MONTANA RENEWABLE DEVELOPMENT ACTION PLAN

STEERING COMMITTEE MEETING

June 5, 2018

Helena, Montana

- **Project Specifics:**
  - ✔ **Objective**
    - ✔ Explore opportunities and barriers to Montana's potential renewable resources
    - ✔ Recommend sustainable solutions to barriers
    - ✔ Initiate actions to achieve solutions
  - **Schedule – 6 months**
    - Dec 8, 2017 to June 30, 2018
  - **Deliverable – Action Plan**
    - for potential development and delivery of Montana renewable resources
    - to enable thriving commercial market for renewable resource development

PROJECT REVIEW AND TODAY'S AGENDA

- **Process:**
  - **Establish project structure**
    - Steering Committee comprised of key stakeholders
    - Sub-committee structure to address policy, planning and operational issues
    - Define detailed project schedule
  - **Identify and commit staff to accomplish objective**
  - **Open, inclusive work flow to ensure stakeholder interests are understood and considered**

PROJECT REVIEW AND TODAY'S AGENDA

PROJECT REVIEW AND TODAY'S AGENDA

- **Progress reported today will be:**
  - **Significant Findings**
  - **Final Recommendations**
- **Finalize Action Items, Action Parties, Schedule**

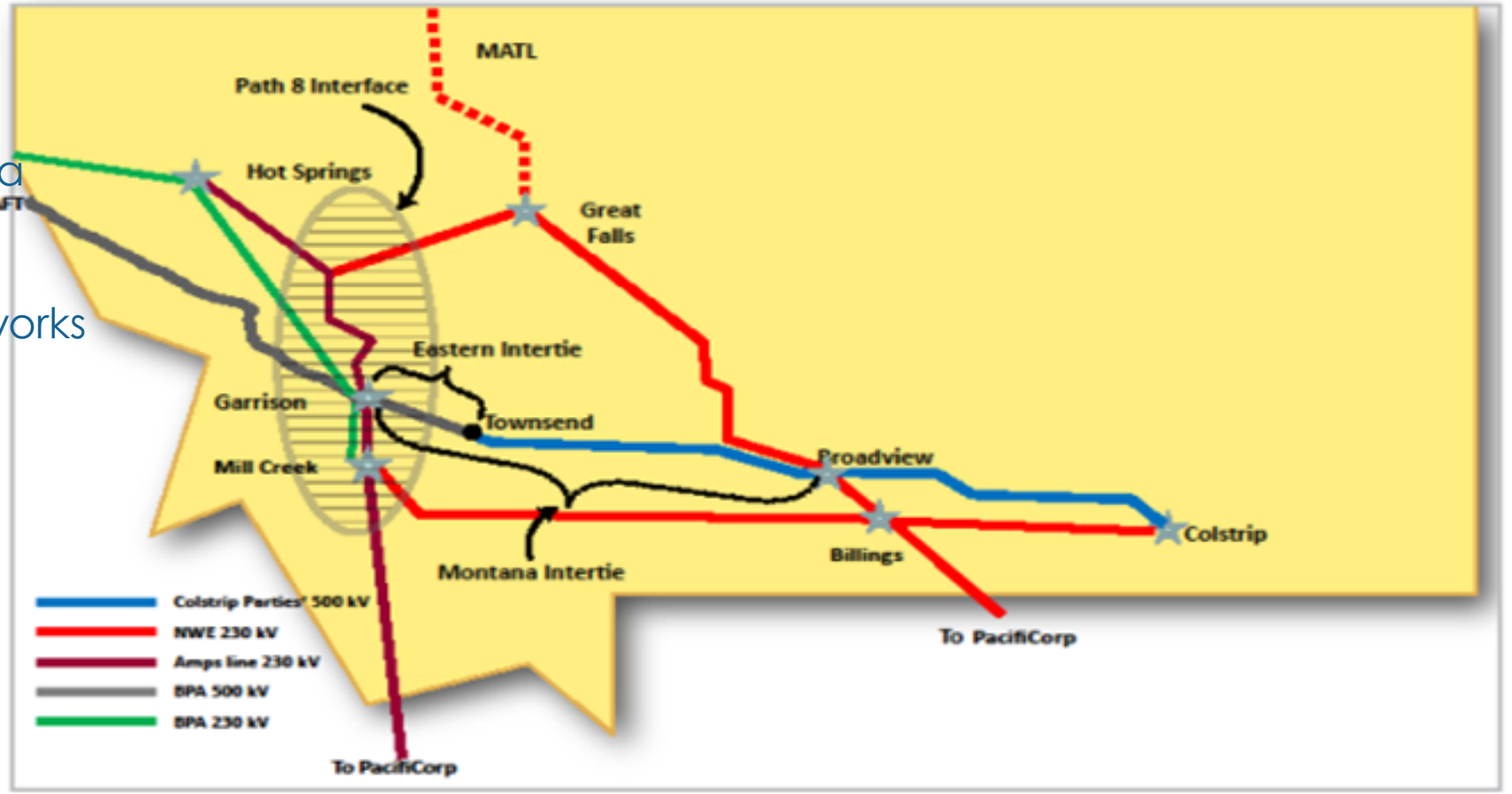
9:30 – 9:45	Introductions & Logistics Vickie VanZandt
9:45 – 10:45	Commercial/Policy: Final Findings and Recommendations Brian Altman
10:30 – 10:45	Break
10:45 – 11:45	Planning: Final Findings and Recommendations Cameron Yourkowski and Pat Rochelle
11:45– 12:45	Lunch
12:45 – 1:15	Operations: Final Findings and Recommendations Casey Johnston, Bart McManus and Libby Kirby
1:15 – 1:45	Steering Committee Guidance, Review, Report Release Final Report Review, Signing, Issuance Process
1:45 – 2:00	Public Comment
2:00 – 2:15	Wrap-up and Next Steps Final meeting with Sponsors, agenda, etc.

TODAY'S AGENDA

COMMERCIAL POLICY SUBCOMMITTEE

Major Montana Transmission

Avista
&
BPA
Networks



Findings

1. Advocates for Montana renewables (state government, developers and public interest groups) are "pushing" the export of Montana renewables. There needs to be a corresponding interest from potential purchasers "pulling" for the acquisition of Montana renewables.

Findings

2. Montana wind resources may be cost competitive with other renewable resources available to Pacific Northwest utilities. However, uncertainties about transmission and integration services are impediments to securing contracts for Montana wind resources.

Findings

3. There is (or will soon be) a significant amount of transmission capacity (from existing capacity, relatively low-cost upgrades and the planned retirement of Colstrip 1&2) to support development of a substantial quantity of Montana renewables for export to the Pacific Northwest, but not necessarily all the way to the I-5 load centers.

Findings

Available Transmission Capacity for Montana Exports -2019				
	East of Garrison	West of Garrison	West of Hatwai	Mid-C to I-5
NWE to AVA to Mid-C	297	297	297	0
NWE to BPA	246	0	0	0
Montana Intertie	184	0	0	0
BPA RAS Upgrade	0	0	0	0
PSE Colstrip 1&2	0	0	0	0
Total	727	297	297	0

Findings

Available Transmission Capacity for Montana Exports -2022				
	East of Garrison	West of Garrison	West of Hatwai	Mid-C to I-5
NWE to AVA to Mid-C	297	297	297	0
NWE to BPA	246	0	0	0
Montana Intertie	184	0	0	0
BPA RAS Upgrade	0	200	200	0
PSE Colstrip 1&2	300	300	300	300
Total	1027	797	797	300

Findings

4. There is substantial uncertainty about the future status of Colstrip 3&4. However, the existing transfer capability of the Colstrip Transmission System can, with relatively minor reinforcements, support a one-for-one replacement of Colstrip generation with new resources, including variable energy resources.

Findings

5. A significant amount of dynamic transfer capability (DTC) is available to support development of a substantial quantity of Montana wind for export to the Pacific Northwest. DTC is necessary for compliance with the current Washington state renewable portfolio standard and enables options for integrating (balancing/regulating) Montana wind in Pacific Northwest balancing authorities.

Findings

6. Many of the transmission and integration challenges faced by Montana developers could be mitigated by the development of a Pacific Northwest regional transmission organization. However, formation of a regional transmission organization is a complex endeavor with potentially significant cost and governance issues.

Findings

7. The Montana Intertie Agreement, originally conceived and written to move Colstrip generation to loads, has provisions that may need to be modified to facilitate future use of capacity on the BPA Eastern Intertie and the Colstrip Transmission System.

Findings

8. State elected officials and regulators have authority to establish policies regarding the selection of resources used to serve electric consumers in their jurisdictions. While recognizing state prerogatives in setting policies, state renewable portfolio standards should not place additional eligibility requirements on out-of-state renewable resources without a just and reasonable basis for doing so.

Recommendations

1. BPA and the Colstrip Transmission System (CTS) owners should review the Montana Intertie Agreement (MIA) and the CTS Agreement and make modifications, if and as necessary, to facilitate future utilization of the Montana Intertie and CTS based on non-discriminatory, open access principles. This includes:
    a. Addressing third-party and non-Colstrip use.
    b. Reviewing the appropriateness of the MIA's 5% loss rate for third party use.

Recommendations

2. Developers of Montana renewable projects should present credible and executable transmission plans to potential purchasers. Purchasers considering Montana renewables should allow a reasonable period after a resource is identified for acquisition to work with the developer to execute the transmission plan.

Recommendations

3. As opportunities arise to meet flexible capacity needs for Montana renewables, BPA should consider requests for providing products and services for resources located outside the BPA balancing authority.

Recommendations

4. Pacific Northwest utilities that may have an interest in acquiring Montana renewables should include scenarios with Montana renewables when studying their flexible capacity needs.

Recommendations

5. BPA and NWE should seek a negotiated solution to the 184 MW transmission capacity dispute as soon as possible.

✓ Complete
June 18, 2018
(expected)

Recommendations

6. BPA should hold a pre-rate case workshop discussion on alternatives for the Montana Intertie rate.

Recommendations

7. BPA, Avista, NorthWestern Energy, and transmission customers should work together to evaluate possible changes to transmission tariffs and business practices that may be impediments to exporting Montana renewables.

Recommendations

8. BPA should evaluate the feasibility and business case for offering Conditional Firm service for Montana exports, especially as a bridge product on its external interconnections.

Recommendations

9. BPA should consider modifying its current policy to allow for developer-funded NEPA costs to be refunded if long-term firm (LTF) service is ultimately purchased at rolled-in embedded cost rates. This would be consistent with how environmental and permitting costs are treated by other transmission providers under FERC's "greater of" pricing policy.

PLANNING SUBCOMMITTEE

Findings

1. Remedial Action Scheme (RAS) participation will be necessary for any new generation acquiring firm transmission service across the CTS. The RAS must coordinate with the Acceleration Trend Relay (ATR) RAS at Colstrip as long as any Colstrip units are operating.

Findings

2. Under steady state conditions, studies performed to date did not identify thermal limit violations for any of the scenarios and did not identify new transmission lines as being required (as long as the 500 kV system is intact).

Findings

3. The studies that conducted dynamic stability analysis also found that the system performed reliably under stress, with no voltage excursions. Specific location and resource design will be reviewed for any necessary frequency response when available.

Findings

4. Adequate voltage support in the Billings, MT area may be a concern; the location of replacement generation may help address it.

   Voltage control can be provided by a number of means including generators, switched capacitors and reactors, Static Var Compensators (SVC), pumped storage, or synchronous condensers.

Findings

5. The 500 KV system is an essential component of reliable load service within Montana as well as for supporting exports to the Pacific Northwest.

Findings

6. Blackstart, sub-synchronous resonance mitigation, RAS, and WECC Path Rating requirements can be addressed timely with Colstrip unit retirements and identification of replacement generation.

Options for Incremental ATC Additions

- Some segments of unused Transmission System Capacity exist today
- Transmission System Capacity should become available as coal fired generation at Colstrip retires
- Incremental ATC can be added with 3 Projects
  - BPA Remedial Action Scheme (RAS)
  - Colstrip Transmission Upgrade
  - Montana to Washington

Options for Incremental ATC Additions

- BPA RAS
  - West of Garrison Incremental ATC – 200 MW
  - West of Hatwai Incremental ATC – 200 MW
  - Costs – ~ $ 2M per site – costs will be site specific
  - Timing – 1-3 years

Options for Incremental ATC Additions

- Colstrip Transmission Upgrade
  - Colstrip to Garrison Incremental ATC – 800 MW
  - Facilities – 500kV series compensation, line and transformer upgrades, sub-synchronous resonance protection, RAS
  - Costs – ~ $ 252 M
    - BPA – $ 127 M
    - CTS – $ 87 M
    - Avista – $ 38 M
  - Timing – ??? (Avista's items have been or will be completed)

Options for Incremental ATC Additions

- Montana to Washington
  - West of Garrison Incremental ATC – 600 MW (LTF)
  - West of Hatwai Incremental ATC – 550 MW
  - BPA Facilities – New substation, upgrade 5 existing substations, reconductor 11 miles of 500kV transmission
  - Costs – ~ $ 140 M
  - Timing – 2023
    - BPA proceeding with offers to pursue NEPA and preliminary engineering after 2016 Transmission Service Request Study and Expansion Process (TSEP) indicated need for additional capacity

Options for Incremental ATC Additions

Potential Transmission Capacity for Montana Exports				
	East of Garrison	West of Garrison	West of Hatwai	Mid-C to I-5
NWE to AVA to Mid-C	297	297	297	0
NWE to BPA	246	0	0	0
Montana Intertie	184	0	0	0
BPA RAS Upgrade	0	200	200	0
PSE Colstrip 1&2	300	300	300	300
M2W	0	600	550	0
CTS Upgrade	800	0	0	0
Total	1827	1397	1347	300

Recommendations

1. Studies must be done in a formal interconnection process when specific generators are identified to include:
    a. Local voltage control
    b. Sub-synchronous resonance
    c. RAS design

Recommendations

2. A Scope of Work should be developed to guide the studies needed should a future retirement or an unexpected, sustained outage of Colstrip Units 3 & 4 occur.

✓ Complete
May 2, 2018

Recommendations

3. NorthWestern should undertake timely blackstart, sub-synchronous resonance mitigation, RAS, and WECC Path Rating requirements when specific replacement generation for Colstrip unit retirement is identified and the technical attributes are known.

Recommendations

- For service on the existing BPA Network, BPA should consider:
  - Administrative changes that should result in additional ATC availability
  - A Conditional Firm product on its external interconnections (especially as a bridge product)

Recommendations

- For potential expansion of the BPA Network, BPA should consider:
  - Flexible, scalable options to meet service requests across BPA Network Flowgates including:
    - Non-wires solutions
    - Planning re-dispatch
    - Battery storage
    - Demand side management
  - Timing:
    - Commercial Assessment: Quarter 4 – 2018
    - Corresponding Cluster Studies: Quarter 1 – 2019

OPERATIONS SUBCOMMITTEE

Findings

1. NorthWestern does not have a Dynamic Transfer Capacity (DTC) limit on its system.

Findings

2. +/- 170 MW (340 MW dynamic range) of Dynamic Transfer Capability (DTC) is available at the Garrison interchange point.

Findings

3. The amount of wind that can be integrated is not equivalent to the amount of DTC available over a path.

   The capacity of wind that can be integrated is much greater than the DTC across the Montana Intertie.

Findings

4. DTC is consumed when resources are moving around within the hour. If movement in one direction only is deemed NOT to consume DTC on the Montana Intertie, integration of approximately 1000MW of wind can be accommodated within the current limit.

Findings

5. DTC can be increased by automating voltage control actions on transmission reactive devices. This option would not be cost prohibitive.

Findings

6. There are no DTC limitations between BPA and other NW parties. The DTC on the Montana Intertie is the limiting factor.

Findings

7. If DTC on the Montana Intertie is significantly increased in the future, interchange points further west may then be limiting.

Findings

8. A BPA study found that Montana wind needed approximately 25% of the balancing reserve needed for wind resources in the Columbia River Gorge to integrate into their balancing authority.

Findings

9. Variable Energy Resources will need to participate in Remedial Action Schemes (RAS), may need to provide local voltage support (depending on location), and will need to provide frequency response.

   Retaining Colstrip units to serve as synchronous condensers (to provide voltage support and inertia) may be an option.

Recommendations

1. BPA should determine that resource output in only one direction within an operating hour does not consume DTC.

✓Complete
March 6, 2018

Recommendations

2. BPA should implement a business practice to operationalize the decision that resource output in only one direction within an operating hour does not consume DTC.

Recommendations

3. Studies should be performed using actual Montana wind data to confirm the diversity characteristics and balancing reserve requirements of Montana wind resources.

Recommendations

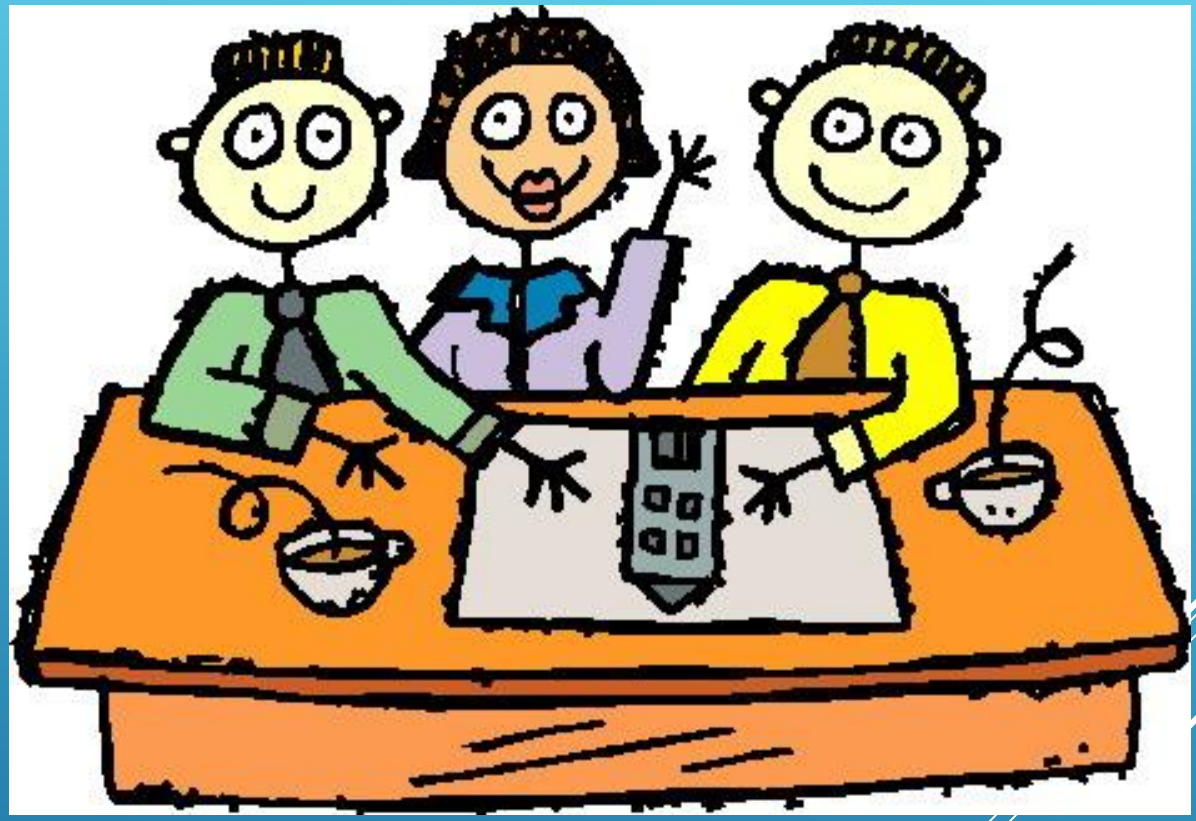
4. NorthWestern's studies should be finalized that identify:
   a. Regulation and load following for existing wind resources
   b. Regulation and load following for additional wind and solar resources
   c. Load variability by class

Recommendations

5. The viability of utilizing Colstrip units in condensing mode* to provide voltage support, inertia, and frequency response should be studied.

* Generators operating as synchronous condensers produce reactive power, but not real power. They 'motor' on the system – as such, they do not consume fuel. As spinning masses, they would also provide some inertia for damping during contingencies.

ADDITIONAL GUIDANCE, STEERING COMMITTEE?



…AND NOW, THE FINAL SPONSORS' BRIEFING IS NEXT

FINAL MEETING:

JUNE 18, 2018 (WITH SPONSORS)

12:30 PM – 2:00 PM (MDT)

HOLIDAY INN, DOWNTOWN MISSOULA

200 SOUTH PATTEE, MISSOULA, MT 59802

406-721-8550

ACRONYMS

ATC	Available Transmission Capacity
ATR	Acceleration Trend Relay
AVA	Avista
BAA	Balancing Authority Area
BPA	Bonneville Power Administration
CAISO	California Independent Systme Operator
CF	Conditional Firm Transmission Service
CTS	Colstrip Transmission System
CUP-West	Colstrip Upgrade Project - West
DTC	Dynamic Transfer Capability
EI	Eastern Intertie
EIM	Energy Imbalance Market
FERC	Federal Energy Regulatory Commission
GASH	Garrison Ashe Project
LTF	Long Term Firm Transmission Service
M2W	Montana to Washington Project
MATL	Montana Alberta Transmission Line.
MI	Montana Intertie
MIA	Montana Intertie Agreement
MRDAP	Montana Renewable Development Action Plan
NAESB	North American Energy Standards Board
NEPA	National Environmental Protection Act

ACRONYMS

NTTG	Northern Tier Transmission Group
NWE	NorthWestern Energy
OASIS	Open Access Sametime Information System
OATT	Open Access Transmission Tariff
PGE	Portland General Electric
PNW	Pacific Northwest
PSH	PSH Mechanical and Electrical Design Consultancy
PTC	Production Tax Credit
RAS	Remedial Action Scheme
RNW	Renewable Northwest
RPS	Renewable Portfolio Standard
RTO	Regional Transmission Organization
SAMTS	Service Across Multiple Transmission Systems
SSR	Sub-synchronous Resonance
TP	Transmission Provider
TSEP	Transmission Service Request Study and Expansion Process
TSR	Transmission Service Request
TTC	Total Transmission Capacity
WAPA	Western Area Power Administration
WOG	West of Garrison Cutplane
WOH	West of Hatwai Cutplane