Session: Modernisation

How can existing assets be optimised?

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For more information:  www.hydropower.org/congress
Hydropower Modernization Initiative: Making the Business Case for Hydropower Infrastructure Investment

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Hydropower Capability

- Largest producer of renewable energy in the USA
- Generates approximately 77 billion KWh of renewable energy annually, enough energy to electrify 11 million households or 39 cities the size of Washington, DC
- 21,000 MW of capacity, largest in USA
- 75 power plants with 353 generating units
Fleet Performance

Availability - All USACE Hydropower Plants

Percentage

1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
Hydropower Modernization Initiative (HMI)

- Develops long-term management strategy based on economics and risk principles
- Provides stakeholders a credible business case for where to allocate investment
- Asset Investment Planning Tool (AIP)
Hydropower Modernization Initiative (HMI)

- Risk (NPV) Analysis and Benefit/Cost Ratio
- Condition Based (HydroAMP)
- Limited to 6 major power train components (runner, generator, transformer, breaker, exciter, governor)
HMI Asset Investment Plan

Benefits

- Quantifies risks associated with lack of funding
- Quantifies CO2e production avoided vs investments (environmental benefits)
- Provides a consistent process for investment planning across the hydropower sector
AIP Tool Inputs

**Component**
- Hydro AMP System
  - Asset Online Year, Latest Condition & Spare Available
- PLEESM Excel
  - Plant Logical Unit Energy Production, Outage Months and Capacity Opportunities
- EVI Excel
  - Forecast Energy Value and CO₂e Displacement
- LoF Excel
  - Forecast LoF %/Year for each Asset Starting Age + Condition

**Plant, Unit**
- Standard Projects Escalation Rates Discount Rate Funding Sources and Scenario Limits

**Region**
- Asset Investment Planning Scenarios
In 9 years the cumulative probability has gone from 1.5% to almost 20%. If we assume a constant Consequence then waiting nine years to fund a project has increased the total exposure to risk by a factor of 13.
20-Year Risk Profile

Risk ($) Billions

- Baseline
- USACE_160_MILL_by_RISK
- USACE_160_MILL_by_BCR

- Baseline
- USACE_60_MILL_BY_BCR
- USACE_60_MILL_BY_RISK

Years: 2014 to 2033
Key Considerations of a Large Modernization Investment Strategy

- Quality Component Performance/Condition Assessments
- Utilize proven tools/concepts to quantify risk
- Take a strategic approach to determining priority of investments
- Determine what is most important to you, mitigating risk or return on investment?
- Develop a flexible long-term holistic Master Plan for plant modernization
Questions or Comments