Avista Distribution and Transmission Planning

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Docket UE 161024

Agenda

- Distributed Energy Resource Planning in the IRP
- Optimizing Distributed Energy Resource (DER) Value
  - Enabling Systems
  - Pilots to Learn
- Distribution Planning
  - Overview
  - Current & Future State Analysis Capabilities
- Transmission Planning
  - Overview
  - Evolving Standards Requirements
  - Solution Alternatives Analysis

Distribution Planning from a IRP Perspective

James Gall,
Integrated Resource Plan Manager

DER Planning in the IRP

Solar

Storage

Conservation

C&I Backup Generation

C&I Demand Response

Energy
Peak reduction
Deferred T&D capital
Reduced line losses
Reduced portfolio risk
Ancillary services (storage)
Improved reliability (storage)

Capital recovery
Taxes
O&M
TRC (conservation)
Energy consumption (storage)

Benefits

Costs

PRiSM Economics

5 MW Solar in Othello, WA (summer peaking feeder)
($/MWh Levelized)

- Energy: $34.17
- Ancillary services: $0
- Line losses: $1.62
- System peak reduction: $0
- Power supply risk reduction: $1.1
- Distribution/transmission Investment avoidance: $0.9
- Reliability: $0
- Power quality: $0
- Externalities: TBD

Total Value: **$37.79 per MWh**

- Total costs for utility scale solar with energy integration is expected to be $**55 to $65 per MWh** for a long term PPA
- Assumes utility scale project developed by a 3rd party, utility ownership will derive different cost due to ITC accounting
- Renewable Energy Credit value is not considered

Current Valuation:
PV value: $3.3 million
PV costs: $5.3 million
NPV: -$2.0 million

Energy value uses 2017 IRP draft price forecast

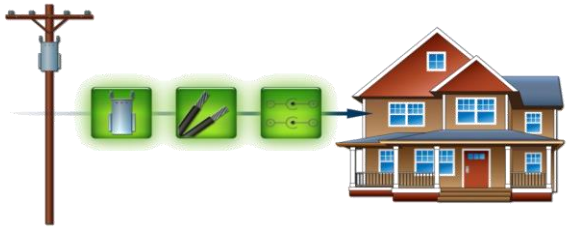
Distribution & Transmission Planning

Heather Rosentrater, VP Energy Delivery

Optimizing DER Value

Foundational Enabling Systems

Smart Grid Demonstration & Investment Projects



- American Recovery and Reinvestment Act Grants
- Smart Line Devices and Distribution Management System
- Fault Detection, Isolation and Restoration – Reliability
- Integrated Volt/Var Control - Energy Efficiency
- Advanced Metering Infrastructure Pilot Project

Future Enabling Systems

Washington Advanced Metering Infrastructure Project

- Communication Network

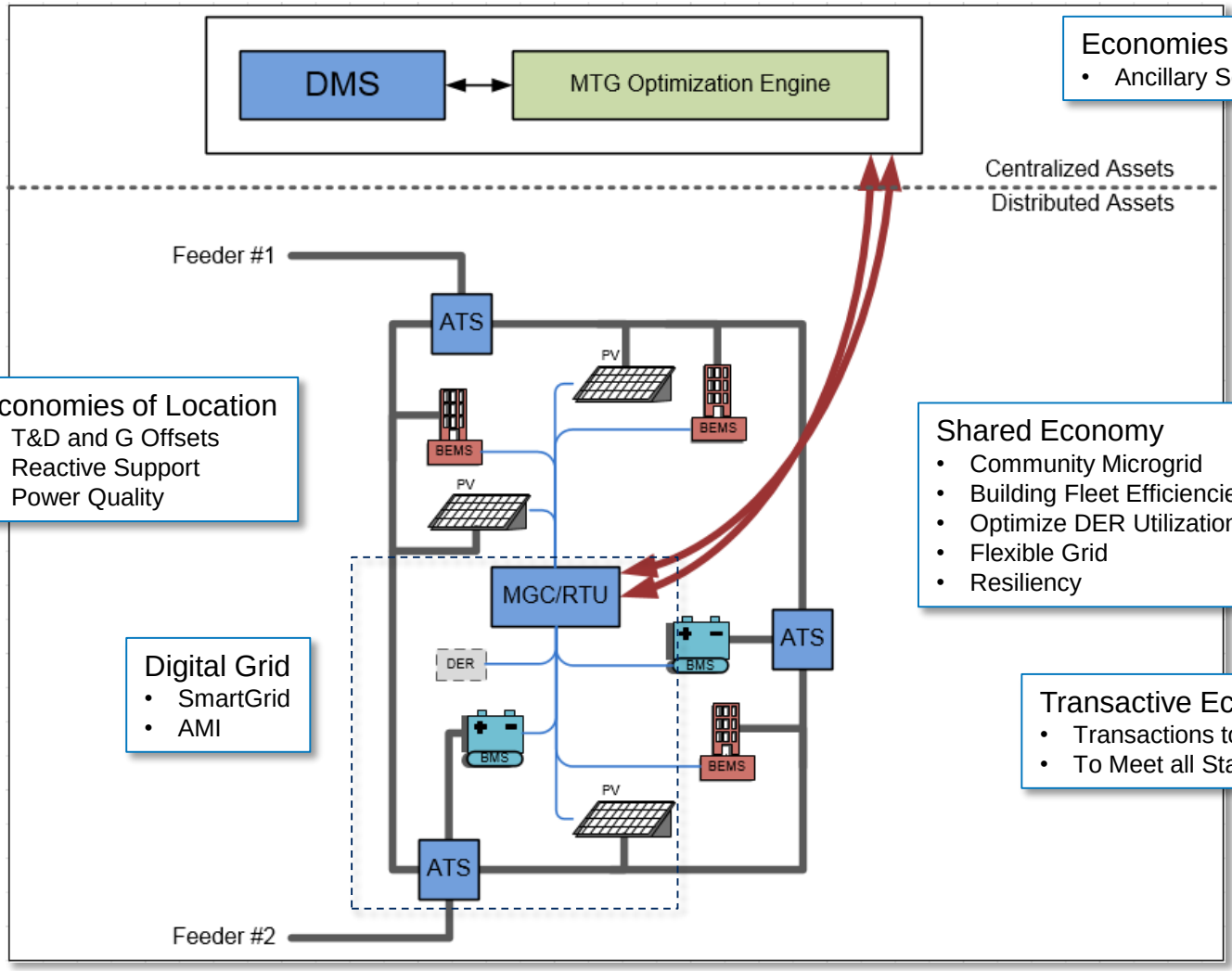
Supervisory Control And Data Acquisition Expansion Project

- Three Phase Measurement at Substation Feeders

Optimizing DER Value

Pilots to Learn

DMS – Distribution Management System
MTG – Micro-Transactive Grid
ATS – Automatic Transfer Switch
MGC – Microgrid Controller
RTU – Remote Terminal Unit
BEMS – Building Energy Management System
BMS – Battery Management System
DER – Distributed Energy Resource



Economies of Scope
- Ancillary Services

Economies of Location
- T&D and G Offsets
- Reactive Support
- Power Quality

Shared Economy
- Community Microgrid
- Building Fleet Efficiencies
- Optimize DER Utilization
- Flexible Grid
- Resiliency

Digital Grid
- SmartGrid
- AMI

Transactive Economy
- Transactions to Optimize Utilization of Assets
- To Meet all Stakeholders Needs

Optimizing DER Value

Pilots to Learn

Turner Energy Storage Project – Washington Department of Commerce

Clean Energy Fund I

- 1MW – 3.5 MWhr Vanadium Flow Battery
- Located Adjacent to SEL Manufacturing
- Use Case Valuation

Economies of Scope

Use Case and application as described in PNNL Catalog	Avista
UC1: Energy Shifting	
Energy shifting from peak to off-peak on a daily basis	Y
System capacity to meet adequacy requirements	Y
UC2: Provide Grid Flexibility	
Regulation services	Y
Load following services	Y
Real-world flexibility operation	Y
UC3: Improving Distribution Systems Efficiency	
Volt/Var control with local and/or remote information	Y
Load-shaping service	Y
Deferment of distribution system upgrade	Y
UC4: Outage Management of Critical Loads	Y
UC5: Enhanced Voltage Control	
Volt/Var control with local and/or remote information and during enhanced CVR events	Y
UC6: Grid-connected and islanded micro-grid operations	
Black Start operation	Y
Micro-grid operation while grid-connected	Y
Micro-grid operation in islanded mode	Y
UC7: Optimal Utilization of Energy Storage	Y

Optimizing DER Value

Pilots to Learn

Shared Energy Economy – Washington Department of Commerce Clean Energy Fund II

- Solar, Storage and Building Management Systems
- Located in the University District – Spokane, Washington
- Use Case Valuation

Distribution Planning

Overview

- Primary goal – Safe and reliable service to all customers, efficiently at lowest life cycle cost
- Annually analyze entire system and identify constraints
  - Drivers: Capacity and Level of Service/Reliability
- Analyze alternative solutions, identify course of action, input to 5 year budget
- Requires continuously analyzing all available solutions and technologies

Distribution Planning

Current State Analysis Capabilities

- Varied data available per circuit
- 346 Circuits
  - 94 Circuits with Distribution Management System Control
  - 101 Circuits with 3-Phase Supervisory Control and Data Acquisition (SCADA)
  - 83 Circuits with 1-Phase SCADA
  - 68 Circuits without SCADA

Distribution Planning

Future Considerations

- Data needs depend on analytics, efficiency, and operational flexibility required
- Current project under consideration to upgrade to 3 phase SCADA on all circuits, $115M
- Evolution towards more data
  - Benefits to utility and customers under evaluation
  - Advanced Distribution Resource Planning may require additional employees and significantly more data than currently available

Transmission Planning

Overview

- Annual study of our transmission system
  - Required & Governed by NERC Standard TPL-001-4
  - Seasonal simulations analyzed out to 20 years
  - Requires reliable performance during outages
    - Performance requirements grow with each standard revision
- Drivers for Transmission Planning projects:
  - Reliability violations found during annual assessment
  - Generation Resource requests:
    - External developers
    - Internal IRP requests

Transmission Planning

Revised Standards Requirements Driving Infrastructure Needs

2003 Northeast Blackout

- Worst blackout to date in U.S.
- Task force is put together to investigate outage
- Final report concludes that to prevent future blackouts, govt. needs **mandatory reliability standards**.

2004

- Version 0 Reliability Standards
- In 2004, NERC begins translating it's operating policies into 90 measurable standards

Energy Policy Act of 2005

- Authorizes the creation of an Electric Reliability Organization w/ oversight from NERC

2007

- NERC has been certified by FERC and reliability standards become mandatory for all Utilities

2016 Standards 2.0

- FERC & NERC improving
- Tighter standards
- New Transmission Planning modeling requirements

Transmission Planning

Typical Study - *Saddle Mountain Project*

- New 230/115 kV station south of Othello
- Process of the study:
  - TPL studies determine system violations
  - Former studies help establish context
  - Other projects are analyzed for potential overlap
  - Alternative projects are developed and vetted
  - Complete study performed for primary alternative
- Regional study completed at Columbia Grid
- Results documented in annual assessment

Transmission Planning

Considerations During Project Selection

- Impact on the TPL requirements
  - Does it solve some violations but create others?
  - Does it improve reliability more than other projects?
- Short-term and long-term cost
- Commercial viability
- Time to construct
- Synergy with other TPL or Avista projects
- New technology possibilities
- Discoveries made during regional process