# NTTG 2018-2019 Revised Draft Final Regional Transmission Plan 09/24/19

**Note: "Additional resource" reference links are referred to throughout this draft report and are still under development. The final report will include these links.**

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# Executive Summary

Transmission investment decisions that affect a region may be better informed by a regional perspective. That is the overarching idea that drives the Northern Tier Transmission Group's (NTTG's) Regional Transmission Plan (RTP).

Commented [NTTG1]: Additional Resource Reference Link

NTTG conducts regional reliability and economic studies of the local transmission plans, rolled up, to determine if there are regionally significant alternatives that may meet the transmission needs of the region more efficiently. The idea is that a regional transmission plan may produce a more efficient or cost-effective plan than a rollup of the local plans[1] .

The NTTG 2018-2019 RTP is developed in accord with NTTG Transmission Providers' Attachment K, which includes FERC Order Nos. 890 and 1000 regional and interregional transmission planning requirements. Specifically, the plan analyzes whether NTTG's transmission needs in 2028 would best be satisfied with projects of a regional or interregional scope.

To arrive at a conclusion, NTTG used a two-year process of identifying transmission requirements and performing reliability and economic analyses on several collections of transmission projects, or Change Cases[2]: the prior (2016-2017) RTP, an Initial RTP made up of projects from the prior RTP and projects included in the Full Funders' Local Transmission Plans, and Change Cases that included Non-Committed regional projects and Interregional Transmission Projects.

Through a reliability study process, NTTG narrowed the number of potential RTP cases to two: the Initial RTP and the prior RTP[3].

During Quarter 5, NTTG received and incorporated stakeholder comments into the report. The new data did not contain material changes that would have caused NTTG to alter the RTP. Stakeholders also submitted one Economic Study Request.

After completing its reliability analysis, NTTG did an economic analysis of the initial RTP and the prior RTP. The economic analysis compared the annualized incremental costs of the two potential RTP cases. The annual incremental cost of the prior RTP was computed and found to be more than $100 million less expensive than the cost of the Initial RTP.

[1] NTTG's regional transmission planning process is not intended to be a replacement for local transmission or resource planning.
[2] Terms are capitalized to be consistent with the Attachment K. Capitalized terms are defined in the glossary.
3 NTTG's 2016-2017 RTP.

Based on the reliability and economic considerations for the transfers studied, the more efficient or cost-effective draft plan that emerged was the prior RTP. This plan includes four regionally significant projects:

1. Boardman to Hemingway (B2H) in Oregon and Idaho
2. Gateway West with six subsections in Idaho and Wyoming
3. Gateway South in Wyoming, Colorado and Utah
4. Antelope projects with two subsections in Idaho

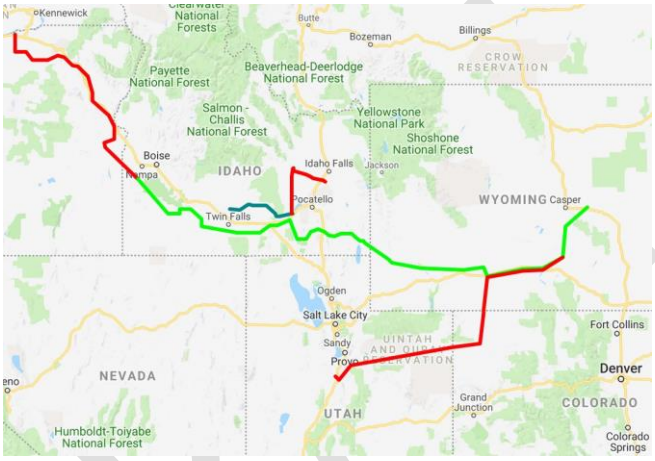


**Figure 1. Transmission projects comprising 2018-2019 NTTG RTP**

Stakeholder input on the RTP was accepted and evaluated throughout the biennial planning cycle. NTTG posted the Draft RTP in December 2018 (Quarter 4) for stakeholder comment and the Draft Final RTP in Quarter 6 for public comment. The revised Draft Final RTP was made available for public comment in Quarter 7. The Planning Committee recommended submittal of the RTP to the NTTG Steering Committee in Quarter 8. The Steering Committee approved the RTP in Quarter 8.

## PLAN ASSUMPTIONS AND CAVEATS

The NTTG 2018-2019 RTP informs local transmission projects but does not serve as a construction plan. To develop the RTP, NTTG relies on the load and resource data submitted by members. It does not consider the re-dispatch or re-optimization of resource assumptions. NTTG conducts the RTP studies in line with the NTTG Transmission Providers' Attachment K.

NTTG's transmission plan assumes that its members' submissions are reasonable and cost-effective. The transmission plan does not attempt to design an optimal portfolio of resources to meet the expected demand of the region's consumers. Instead, it aims to identify a reliable and cost-effective portfolio of transmission around the inputs of NTTG members. The 2018-2019 RTP represents a lower-cost transmission plan than one represented by a rollup of the combined Transmission Provider's plans.

To the degree that those NTTG Transmission Providers' inputs are not realistic or cost-effective, the resulting NTTG Transmission Plan will likely be affected. However, NTTG regards correcting such potential errors as work to be undertaken in the context of integrated resource plans conducted by individual load-serving entities in their respective states.

## THE NORTHERN TIER TRANSMISSION GROUP

NTTG formed in 2007 to provide a forum where all interested stakeholders, including Transmission Providers, customers and state regulators, can participate in an open, transparent, coordinated regional transmission planning process. The process is intended to promote effective planning and use of the multi-state electric transmission system within the NTTG footprint spanning from the Pacific Northwest to the desert Southwest.


**Figure 2. NTTG footprint**

NTTG fulfills requirements of the Federal Energy Regulatory Commission (FERC) Order No. 1000 for each public utility transmission provider to participate in a regional transmission planning process that produces a regional transmission plan and, if appropriate, includes a regional cost-allocation method.

NTTG evaluates transmission projects that move power across the regional bulk electric transmission system, serving load in its footprint and wheeling electricity to external markets. The transmission providers belonging to Northern Tier serve more than 4.3 million retail customers with more than 29,000 miles of high-voltage transmission lines. These members provide service across much of Utah, Wyoming, Montana, Idaho and Oregon, and parts of Washington and California.

NTTG works with other entities—the Western Electricity Coordinating Council (WECC) for reliability data and neighboring Planning Regions (e.g., ColumbiaGrid, WestConnect and California Independent System Operator (CAISO)) for interregional project coordination.

## NORTHERN TIER MEMBERS

Deseret Power Electric Cooperative
Idaho Power Company
Idaho Public Utilities Commission
MATL LLP
Montana Consumer Counsel
Montana Public Service Commission
NorthWestern Energy
Oregon Public Utility Commission
PacifiCorp
Portland General Electric
Utah Associated Municipal Power Systems (UAMPS)
Utah Office of Consumer Services
Utah Public Service Commission
Wyoming Office of Consumer Advocates
Wyoming Public Service Commission

PURPOSE OF THE PLAN

The NTTG RTP aims to produce, if possible, a more efficient or cost-effective regional plan to meet the needs of the region compared with a plan that rolls up the local Transmission Providers' transmission plans and other Change Case transmission plans studied.

This study process complies with FERC Order No. 1000, Attachment K—Regional Planning Process. FERC Order No. 1000 mandates that public utility transmission providers participate in a regional transmission planning process that produces a regional transmission plan. It also requires that local and regional transmission planning processes consider transmission needs driven by state or federal public policy requirements. Lastly, it requires public utility transmission providers in neighboring transmission planning regions to coordinate in finding more efficient or cost-effective solutions to their transmission needs.

## PLAN DEVELOPMENT PROCESS

The RTP is developed through a two-year, five-step process:

1) Identification of the transmission requirement for the NTTG footprint, derived from the data submissions from the local transmission providers

2) Reliability analysis and evaluation of the Initial RTP and Alternative Projects (including interregional projects) through Change Cases

3) Economic analysis and evaluation comparing the annualized incremental costs of the Initial RTP and the Change Cases that perform acceptably

4) Selection of the projects that yield a regional transmission plan that is more efficient or cost-effective than a rollup of the local providers' plans

5) Cost allocation for any projects submitted for the purposes of cost allocation and selected into the RTP if they are deemed to be eligible for cost allocation

## BIENNIAL CYCLE

NTTG follows an eight-quarter planning cycle to produce the 10-year RTP. In the first step, the Planning and Cost Allocation Committees pre-qualify[4] Transmission Developers who properly submit their transmission project to be considered for regional cost allocation (should the sponsor's project be selected in the RTP for cost allocation). The biennial cycle includes steps to collect, evaluate and analyze transmission and non-transmission data, produce and publish a draft plan, gather stakeholder and public input, update the plan and complete the cycle with the publishing of an RTP.


**Figure 3. Eight-quarter planning process**

**Commented [NTTG2]:** Graphic will be updated for current biennial cycle

[4] Pursuant to Attachment K, Section Pre-qualify for Cost Allocation, a Project Sponsor that intends to submit a project for cost allocation must be pre-qualified before the beginning of the 2018-2019 biennial planning cycle (i.e., the last quarter of the prior planning cycle).

## BIENNIAL STUDY PLAN

The Biennial Study Plan outlines the process that NTTG follows to develop its 10-year RTP. It provides the framework to guide plan development. It also describes NTTG's process to determine if a properly submitted Interregional Transmission Project (ITP) would yield a transmission plan that is a more efficient or cost-effective solution to NTTG's regional transmission needs.

The NTTG Planning Committee manages the Study Plan. The Planning Committee establishes the Technical Work Group (TWG) subcommittee to develop the Study Plan. The TWG also performs the necessary technical evaluations for the RTP and assesses any projects, including ITPs, submitted to NTTG. TWG members are NTTG Planning Committee members or their designated technical representatives. They have access to and expertise in power-flow analysis for power systems or production-cost modeling, or both.

Developed during Quarter 2 of the biennial planning cycle, the Study Plan establishes the:

- Study methodology and criteria
- Study assumptions based on the loads, resources, point-to-point transmission requests, desired flows, constraints and other technical data submitted in Quarter 1 and updated in Quarter 5 of the regional planning cycle
- Software analysis tools
- 2028 production cost–model database and hours to be selected for reliability analysis
- Evaluation criteria for reliability and transmission service obligations
- Capital cost, energy losses and reserve-sharing metric calculations
- Public Policy Requirements and Public Policy Considerations

The Study Plan is posted for stakeholder comment, recommended for approval by the Planning Committee and approved by the Steering Committee during Quarter 2 of the biennial cycle. Data submission updates are provided in Quarter 5, leading to any Study Plan revisions in Quarter 6, if needed. For any differences between what is stated in the Study Plan and the process stated in the NTTG Transmission Providers' FERC Order 1000 Attachment K, the Attachment K will take precedence.

## STUDY METHODOLOGY

To determine the more efficient or cost-effective transmission plan, the TWG subcommittee conducted reliability and economic studies in accordance with the 2018-2019 Study Plan. The Study Plan and ultimately the RTP reflect the NTTG Transmission Providers' Attachment K requirements to satisfy its transmission needs.

NTTG's regional transmission planning does not investigate local transmission planning or generation decisions related to integrated resource planning. Rather, NTTG's methodology uses a regional perspective to question the Initial RTP's roll-up of Non-Committed regional transmission projects. The goal is to identify, if possible, a regional transmission plan that is more efficient or cost-effective than the aggregated Full Funder's transmission plans.

In conducting its regional studies, NTTG uses regional transmission and non-transmission alternatives, if any, to honor the local transmission needs. NTTG's reliability studies assume existing generation and proposed future generation have similar firm transmission rights. Re-dispatch of either existing or future generation to relieve transmission congestion is not considered in long-term planning analysis to meet the NTTG firm load requirements.

The reliability studies used production-cost modeling and power-flow studies. The production-cost model results were used to identify nine stressed hours. After review of the cases, eight were subjected to reliability analysis using a power-flow model. The input and output data for these selected hours were transferred, using the round-trip process, from the production-cost model (i.e., GridView) to a power-flow model (i.e., PowerWorld) to perform the technical reliability analysis.

Next, economic studies employed the Attachment K's three metrics—capital related costs, energy losses and reserves—to analyze those Change Case plans that were deemed reliable to further determine the cost-effectiveness of the NTTG transmission plan.

### Production-Cost Modeling

The TWG examined 8,760 hours of data using GridView[5] production-cost software to determine stressed conditions within the NTTG footprint. The production-cost dataset representing the year 2028 was obtained from the 2028 ADS case of the Western Electricity Coordinating Council (WECC). This case included a representation of the load, generation and transmission topology of the WECC interconnection-wide transmission system 10 years into the future.

After a review that resulted in updates and corrections to load, resource and transmission data, the TWG used a modified ADS case to simulate the entire year and used those results to select

[5] GridView is a registered product of ABB.

and create stressed conditions that affect the NTTG area for study. For a more detailed discussion of the conditions and hours, see the section on stress-conditioned case study results.

### Power-Flow Cases

For the next step in the process, the TWG used PowerWorld[6] simulation software to convert the production-cost model for the eight stressed hours into power-flow cases. Each of the stressed cases was then reviewed by the TWG to ensure that the case met steady-state system performance criteria (no voltage issues or thermal overloads). To better reflect possible highly stressed conditions for the selected peak loads within the NTTG footprint, the balancing area loads in the power-flow model were adjusted for the summer and winter peak power-flow cases.

Bubble diagrams showing the inter-area flows for each of the stressed cases are included in the RTP in Section IV, Stress-Conditioned Case Study Results.

**Commented [NTTG3]:** This will be highlighted graphically as an Additional Resource Reference.

## DATA SUBMISSION

Information flows into NTTG during Quarter 1 and is updated in Quarter 5 of the biennial cycle. Transmission Providers and stakeholders may supply data on forecasted firm-energy obligations and commitments required to support the transmission system within the NTTG footprint. The data may include load forecasts, resources, transmission topology, transmission service and Public Policy Requirements submissions. Regional transmission projects submitted in Quarter 1 are shown in Table 1 and include those from the prior RTP, Transmission Provider Local Transmission Plans (LTP), Sponsored Projects, unsponsored projects and Merchant Transmission Developer Projects.

### Forecasted Loads

Participating load-serving entities provide load forecasts for balancing authority areas internal to the NTTG footprint. These loads represent an average expected peak[7] and are generally the same as those found in the participants' official load forecasts (such as those in integrated resource plans) and are similar to those provided to the Load and Resource Subcommittee of the WECC Planning Coordination Committee. Transmission Providers and Stakeholders can update their Quarter 1 submissions in Quarter 5, if there have been material changes. Overall average loads increased by more than 500 MW in the two years since the prior planning period. Figure 4 summarizes the load forecast used in the 2018-2019 planning cycle.

[6] PowerWorld is a registered trademark of PowerWorld Corp.

[7] A peak condition that has an equal probability to occur or not in a given year, sometimes referred as a 50 percent exceedance level or a 1 in 2 peak. A 1 in 5 peak would have a 20 percent chance of exceedance.

| SUBMITTED BY: | 2017 Actual Peak Demand (MW) | 2026 Summer Load Data Submitted in 2016-17 (MW) | 2028 Summer Load Data Submitted in Q1 2018 (MW) | 2028 Summer Load Data Submitted in Q5 2019 (MW) | Difference (MW) 2026-2028 |
|---|---|---|---|---|---|
| **Idaho Power** | 3,806 | 4,346 | 4,412 | 4299 | -47 |
| **NorthWestern** | 1,803 | 1,992 | 2,027 | 2030 | 38 |
| **PacifiCorp** | 12,664 | 13,044 | 13,386 | 13,386 | 342 |
| **Portland General** | 4,023 | 3,885 | 3,928 | 4060 | 175 |
| **TOTAL*** | 22,296 | 23,267 | 23,753 | 23,775 | 508 |

* Loads for Deseret G&T and UAMPS are included in PacifiCorp East

**Figure 4. 2028 NTTG forecasted loads**

## Forecasted Resources

NTTG received 1,799 MW of proposed new generation resources from its funding Transmission Providers for consideration in the RTP. Figure 5 shows these incremental resources within the NTTG footprint and compares submissions from the prior RTP with submissions for Quarters 1 and 5 of the current cycle. The total resources forecasted in Quarter 5 for 2028 represent a reduction of 1,401 MW, or 44 percent, from the 3,200 MW forecast in the same period of 2016 for 2026.

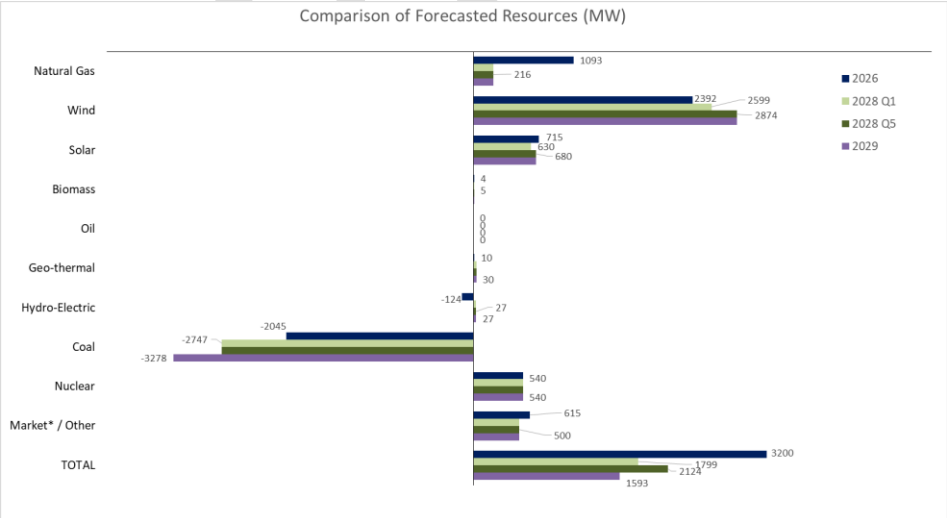


**Figure 5. Comparison of forecasted NTTG resources**

As shown in Figure 6, a significant number of coal-fired generating plants are scheduled for retirement during the planning horizon. The Cholla 4 and Craig Unit 1 coal plants lie outside the NTTG footprint, in Arizona and Colorado, respectively, but are reflected in Figure 5 (Forecasted Resources). Additionally, PacifiCorp plans to retire the Naughton 1 and 2 coal plants after 2029. Those retirements will be considered by NTTG during its next biennial planning cycle.

| Coal Unit | Retirement Date[8] | Study Treatment |
|---|---|---|
| **Naughton 3** | 12/2018 | Retired |
| **Valmy 1** | 12/2019 | Retired |
| **Boardman** | 12/2020 | Retired |
| **Cholla 4**[9] | 12/2020 | Retired |
| **Colstrip 1 & 2** | 7/2022 | Retired |
| **Valmy 2** | 12/2025 | Retired |
| **Craig 1**[9] | 12/2025 | Retired |
| **Dave Johnson 1, 2, 3, 4** | 12/2027 | Retired |
| **Bridger 1** | 12/2028 | On-line, Retired in Sensitivity case |

**Figure 6. Planned coal retirements**

Figure 5 also reflects PacifiCorp's Energy Vision 2020 wind resource acquisition plan.

### Transmission Facilities and Service Submissions

Table 1 shows the regional transmission projects submitted in Quarter 1. Project types include those submitted through the prior RTP and Full Funders' Local Transmission Plans (LTPs), as well as Sponsored, Unsponsored or Merchant Transmission Developer Projects. NTTG also received two firm transmission-service obligation submissions from Idaho Power. The Initial RTP was derived from projects included in the prior RTP and projects included in the Full Funders' LTPs.

[8] Units are assumed to retire at the end of the stated month.
[9] Reflects PacifiCorp's retirement of coal retirements outside the NTTG footprint

## MARCH 2018 DATA SUBMITTAL – TRANSMISSION ADDITIONS BY 2028

| Submitter | From | To | Voltage | Circuit | Type | Regionally Significant[10] | Committed | Projects (In-service Year) |
|---|---|---|---|---|---|---|---|---|
| Idaho Power | Hemingway | Longhorn | 500 kV | 1 | LTP & pRTP | Yes | No | B2H Project (2026) |
| | Hemingway | Bowmont | 230 kV | 2 | LTP | Yes | No | New Line - associated with Boardman to Hemingway (2026) |
| | Bowmont | Hubbard | 230 kV | 1 | LTP | Yes | No | New Line - associated with Boardman to Hemingway (2026) |
| | Hubbard | Cloverdale | 230 kV | 1 | LTP | No | No | New Line (2021) |
| | Midpoint | Hemingway | 500 kV | 2 | LTP | Yes | No | Gateway West Segment #8 (joint with PacifiCorp East) (2024) |
| | Cedar Hill | Hemingway | 500 kV | 1 | LTP & pRTP | Yes | No | Gateway West Segment #9 (joint with PacifiCorp East) (2024) |
| | Cedar Hill | Midpoint | 500 kV | 1 | LTP | Yes | No | Gateway West Segment #10 (2024) |
| | Midpoint | Borah | 500 kV | 1 | LTP & pRTP | Yes | No | (convert existing from 345 kV operation) (2024) |
| | Ketchum | Wood River | 138 kV | 2 | LTP | No | No | New Line (2020) |
| | Willis | Star | 138 kV | 1 | LTP | No | No | New Line (2019) |
| Enbridge | SE Alberta | | DC | 1 | LTP | Yes | No | MATL 600 MW Back to Back DC Converter (2024) |
| PacifiCorp East | Aeolus | Clover | 500 kV | 1 | LTP & pRTP | Yes | No | Gateway South Project – Segment #2 (2024) |
| | Aeolus | Anticline | 500 kV | 1 | LTP & pRTP | Yes | No | Gateway West Segments 2&3 (2020) |
| | Anticline | Jim Bridger | 500 kV | 1 | LTP & pRTP | Yes | No | 345/500 kV Tie (2020) |
| | Anticline | Populus | 500 kV | 1 | LTP & pRTP | Yes | No | Gateway West Segment #4 (2024) |
| | Populus | Borah | 500 kV | 1 | LTP | Yes | No | Gateway West Segment #5 (2024) |
| | Populus | Cedar Hill | 500 kV | 1 | LTP & pRTP | Yes | No | Gateway West Segment #7 (2024) |
| | Antelope | Goshen | 345 kV | 1 | LTP | Yes | No | Nuclear Resource Integration (2026) |
| | Antelope | Borah | 345 kV | 1 | LTP | Yes | No | Nuclear Resource Integration (2026) |
| | Windstar | Aeolus | 230 kV | 1 | LTP & pRTP | Yes | No | Gateway West Segment #1W (2024) |
| | Oquirrh | Terminal | 345 kV | 2 | LTP | Yes | Yes | Gateway Central |
| | Cedar Hill | Hemingway | 500 kV | 1 | LTP | Yes | No | Gateway West Segment #9 (joint with Idaho Power) (2024) |
| | Shirley Basin | Standpipe | 230 kV | 1 | LTP | Yes | No | Local Wind Integration (2020) |
| PacifiCorp West | Wallula | McNary | 230 kV | 2 | LTP | Yes | Yes | Gateway West Segment A (2020) |
| Portland General | Blue Lake | Gresham | 230 kV | 1 | LTP | No | Yes | New Line (2018) |
| | Blue Lake | Troutdale | 230 kV | 1 | LTP | No | Yes | Rebuild (2018) |
| | Blue Lake | Troutdale | 230 kV | 2 | LTP | No | Yes | New Line (2018) |
| | Horizon | Springville Jct | 230 kV | 1 | LTP | No | Yes | New Line (Trojan-St Marys-Horizon) (2020) |
| | Horizon | Harborton | 230 kV | 1 | LTP | No | Yes | New Line (re-terminates Horizon Line) (2020) |
| | Trojan | Harborton | 230 kV | 1 | LTP | No | Yes | Re-termination to Harborton (2020) |

[10] Regionally significant transmission projects are generally those that affect transfer capability between areas of NTTG. Projects that are mainly for local load service are not regionally significant. Projects that are not regionally significant will be placed into all Change Cases and not tested for impact on the RTP. The facilities submitted in the LTPs will be removed in the Null Case.

| Submitter | From | To | Voltage | Circuit | Type | Regionally Significant[10] | Committed | Projects (In-service Year) |
|---|---|---|---|---|---|---|---|---|
| | St Marys | Harborton | 230 kV | 1 | LTP | No | Yes | Re-termination to Harborton (2020) |
| | Rivergate | Harborton | 230 kV | 1 | LTP | No | Yes | Re-termination to Harborton (2020) |
| | Trojan | Harborton | 230 kV | 2 | LTP | No | Yes | Re-termination to Harborton (2020) |
| | | | 115 kV | 1 | LTP | No | Yes | Various Load Service Additions (2019-2024) |

**Table 1. Proposed NTTG transmission additions by 2028**

## INTERREGIONAL PROJECT COORDINATION

As part of interregional coordination, NTTG and the other regional entities in the Western Interconnection collaborate during their transmission planning processes to coordinate their interregional transmission planning data. These coordination efforts inform each planning region's transmission plans.

A properly submitted ITP is evaluated as an Alternative Project in NTTG's regional planning process. ITPs are analyzed to determine whether an ITP alone or in combination with other ITPs or other Non-Committed Projects could, from a regional perspective, satisfy NTTG's transmission needs on a regional or interregional basis more efficiently or cost effectively than through local planning processes. The set of Non-Committed Projects (regional, interregional or both) that result in the more efficient or cost-effective plan forms the RTP.

| SUMMARY OF Q1-2018 INTERREGIONAL PROJECTS SUBMITTED TO NTTG | | | | | | |
|---|---|---|---|---|---|---|
| **Project Name** | **Company** | **Relevant Planning Region(s)** | **Termination From** | **Termination to** | **Status** | **In Service Date** |
| Cross-Tie Transmission Project | TransCanyon, LLC | NTTG, WestConnect | Clover, UT | Robinson Summit, NV | Conceptual | 2024 |
| SWIP-North[11] | Great Basin Transmission LLC | CAISO[12], NTTG, WestConnect | Midpoint, ID | Robinson Summit, NV | Permitted | 2021 |
| TransWest Express Transmission DC/AC Project18 | TransWest Express, LLC | CAISO, NTTG, WestConnect | Rawlins, WY | Boulder City, NV | Conceptual | 2022 |
| TransWest Express Transmission DC Project[13] | TransWest Express, LLC | CAISO, NTTG, WestConnect | Rawlins, WY | Boulder City, NV | Conceptual | 2022 |

**Table 2. Interregional Transmission Projects submitted to NTTG (Q1 2018)**

## STRESS-CONDITIONED CASE STUDY RESULTS

The TWG performed a rigorous contingency analysis on eight of the nine stress-conditioned cases[14]. This contingency analysis consisted of over 445 single contingencies and 36 credible double contingencies, to determine if each contingency met the system performance criteria. For legitimate reliability violations reported by the power-flow program, TWG determined what additional transmission capacity would be needed to meet the criteria and adjust the Initial RTP to include the additional equipment. If no violations were found, then the facilities in the Initial RTP were deemed adequate for serving NTTG loads and resources in the year 2028. The Eight Stressed Cases section provides a graphic summary of the NTTG footprint loads and resources balance for each of the conditions studied.

The analysis found that system performance would be inadequate for four cases (E, F, G and I) to meet NTTG's requirements without transmission system additions by 2028.

| STRESSED CONDITION | DATE | HOUR | TWG LABEL |
|---|---|---|---|
| NTTG SUMMER PEAK | JULY 19, 2028 | 16:00 | A |
| NTTG WINTER PEAK | DEC. 5, 2028 | 19:00 | B |
| HIGH EASTBOUND IDAHO-NW | JUNE 3, 2028 | 02:00 | C |

[11] The SWIP-North project submitted by Great Basin Transmission (GBT) requires a new physical connection at Robinson Summit, at the southern end of the Project. To transmit power beyond the Project, ~1,000 MW of capacity rights on the already in-service ON Line Project from Robinson Summit to Harry Allen 500 kV, as well as, completion of CAISO's Harry Allen to Eldorado Project in 2020, those GBT capacity rights will provide a CAISO access to SWIP-North.

[12] CAISO has volunteered to participate in the studies and accept cost allocation.

[13] Two Alternatives were submitted by TransWest Express, 1) a DC Line the entire Length, and 2) a DC line from Wyoming to the Intermountain Power Project area then an AC line to Nevada.

[14] [6] TWG dropped further study of Case D since the case did not achieve the desired case objectives.

| | | | |
|---|---|---|---|
| HIGH WESTBOUND IDAHO-NW[15] | OCT. 11, 2028 | 11:00 | D |
| HIGH TOT2/COI/PDCI | MAY 16, 2028 | 19:00 | E |
| HIGH WYOMING WIND | FEB. 24, 2028 | MIDNIGHT | F |
| HIGH BORAH WEST | DEC. 11, 2028 | 02:00 | G |
| HIGH NTTG FOOTPRINT IMPORT | JULY 27, 2028 | 14:00 | H |
| HIGH AELOUS WEST AND SOUTH | JUNE 3, 2028 | 18:00 | I |

**Table 3. Hours selected to represent NTTG system stresses**

EIGHT STRESSED CASES

**Commented [NTTG4]:** These 8 Stressed Cases will be shown graphically.

NTTG SUMMER PEAK (A)
4 PM, 07/19/2028
23,542 MW
19,331 MW (IMPORT)

This case showed a need to import energy during the summer peak. Both the Prior RTP and Initial RTP performed reasonably well in this scenario.

NTTG WINTER PEAK (B)
5 PM, 12/05/2028
21,149 MW
18,050 MW (IMPORT)

The region would need to import energy during the winter peak. Only a few local system violations occurred in the Prior RTP case.

HIGH EASTBOUND IDAHO-NW (C)
2 A.M, 06/03/2028
11,586 MW
9,408 MW (IMPORT)

Energy flowing eastbound on the Idaho-Northwest Path was 1,970 MW in this case. But the existing Idaho-Northwest import capability is 1,200 MW. The path had 128 hours that exceeded that level, mostly from May through July. NTTG would need to import a total of approximately 2,662 MW to make up the imbalance.

HIGH TOT2/COI/PDCI (E)

7 PM, 05/16/2028
15,214 MW
15,789 MW
191 MW (IMPORT)

This case evaluated the performance of the ITPs in supporting interregional transfers. Loads and resources nearly balanced in this scenario, with a slight import of 191 MW required after line losses.

HIGH WYOMING WIND (F)
MIDNIGHT, 02/24/2028
12,218 MW
15,307 MW
2,344 (EXPORT)

This case studied power produced by wind-propelled turbines in Wyoming. The actual extracted-case wind production was 2,707 MW. At a targeted level of 2,655 MW, which is 90 percent of the capacity factor of the wind turbines, generation from the wind turbines would exceed the target for 1,020 hours in an average year, usually from mid-September through May.

HIGH BORAH WEST (G)
2 AM, 12/11/2028
12,482 MW
14,150 MW
972 MW (EXPORT)

The Borah West path is currently rated at 2,557 MW. Any firm transfers above this level would require upgrades. In the analysis, the 2,557 MW net flow level was exceeded 11 times. A second version of the case was able to bring loads and resources nearly in balance by reconfiguring flows from generating resources.

HIGH NTTG FOOTPRINT IMPORT (H)
2 PM, 07/27/2028
20,872 MW
15,135 MW
6,267 MW (IMPORT)

No current operating procedures would restrict operation in this dispatch region. One notable condition of this dispatch hour is that the Wyoming wind production was near zero.

HIGH AEOLUS WEST AND SOUTH (I)
6 PM, 06/03/2028

14,287 MW
13,317 MW
1,624 MW (IMPORT)

In reviewing the flows of the other extracted hours, the TWG noted that few hours fully stressed the Gateway South project. This hour was selected for that purpose. In this case, electricity flows on the Gateway South project are 1,018 MW. The wind level in this case, 2,855 MW, is likely to be exceeded 513 hours per year.

## DEVELOPMENT OF CHANGE CASES

For each of the eight stress-conditioned cases, the TWG prepared a Null Change Case and analyzed reliability results. The Null Case represents roughly today's transmission system made to serve loads and resource requirements in 2028.

## CHANGE CASE RESULTS

For all Null Cases, the Antelope resource addition resulted in poor performance without the associated Antelope projects. Generally, cases can be ranked from better to worst in the following order:

Heavy Winter (B)
High NTTG Import (H)
Heavy Summer (A)
High Eastbound Idaho-Northwest (C)
High TOT2 (E)
High Borah West (G)
High Wyoming Wind (F)
Aeolus West and South (I)

**Commented [NTTG5]:** These will be shown graphically

To study the wide range of potential combinations of Non-Committed projects, the TWG developed a Change Case matrix (Figure 7). Once the stressed power-flow cases were selected and developed, the TWG modified the matrix to better reflect the recommended analysis. During August 2018, stakeholder comments were solicited on the draft set of projects selected for analysis in the Change Case matrix. No comments were submitted. The matrix was also presented to the Planning Committee at its October and November 2018 meetings.

| Case | B2H | Gateway S | Gateway W | Antelope Projects | SWIP N | Cross-Tie | TWE DC | TWE DC/AC | Stressed Conditions: |
|---|---|---|---|---|---|---|---|---|---|
| null | | | | | | | | | A B C F G H I |
| pRTP | ✓ | ✓ | a | ✓ | | | | | A B C E F G H I |
| iRTP | ✓ | ✓ | ✓ | ✓ | | | | | A B C E F G H I |
| CC1 | ✓ | | | | | | | | A B C F G I |
| CC2 | | ✓ | | ✓ | | | | | A C E F I |
| CC3 | | ✓ | a | | | | | | A C E F I |
| CC4 | ✓ | | a | ✓ | | | | | A C E F I |
| CC5 | ✓ | ✓ | | ✓ | | | | | A C E F I |
| CC6 | ✓ | ✓ | a | | | | | | A B C E F G H I |
| CC7 | | | | | | | | ✓ | A B C E F I |
| CC8 | | | | | | | ✓ | | A B C E F I |
| CC9 | | | | | | ✓ | | | A B C F I |
| CC10 | | | | | ✓ | | | | A B C F |
| CC11 | | | | ✓ | | | | ✓ | (E)+RPS@1500 |
| CC12 | | ✓ | | ✓ | | | | ✓ | (E)+RPS@1500 |
| CC13 | | | a | ✓ | | | | ✓ | (E)+RPS@1500 |
| CC14 | | ✓ | a | ✓ | | | | ✓ | (E I)+RPS@1500 |
| CC15 | | | | ✓ | | | ✓ | | (E)+RPS@1500 |
| CC16 | | ✓ | | ✓ | | | ✓ | | (E)+RPS@1500 |
| CC17 | | | a | ✓ | | | ✓ | | (E)+RPS@1500 |
| CC18 | | ✓ | a | ✓ | | | ✓ | | (E)+RPS@1500 |
| CC19 | | | | ✓ | | ✓ | | | (E)+RPS@1500 |
| CC20 | | ✓ | | ✓ | | ✓ | | | (E)+RPS@1500 |
| CC21 | | ✓ | a | ✓ | | ✓ | | | (E I)+RPS@1500 |
| CC22 | | | a | ✓ | ✓ | | | | (E)+RPS@1500 |
| CC23 | | ✓ | a | ✓ | ✓ | | | | (E I)+RPS@1500 |
| CC24 | | ✓ | a | ✓ | ✓ | ✓ | | | (E I)+RPS@3000 |
| CC25 | | | a | ✓ | ✓ | | | ✓ | (E)+RPS@3000 |
| CC26 | | ✓ | | ✓ | | ✓ | | ✓ | (E)+RPS@3000 |
| CC27 | | ✓ | a | ✓ | ✓ | ✓ | | ✓ | (E)+RPS@4500 |
| CC28 | | | a | ✓ | ✓ | | ✓ | | (E)+RPS@3000 |
| CC29 | | ✓ | | ✓ | | ✓ | ✓ | | (E)+RPS@3000 |
| CC30 | | ✓ | a | ✓ | ✓ | ✓ | ✓ | | (E)+RPS@4500 |
| CC31 | ✓ | ✓ | b | ✓ | | | | | E F G I |
| CC32 | ✓ | ✓ | c | ✓ | | | | | F G I |
| CC33 | ✓ | ✓ | d | ✓ | | | | | E F I |

| | |
|---|---|
| | The change case does not include the non-Committed Project |
| ✓ | The change case includes the non-Committed Project |
| a | Gateway West without Midpoint-Hemingway #2, Cedar Hill-Midpoint and Populus-Borah |
| b | pRTP less Populus-Cedar Hill-Hemingway |
| c | pRTP less Populus-Cedar Hill-Hemingway plus Populus-Borah |
| d | pRTP less Populus-Cedar Hill-Hemingway and Anticline-Populus |
| | The change case was run with and without B2H |

**Figure 7. Change Case matrix used in development of NTTG RTP**

More than 150 reliability studies were performed against more than 480 contingencies. To better communicate the results of these studies, the TWG created heat maps, which present a weighted[16] graphical performance of a Change Case on a specific flow condition. A complete heat map analysis of the Change Cases is included in Section V of the RTP.

Commented [NTTG6]: This will be highlighted graphically as an Additional Resource Reference.

Figure 8, for example, shows where performance issues (e.g., an overloaded transmission line) occurred for contingencies. The accumulation of overloads and voltage issues are represented by the color spectrum from blue through red, or "cooler" through "hotter." These violations occur when transmission systems cannot handle anticipated transfers across that area's transmission lines.

In particular, in Figure 8, the heat map for the F-Null Case, three general areas of reliability violations show up: northwest Wyoming/southeast Montana, southern Idaho and southeast Washington/central Oregon. These violations occur because the transmission systems are incapable of handling anticipated transfers across that area's transmission system.

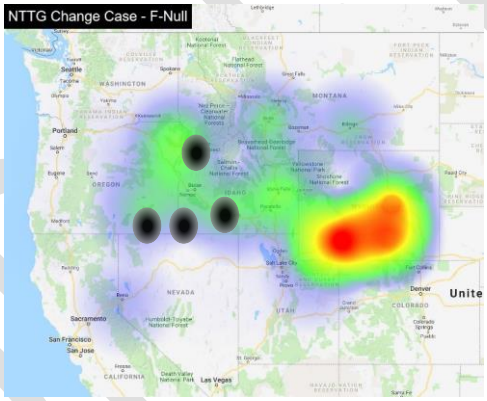


**Figure 8. Heat map for the F-Null Case**

Contrasting Figure 8 with Figure 9, the same map for the Prior RTP looks much different. In this case, the map points to an overload in Oregon on the Burns Series capacitor that is likely to be replaced before 2028. The rating of the bank will be re-evaluated to avoid it becoming a

[16] High-voltage conditions had a weighting of 1; low-voltage conditions had a weighting of 2; overloads of branches had a weighting of 5. For example, a zone in which 10 contingencies caused an overload of one branch in that zone received a total weight of 50 (i.e., 10 x 5), which would then be translated into a color on the map. Blue represents a weighted total of about 10, green is a count up to 30, yellow is a count up to 50 and red is for a weighted count exceeding about 70. Unsolvable contingencies indicate that a particular portion of the system was stressed well beyond its capabilities for reliable operation. In those cases, black circles were added to the figures to indicate the approximate location of violations that would have occurred had the case stress reduced to permit a solution.

bottleneck to system performance. This map shows the dramatic improvement of the Prior RTP when compared with the Null Case.


**Figure 9. Heat map for the Prior RTP**

### Heavy Summer Case

In the Heavy Summer Null case, the most significant issue was related to the integration of the new Antelope Project resources. The prior RTP showed local load-service issues when stressed in a 1 in 5 peak condition (20 percent probability of occurring).

### Heavy Winter Case

In the Heavy Winter Null case, similar to the Heavy Summer Null case, the most significant issue was again related to the integration of the new Antelope Project resources. The remaining issues in the prior RTP case were a very slight overload near Billings and an overload issue at Bridger resulting in the loss of two system elements (N-2 contingency).

### High Eastbound Idaho-Northwest Case

In the High Import Null Case, stresses across the Idaho-Northwest and Montana-Idaho paths were relieved with the addition of the Boardman to Hemingway project. But heat maps show that the Boardman to Hemingway project would do little to relieve violations caused by integrating the Antelope resource. Including the other Non-Committed projects of the prior RTP with the Boardman to Hemingway projects eliminated those violations. Change Case CC3 tested to see if the Gateway West and/or Gateway South projects could replace or be comparable to the Boardman to Hemingway or the Antelope projects. Neither of those Gateway projects resolved the Northwest-to-Idaho issues and thus would be inadequate to replace Boardman to

Hemingway. Boardman to Hemingway resolved performance issues between the Northwest and Idaho under summer import conditions.

### High Tot2/COI/PDCI Case

The E-Null case showed significant high- and low-voltage violations and overloads centered in Wyoming. The addition of the prior RTP projects largely cleared those issues, with some remaining local overloads in the Bonneville Dam area and a transformer overload at the Jim Bridger Power Plant in Wyoming. Without Gateway South in Change Case 4 or Gateway West in Change Case 5, the configuration performed poorly.

### High Wyoming Wind Case

The Null case results here, with wind production at 2,707 MW, showed worse performance than the heavy southern Idaho export case. The 2,707 MW mark represented a condition that exceeds the original target level of 2,655 MW by almost 12 percent. Adding the prior RTP facilities solved most of the stresses. The only remaining problem lay with the rating of a series capacitor bank in Burns, Ore. This bank has reached the end of its useful life and is due for replacement. The parties will consider these studies in establishing its new rating.

### High Borah West Case

Similar to the High TOT2/COI/PDCI and High Wyoming Wind cases, the High Borah West case showed significant stresses in Wyoming and Idaho without the addition of new transmission capacity. These stresses were relieved for the most part by the addition of the prior RTP projects. Removing the Populus-Cedar Hill-Hemingway segment, as depicted in Change Case 31, triggered violations. Connecting Populus to Borah, as depicted in Change Case 32, helped slightly, but the Populus-Cedar Hill-Hemingway segment was still needed. Subtracting NTTG footprint energy exports did not avert the need for the Populus-Cedar Hill-Hemingway line.

### High NTTG Footprint Import Case

The High NTTG footprint import case exposed a transmission gap related to the integration of the new Antelope Project resources. Adding the prior RTP projects solved most of those issues, with some minor issues remaining with a slight overload near Vernal, Utah, and low voltages in the Three Mile Knoll area near Soda Springs, Ida.

### High Aeolus West and South Case

This case could not be solved without some Wyoming transmission facility additions. Change cases 4 and 5 found that neither Gateway West nor Gateway South could perform adequately without the other. In Change Case 33, the western portions of Gateway West (west of the

Bridger Power Plant) were excluded and replaced with the Gateway South project. This case performed satisfactorily; however, the Bridger dispatch level (885 MW) was low.

### 2029 Bridger Retirement Sensitivity Case

The TWG performed robustness sensitivity cases to test the planned retirements at the Jim Bridger Power Plant. The cases looked at hours when all four units of the Bridger plant were dispatched above 1,500 MW. This covered the Heavy Summer, Heavy Winter, TOT2/COI/PDCI and High Wyoming Wind cases. The other four cases were not affected by a Bridger unit replacement, since the Bridger plant was dispatched below 1,500 MW.

The four covered cases were adjusted to remove the 608-MW Bridger Unit 1 from service. In the Heavy Summer and Heavy Winter conditions, the unit's output was replaced by additional dispatch from the Grand Coulee Dam. In all four cases, adjustments between the 345-kV system and the 500-kV system at Bridger unloaded the 500-kV system.

The Heavy Summer and Heavy Winter cases saw no appreciable change in outage performance, since the Wyoming Wind transfers out of state were relatively light. The other two cases saw a minimal need for a change in performance or modifications.

### Interregional Transmission Projects

The TWG analyzed the Interregional Transmission Projects to determine whether an ITP alone or in combination with the other ITPs or Non-Committed projects, or both, could satisfy NTTG's transmission needs on a regional or interregional basis more efficiently or cost effectively than through local planning processes.

The ITPs were added to the Null cases without any additional transmission resources to serve NTTG load beyond those resources identified in the Quarter 1 data submittals. The ITPs were tested against five different Change Cases. The analysis found that the ITPs did not provide the NTTG footprint with regional benefits by either significantly reducing performance issues or displacing NTTG Non-Committed projects.

## RELIABILITY CONCLUSIONS

Based on the study results, the TWG concluded that the transmission projects represented by both the Prior RTP and the Initial RTP satisfied the NTTG reliability criteria. The ITPs were evaluated to determine whether one or more ITP would defer or replace NTTG's Non-Committed projects. The TWG determined that none of the ITPs solved NTTG's reliability performance issues and, as such, have not been included in the RTP.

The NTTG area would be reliably served in 2028 only by including the following Non-Committed regional projects:

- Boardman to Hemingway (B2H)
- The Energy Gateway projects, including segments:
  - Windstar–Aeolus 230 kV
  - Aeolus–Clover 500 kV
  - Aeolus–Anticline 500 kV
  - Anticline–Populus 500 kV
  - Populus-Cedar Hill–Hemingway 500 kV
  - Borah–Midpoint 345 kV to 500 kV conversion
- Antelope Transmission Project, including:
  - Antelope–Borah 345 kV
  - Antelope–Goshen 345 kV
  - Antelope 345/230 kV transformers and interconnection facilities

**Commented [NTTG7]:** These will be shown in three separate boxes, one for each of the projects.

## ECONOMIC EVALUATIONS

To determine which of the Change Cases is the more efficient or cost-effective plan, the TWG uses three economic metrics, as determined in the biennial Study Plan. Once the more efficient or cost-effective projects are identified, they are included in the RTP. The three metrics—capital-related costs, power-flow losses and reserves—and results are discussed below.

### Capital-Related Cost Metric

Development of the capital-related cost metric requires three steps. The first step validates the capital cost of the Project Sponsor's Q1 submitted project. The second step uses those results to estimate the annual capital-related costs over the assumed transmission life (40 years). The third step is to levelize the net present value of the annual capital-related costs for the prior RTP and the Initial RTP.

### Energy-Loss Metric

The energy-loss metric captures the change in energy generated, based on system topology, to serve a given amount of load. A reduction in losses for a Change Case would represent a benefit, since less energy would be required to serve the same load. The analysis found that the Prior RTP case had more energy losses than the Initial RTP.

### Reserve Metric

The reserve metric evaluates the opportunities for two or more parties to save money by sharing a generating resource that would be enabled by transmission. The metric is a year 10 look at the increased load and generation additions in the NTTG footprint and the transmission additions that may be included in the RTP. The analysis found no appreciable difference between the Prior RTP and the Initial RTP.

In the study cycle, the TWG analyzed the Gateway West, Gateway South and Boardman to Hemingway projects. A preliminary calculation of the reserve metric found that none of the reserve benefits exceeded $750,000 per year over the reserve-sharing ability of the existing transmission system. More importantly, both the Prior and Initial RTPs shared the same benefit value. Thus, the Change in Reserve metric did not factor into selecting the RTP.

### Economic metric analysis conclusion

The sum of the annual capital-related cost metric, loss metric (monetized) and reserve metric (monetized) yielded the incremental cost for the Prior RTP and the Initial RTP. The calculation (Table 4) found that the prior RTP yielded the lowest incremental cost, after adjustment by the plan's effects on neighboring regions. Thus, the Prior RTP was incorporated into the RTP.

Annual Incremental Cost
2018$

| 11/16/2018 | iRTP | pRTP | pRTP less iRTP |
|---|---|---|---|
| Capital Related Cost | $903,531,849 | $802,814,981 | ($100,716,868) |
| Losses - Monitized | $77,520,138 | $77,608,952 | $88,814 |
| Reserve - Monitized | ($750,000) | ($750,000) | $0 |
| Incremental Cost | $980,301,987 | $879,673,933 | ($100,628,054) |

**Table 4. Annual incremental cost comparison**

## PUBLIC POLICY CONSIDERATION SCENARIO REQUESTS

Stakeholders may ask NTTG to consider factors relevant to public policy but not required by local, state or federal laws or regulations. This is known as a Public Policy Consideration (PPC) scenario request. The results of PPC analysis may inform the RTP but do not result in the inclusion of additional projects in the RTP. Public policy requirements are included in the Transmission Providers' submissions and in the Initial RTP.

During Quarter 1 of the NTTG 2018-2019 regional planning cycle, Deseret Power, Utah Association of Energy Users, Utah Associated Municipal Power Systems, Utah Department of Commerce Office of Consumer Services, Utah Municipal Power Agency, and Wyoming Industrial Energy Consumers jointly submitted a PPC request, defined in the NTTG Funders' Attachment K, for a scenario analysis. The request asked to gauge the impacts and implications on transmission and reliability of closing Jim Bridger Unit 1 and Naughton Units 1 and 2. All three retirements lie outside the 2028 study period.

The TWG conducted power-flow analyses on four Change Cases and made a number of observations. A full report of the study can be found in Appendix D of the NTTG 2018-2019 Final RTP.

Commented [NTTG8]: This will be highlighted graphically as an Additional Resource Reference.

## REGIONAL ECONOMIC STUDY REQUESTS

Stakeholders may ask NTTG to model how specific upgrades or other investments to the transmission system or demand resources—not otherwise considered in the Local Transmission Plans of the NTTG Transmission Providers—could make it cheaper to reliably serve the forecasted needs of the NTTG footprint.

In Quarter 5 of the NTTG 2018-2019 study cycle, Deseret Power, on behalf of itself and four other Utah stakeholders, requested an economic study to evaluate up to two 345-kV transmission lines as a lower-cost alternative to the 500-kV Gateway West and Gateway South lines.

A TWG economic study demonstrated acceptable system performance for the proposed 345-kV lines. However, additional production cost model (PCM) simulations indicated that the 345-kV lines would have lower overall transmission capacity than the planned 500-kV transmission. This capacity limitation would result in increased flows on transmission exiting Wyoming. And it would force generation to increase in Utah in the PCM simulations, dispatching it without consideration of economics.

In addition to the economic and capacity limitations, securing permits and rights-of-way for the two proposed 345-kV lines could require an additional 12 to 15 years. PacifiCorp already has secured all rights and is building the Aeolus-to-Anticline 500-kV transmission system in Wyoming, scheduled for energization in 2020. The proposed 345-kV option has no sponsor.

For more information regarding the assumptions and results see Appendix E of the NTTG. 2018-2019 Final Report.

Commented [NTTG9]: This will be highlighted graphically as an Additional Resource Reference.

## FINAL REGIONAL TRANSMISSION PLAN

Based on the reliability and economic conclusions discussed above, the more efficient or cost-effective plan, based on the studies in this report, is the Prior RTP. The Prior RTP is a staged variant of the Initial RTP.

NTTG's Final RTP, as shown in Figure 11, emerged after a rigorous reliability analysis of the NTTG Transmission Providers' rollup of their local area plans and assumption of Non-Committed regional transmission projects, augmented with stakeholder Interregional

Transmission Projects. This technical analysis was followed by an economic metric analysis that selected NTTG's more efficient or cost-effective RTP.

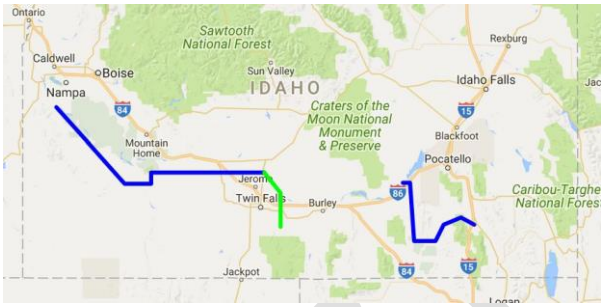


**Figure 10. Initial RTP segments not included in Final RTP**

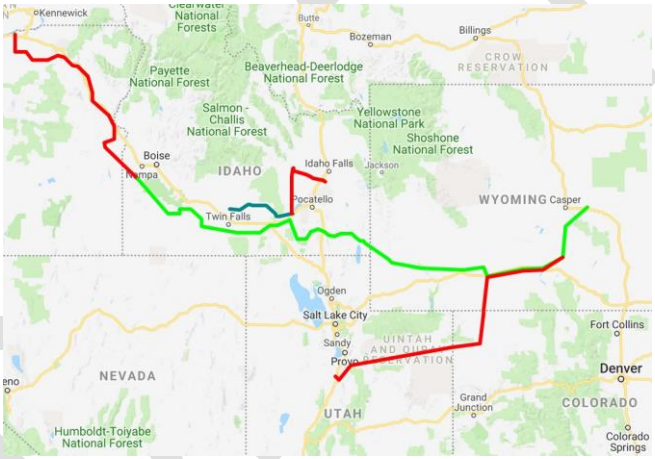


**Figure 11. Transmission projects comprising 2018-2019 NTTG RTP**

## COST ALLOCATION

None of the projects selected in the RTP requested cost allocation.

## NEXT STEPS

Publication of the NTTG RTP completes the two-year planning process begun with pre-qualification of Project Sponsors in Quarter 8 of 2017 and continued with project data submittal in Quarter 1 of 2018. The NTTG 2018-2019 RTP identified a need for new transmission capacity

to serve forecasted load in 10 years. The plan also identified a set of transmission projects, known in this report collectively as the prior RTP, as the more efficient or cost-effective transmission plan to meet that need.

While the RTP is not a construction plan, it provides valuable regional insight and information for all stakeholders (including developers) to consider and use in their respective decision-making processes.

This report marks the last RTP produced by NTTG. NTTG and Columbia Grid are forming a single transmission planning region that will enhance the reliability and efficiency of the regional system encompassing the greater Pacific Northwest and northern Rocky Mountain region. NorthernGrid, as the new entity will be called, will bring the two groups' regional transmission planning under one association. NTTG's funders anticipate launching NorthernGrid in early 2020.

## GLOSSARY

Note: This Glossary is for the benefit of readers and neither supplements nor modifies any defined terms contained in any entity's filed Open Access Transmission Tariff (OATT), including the Attachment K to that tariff. To the extent that a term diverges from any entity's OATT, the OATT takes precedence.

**Alternative Project** Alternative Project refers to Sponsored Projects, projects submitted by stakeholders, projects submitted by Merchant Transmission Developers and unsponsored projects identified by the Planning Committee (if any).

**Change Case** A Change Case is a scenario where one or more of the Alternative Projects is added to or replaces one or more Non-Committed projects in the Initial RTP. The deletion or deferral of a Non-Committed Project in the Initial RTP without including an Alternative Project can also be a Change Case.

**Committed Project** A Committed Project is a project that has all permits and rights of way required for construction, as identified in the submitted development schedule, by the end of Quarter 1 of the current regional planning cycle.

**Draft Regional Transmission Plan** Draft Regional Transmission Plan refers to the version of the Regional Transmission Plan that is produced by the end of Quarter 4 and presented to stakeholders for comment in Quarter 5.

**Draft Final Regional Transmission Plan** Draft Final Regional Transmission Plan refers to the version of the Regional Transmission Plan that is produced by the end of Quarter 6, presented

to stakeholders for comment in Quarter 7 and presented, with any necessary modifications, to the Steering Committee for adoption in Quarter 8.

**Initial Regional Transmission Plan** Initial Regional Transmission Plan comprises projects included in the prior Regional Transmission Plan and projects included in the Full Funders Local Transmission Plans and accounts for future generation additions and deletions (e.g., announced coal retirements).

**Interregional Transmission Project** An Interregional Transmission Project is a proposed new transmission project that would directly interconnect electrically to existing or planned transmission facilities in two or more planning regions and that is submitted into the regional transmission planning processes of all such planning regions.

**Merchant Transmission Developer** Merchant Transmission Developer refers to an entity that assumes all financial risk for developing and constructing its transmission project. A Merchant Transmission Developer recovers the costs of constructing the proposed transmission project through negotiated rates instead of cost-based rates.

**Non-Committed Project** This is a project that does not have all of its required construction permits and rights of way, as identified in the submitted development schedule, by the end of Quarter 1 of the current regional planning cycle.

**Null Case** A Null Case tests how the current topology of the transmission grid would perform with loads and resources in the future.

**Project Sponsor** A Project Sponsor is a Non-incumbent Transmission Provider or Incumbent Transmission Provider intending to develop the project that is submitted into the planning process.

**Public Policy Consideration** Those public policy considerations that are not established by local, state, or federal laws or regulations.

**Public Policy Requirements** Those public policy requirements that are established by local, state or federal laws or regulations, meaning enacted statutes (i.e., passed by the legislature and signed by the executive) and regulations promulgated by a relevant jurisdiction.

**Sponsored Project** A Sponsored Project is a project proposed by a Project Sponsor.