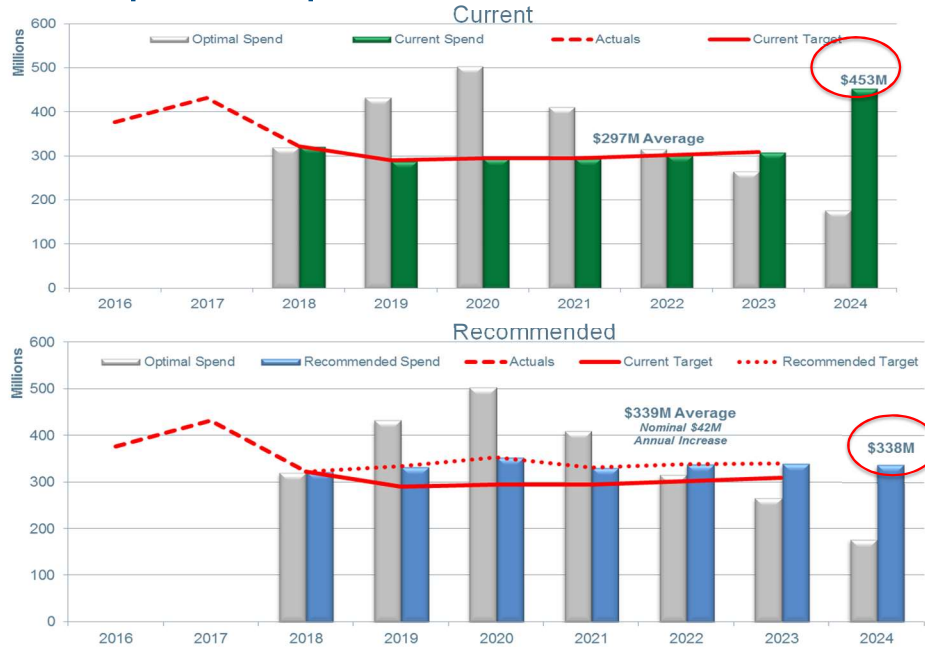
- Capability to quickly add or reduce unit output (Automatic Generation Control Ramp Rate)
- Cycle Time
- Lowest Unit Output (Turndown)

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Example of Optimization Results

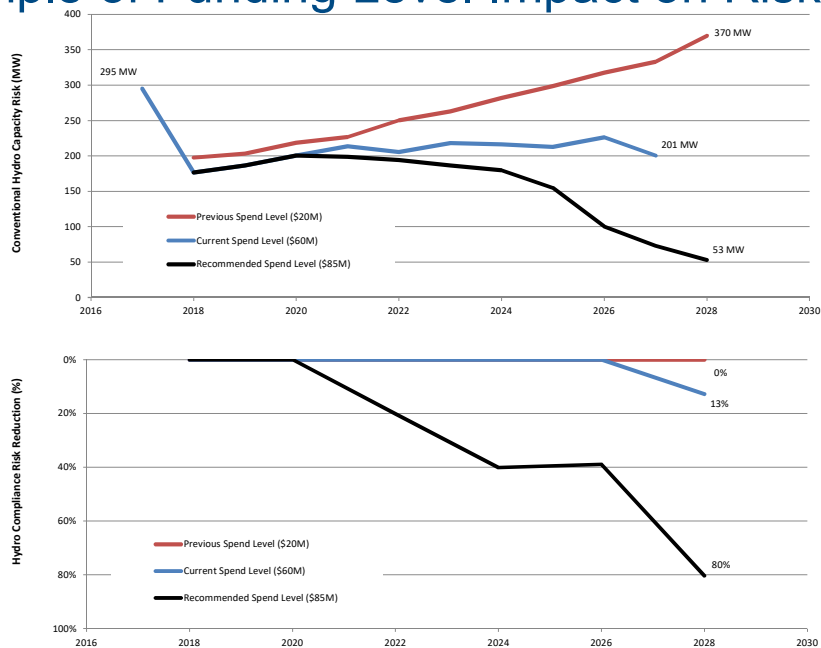


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Example of Funding Level Impact on Risk Profile



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Example Risk Matrix (Safety & Compliance)

	Negligible	Very Minor <i>First Aid Internal Audit Finding</i>	Minor <i>Recordable REE</i>	Moderate <i>Lost Time NOV</i>	Major <i>Fatality Loss of Permit</i>	Severe <i>Multiple Fatality Regulator Oversight</i>	Catastrophic <i>Public at Risk Shutdown</i>
Almost Certain							
Once in 3 years			3 Safety 2 Compliance	1 Safety 1 Compliance			
Once in 10 years				1 Safety 2 Compliance	1 Safety		
Once in 33 years					1 Compliance		
Once in 100 years					9 Safety 8 Compliance		
Once in 333 years							
Once in 1000 years						4 Safety	
None							

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