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July 5, 2018

MEMORANDUM

TO: Council Members

FROM: Brian Dekiep and Mike Starrett

SUBJECT: MT Renewable Action Plan (BPA and Montana Partnership)

BACKGROUND:

Presenters: Brian Dekiep, Mike Starrett and Bill Pascoe (Pascoe Consulting)

Summary:

The Action Plan is the result of a partnership between the state of Montana and the Bonneville Power Administration with contributions for stakeholders, who jointly hosted a series of conversations focused on the potential to develop a long-term strategy to support the development of potential new renewable energy resources in Montana. The extensive participation of many parties, including public and private utilities, regulators, advocates and renewable resource developers, has improved regional understanding of the opportunities and barriers to development of renewable resources in Montana. The first meeting was held in Helena on December 8th, 2018 and concluded with its final meeting on June 18. The committee issued its report in late June 2018. Below is a link to BPA's website containing all materials from this initiative.

<https://www.bpa.gov/Projects/Initiatives/Montana-Renewable-Energy/Pages/Montana-Renewable-Energy.aspx>

Summary of conclusions:

The project subcommittees concluded that the environment for Montana renewables development is positive and could be enhanced by the actions recommended in this report. One of the project's significant conclusions is that the delivered cost of Montana renewables appears to be competitive with other renewable resources in the Northwest.

Even without further action, this process identified enough transmission capacity to move 360 megawatts of new renewables from Montana to parts of the Northwest. More transmission capacity will be available after the retirement of two units at the Colstrip Power Plant in 2022, and the capacity could be increased further with the investment of relatively minor transmission upgrades, compared to the cost of building new transmission lines.

In addition, there is enough available Dynamic Transfer Capacity (DTC) today at the Garrison interchange to accommodate the dynamic transfer of over 1,000 megawatts of wind. DTC is necessary for integrating variable resources. The existing DTC can be doubled at relatively low cost if necessary. Some of the actions identified in this process have already been completed. For example, BPA and NorthWestern Energy resolved a long-standing dispute over 184 megawatts of available transmission capacity from Montana to BPA. The resolution gives certainty to potential transmission customers looking for transmission capacity from Montana to markets in the west. Going forward, potential purchasers can acquire transmission capacity from either BPA or NorthWestern.

By following through on the remaining actions items, the conditions for developing renewable resources would be further enhanced. These recommended actions range from modifying transmission agreements that may be needed to enable other parties to use the Colstrip Transmission System, to following through with work underway to relieve congestion on BPA's system to aid in delivery to Pacific Northwest load centers.

MONTANA RENEWABLE DEVELOPMENT ACTION PLAN

RECOMMENDATIONS AND FINDING

NWPCC Meeting: June 10-11, 2018
Missoula, Montana



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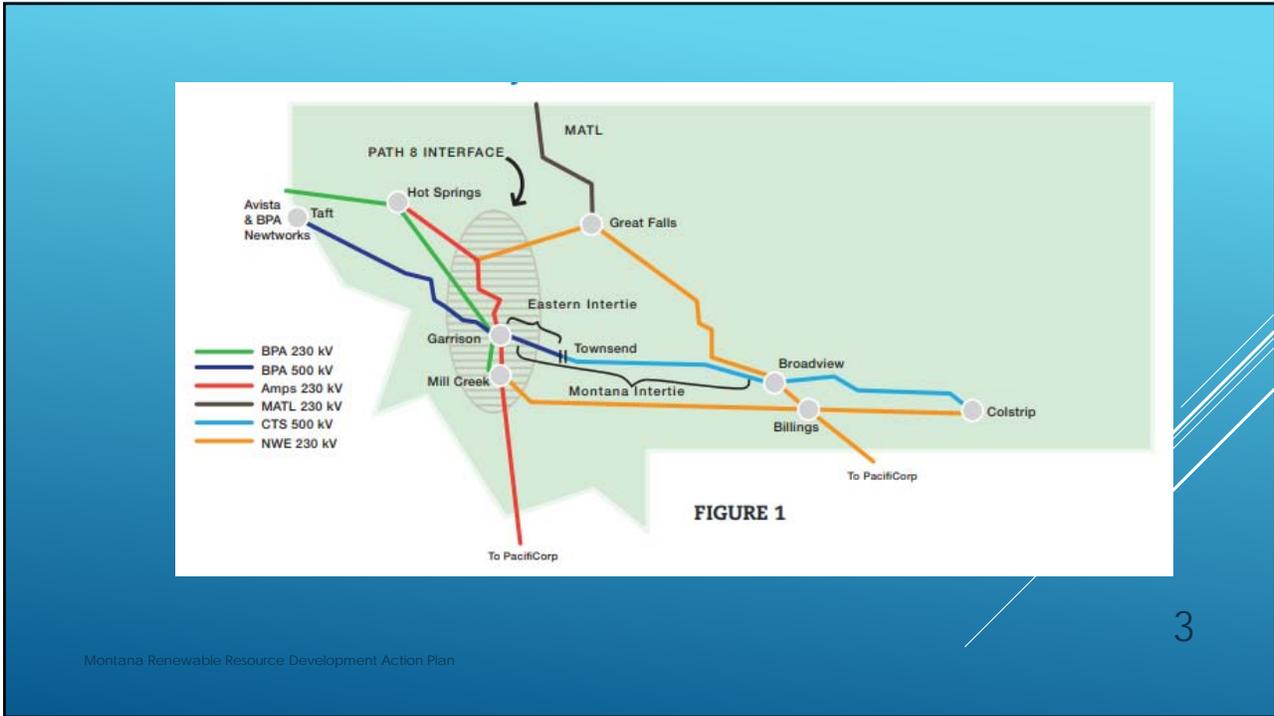
Montana Renewable Resource Development Action Plan

- ▶ Sponsored by BPA Administrator Elliot Mainzer and Montana Governor Steve Bullock
- ▶ First Meeting held in Helena on December 8th 2018, final meeting was June 18th in Missoula.
- ▶ Organized in a structure of 3 working committees guided by a steering committee. (1) commercial/policy, (2) planning, and (3) operational issues.
- ▶ Committees addressing transmission, ancillary services, regulatory, commercial and viability issues.
- ▶ A final report published by the steering committee in late June

This presentation primarily uses slides created by the broad stakeholder driven committees to summarize major findings and recommendations

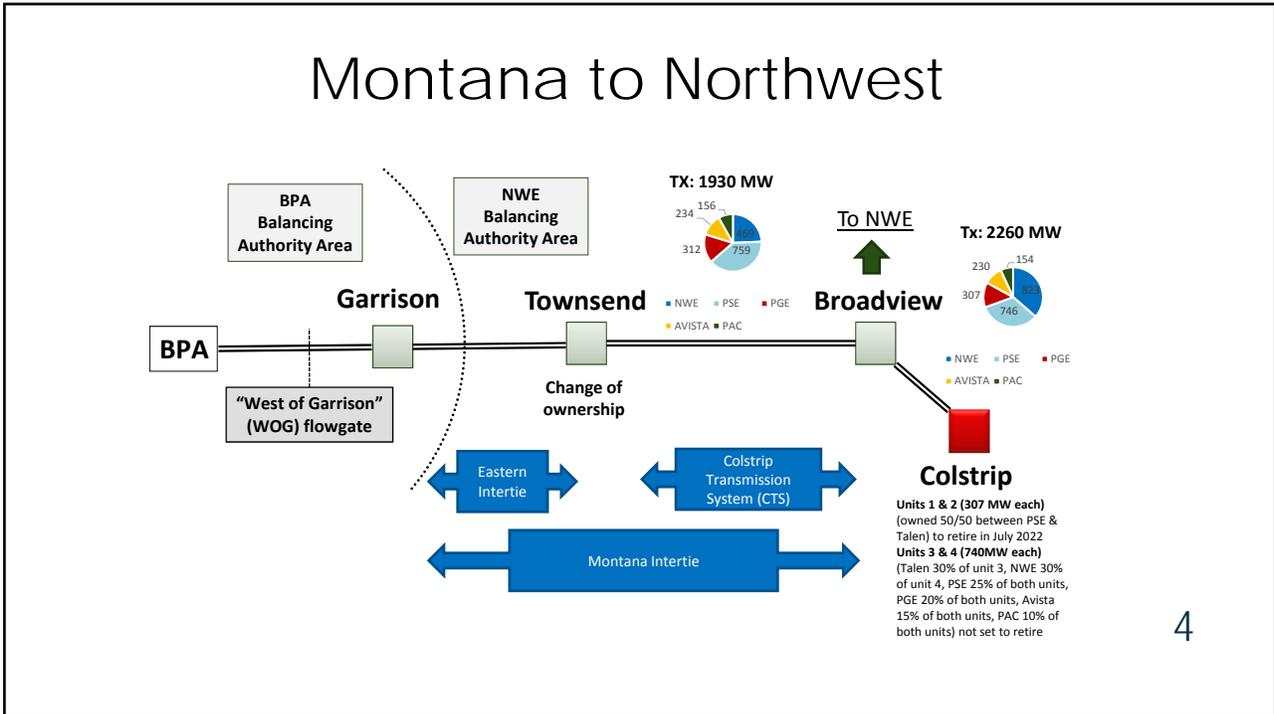
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Montana Renewable Resource Development Action Plan



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▶ **Project Specifics:**

✓ **Objective**

- ✓ Explore opportunities and barriers to Montana's potential renewable resources
- ✓ Recommend solutions to barriers
- ✓ Initiate actions to achieve solutions

▶ **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

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Council Staff Initial Highlights(1/2)

- Several hundred megawatts of unused Transmission System Capacity is available today and can reach mid-Columbia, but not necessarily all the way to Interstate-5 load centers
- There is enough dynamic transfer capability to support the development of 1,000 MW of wind for export to the Pacific Northwest. This is a requirement for Washington's RPS.
- The rights-holders of MT-NW transmission capacity currently used to deliver energy from Colstrip 1 & 2 have flexibility with next steps after retirement
 - Options could include adding new generation, reassigning the rights, possibly re-directing, or other

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Council Staff Initial Highlights(2/2)

- Publicly available steady state and dynamic studies done to date have demonstrated reliable system operation across a number of Colstrip retirement scenarios
- The study results indicate new transmission lines are not needed to reliably maintain high transfer capability as long as the Colstrip 500-kV system remains in tact
- With relatively minor investments (compared to new line builds), the existing transfer capability of the Colstrip Transmission System can support a one-for-one replacement of Colstrip generation with new sources including renewables
- Slides to follow describe study requirements for interconnection 7 of specific projects



COMMERCIAL POLICY SUBCOMMITTEE

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MARKETS

FINDING: Advocates for Montana renewables are “pushing” the export of Montana renewables. There needs to be a corresponding interest from potential purchasers “pulling” for their acquisition.

FINDING: The delivered cost of Montana wind resources to Pacific Northwest utilities appear to be cost competitive with other renewable resources. However, uncertainties about transmission and integration services can be impediments to securing contracts for Montana wind resources.

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MARKETS

RECOMMENDATION: Renewables developers 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.

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TRANSMISSION AVAILABILITY

FINDING: There is (or will soon be) a significant amount of transmission capacity 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.

FINDING: The existing transfer capability of the Colstrip Transmission System can, with relatively minor reinforcements (though still in the \$M's), support a one-for-one replacement of Colstrip generation with new resources, including variable energy resources.

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TRANSMISSION AVAILABILITY

Existing and **Potential** Transmission Capacity for Montana Exports

	East of Garrison	West of Garrison	West of Hatwai	Cross Cascades
NWE to AVA to Mid-C	297	360	360	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
SUBTOTAL	1,027	860	860	300
CTS & M2W Upgrades	800	600	550	0
TOTAL	1,827	1,460	1,410	300

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TRANSMISSION AVAILABILITY

RECOMMENDATION: BPA and NWE should seek a negotiated solution to the 184 MW transmission capacity dispute as soon as possible. [Completed.]

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

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MONTANA INTERTIE

FINDING: The Montana Intertie Agreement may need to be modified to facilitate future use of capacity on the BPA Eastern Intertie and the Colstrip Transmission System.

RECOMMENDATION: 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 use by resources other than Colstrip.

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

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TARIFFS & BUSINESS PRACTICES

RECOMMENDATION: Transmission owners and customers should work together to evaluate possible comparable changes to tariffs and business practices that may be impediments to exporting Montana renewables.

RECOMMENDATION: BPA should consider allowing 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.

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INTEGRATION / ANCILLARY SERVICES

FINDING: 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 RPS and enables options for integrating Montana wind in PNW BAs.

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

RECOMMENDATION: Pacific Northwest utilities interested in acquiring Montana renewables should include scenarios with Montana renewables when studying their flexible capacity needs.

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REGIONAL TRANSMISSION

FINDING: Many of the transmission and integration challenges for Montana developers could be mitigated by formation of a Pacific Northwest Regional Transmission Organization. However, formation of an RTO is a complex endeavor with potentially significant cost and governance issues.

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RENEWABLE PORTFOLIO STANDARDS

FINDING: 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 consider the impacts of additional requirements on out-of-state renewable resources, and the propriety of imposing such requirements.

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PLANNING SUBCOMMITTEE

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Major Findings

1. New generation must participate in Remedial Action Schemes (RAS) and coordinate with the Acceleration Trend Relay (ATR) RAS at Colstrip as long as the ATR or its replacement are needed.

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Major Findings

2. As long as the Colstrip 500-kV transmission system remains intact and with the proper enhancements, new transmission lines are not needed to reliably maintain high transfer capability. The 500-kV system is also essential for reliable load service within Montana and for exports to the Pacific Northwest.

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Major Findings

3. 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.

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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
- Assuming transmission service requests to pay for the investment, incremental ATC can be added with 3 Projects:
 - BPA Remedial Action Scheme (RAS)
 - Colstrip Transmission Upgrade
 - Montana to Washington

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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

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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.

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Recommendations

3. NorthWestern, with support from the other Colstrip Owners and BPA 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.

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Recommendations

4. 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)

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Recommendations

5. 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
 - Storage (pumped storage, batteries, etc.)
 - Demand side management

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OPERATIONS SUBCOMMITTEE

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Major Findings

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

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Major Findings

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

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Major Findings

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

More than 1000MW of wind can be accommodated within the current limit. If movement in one direction only is not deemed to consume DTC on the Montana Intertie, 1400MW can be integrated.

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Major Findings

4. DTC can be approximately doubled by automating voltage control actions on transmission reactive devices. This option would low cost.

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Major Findings

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

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

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Major Findings

6. If a wind plant located in Montana is integrated with wind resources in the Columbia River Gorge, the incremental increase in the balancing reserve requirement is 25% that of a same size plant in the Gorge.

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Major Findings

7. There are potential flexible capacity resources on the eastern side of the Montana Intertie (e.g. pumped storage). Because these resources would be on the same side of the intertie as the potential wind, their use for balancing would lessen the DTC impact.

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Major Findings

8. Variable Energy Resources must participate in Remedial Action Schemes (RAS), provide local voltage support (depending on location), and provide frequency response.

Retaining Colstrip units to serve as synchronous condensers (to provide voltage support and inertia) may be an option, though there may be complications or complexity in this finding this committee did not evaluate.

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Recommendations

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

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Recommendations

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

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Recommendations

4. NorthWestern's studies should be finalized that identify:
 - Regulation and load following for existing wind resources
 - Regulation and load following for additional wind and solar resources

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Recommendations

5. The viability of utilizing Colstrip units in condensing mode as well as the Gordon Butte pumped storage facility to provide voltage support, inertia, and frequency response should be studied.

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