



Transmission and Markets Engagement Guide

Introduction

This Transmission and Markets Engagement Guide (“Guide”) provides a high-level description of the Pacific Northwest electric grid and its operations, including ongoing efforts to build the new power generators and transmission facilities needed to serve the expected increase in electricity use, and how these issues impact Pacific Northwest Tribes.

How is electricity bought and sold within the region? How is the power industry working to build more efficient markets for buying and selling electricity? Why are there efforts to consolidate transmission facilities’ operation under one Regional Transmission Organization? Most importantly, how can Tribes shape these conversations to minimize burdens to Tribes and maximize benefits?

The Guide

- reviews the operating framework for all electric utilities and discussing their universal goal—to ensure that customer loads are served at all times;
- details the transmission networks operating in the West and how their operations are regulated;
- addresses the expected growth of electricity demand in the region and the expected growth of system resources needed to meet that demand;
- covers the tension between Tribal treaty rights and electric resource development and the need for Tribal governments to participate in the planning exercises of regional utilities and transmission organizations; and
- outlines opportunities for Tribal involvement in the Pacific Northwest’s energy future.



Integrated Utility Operations in the Western United States

Utility-scale electric generators, typically generators that are 50 megawatts (MW) or larger—whether carbon, wind, water, nuclear, or solar fueled—are connected to the electric grid via transmission lines. A power generation project is useless if it cannot connect to customers by moving its power through the transmission system, and in fact a new power project will not be built without having first secured rights to transmission capacity needed to move the project's potential power to customers.

Customers and how they use electricity dictate utility system operations. Customers include residential users, commercial entities such as small- to medium-sized governments and businesses, and industrial customers such as manufacturing plants, lumber and paper mills, and even large casinos. The combined electric use of these customers, commonly termed “demand,” creates “load centers” that electric utilities must serve.

When functioning properly, the utility grid is considered “balanced,” indicating that the flow of electricity from generators is following but not exceeding customer demand. This “balancing relationship” between demand and generation is measured in microseconds as demand is ever changing, and the overall grid system must remain in balance at all times or risk an emergency shutdown. The electric distribution grid has many failure protections that allow operators to shut down parts of the system in order to maintain system balance. On the transmission system, insufficient or excessive generation will trip built-in safety components and shut down certain lines in order to protect the overall transmission system. Customers sometimes feel the effects of these emergency protocols as “blackouts.”

1 Based upon self-developed daily load forecasts, a utility will manage its existing power generator fleet to match the load – typically starting with its least cost generators. The utility must also keep “power reserves” at the ready in order to deal with any emergencies, such as a generator failure within its system or a neighboring system.

2 Energy efficiency is also commonly referred to as an “energy resource” and is used by utilities to reduce customer demand and the system's dependency upon electric generators.

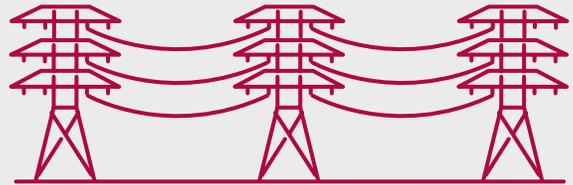
GENERATION

To reliably supply electric service to customers in a load center, a utility will operate its power generators to produce the electricity needed to meet but not exceed the load center's demand.¹ Power generation in the Pacific Northwest includes hydropower, fossil resources like coal and natural gas, nuclear power, as well as wind and solar power.



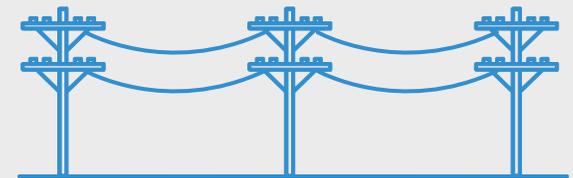
TRANSMISSION

Power generation output is then carried by the transmission system to load centers—places like towns or large industrial operations—and then to the distribution system and its customers.



DISTRIBUTION

The electricity needed to meet customer demand is carried to homes and businesses by the utility's distribution system—poles and wires that span urban neighborhoods, homes throughout the countryside, shopping centers, and industrial areas.



END USE



Customer demand simultaneously sends a signal to the generators to increase or decrease electricity output.

The Transmission System in the Western Interconnection



This map shows the general location of transmission lines across the Western Interconnection relative to Tribal reservation lands. The electrical capacity (how many megawatts it can carry) for each line is shown in the lower right hand corner of the illustration and color coded for reference. Please note the abundance of transmission lines operating in highly populated areas along the coast and in the area designated as the Mid-Columbia in Washington state.

IMAGE CREDIT Gridworks illustration; maps provided by WECC and BOIA.

O	+ 500 kV DC
R	500 kV
G	345 kV - 360 kV
B	230 kV - 287 kV
—	Lower Voltages

Throughout the Western U.S. and within the Pacific Northwest specifically, transmission lines have been constructed to carry high voltages over long distances from the generation resources producing the power to the customer centers using that power. The term *Western Interconnection* refers to the wide area of synchronous electric grid that covers the western United States from the Pacific Coast states to the eastern borders of Colorado and New Mexico; and from the Canadian provinces of British Columbia and Alberta to the northern states of Mexico. The Western Interconnection is one of three grid systems operating in North America, and at a federal level is regulated by the Federal Energy Regulatory Commission (FERC).

The term “synchronous electric grid” refers to the interconnection’s common operating characteristics that allow utilities within the Western Interconnection to share electricity taken from the grid without having to modify the voltage to fit their systems.

The benefits of synchronous zones within the Western Interconnection include:

- pooling of generation, resulting in lower generation costs;
- pooling of load, resulting in significant equalizing effects;
- common provisioning of reserves, resulting in cheaper primary and secondary reserve power costs;
- opening of the market, resulting in the possibility of long term contracts and short term power exchanges; and
- mutual assistance in the event of disturbances.

Once transmission lines are sited and built, the regulation of transmission resources in the United States focuses on the costs of operating the line and whether it is being operated safely and reliably. The Federal Energy Regulatory Commission, or FERC, is the economic regulator of most interstate transmission lines (the exception in the PNW of the Bonneville Power Administration (BPA) and its transmission operations; additionally, state public utility commissions are the economic regulator for a utility’s lines falling within a single state). By considering the specific costs associated with planning, permitting/siting, and constructing a line, as well as costs incurred in a line’s actual operation, FERC approves the rates that are passed through to customers.

FERC is also the nation’s reliability regulator, tasked with ensuring reliability standards that dictate safety and operational requirements of the transmission system, but has delegated this function to regional reliability entities such as the Western Electricity Coordinating Council, or WECC.

WECC is the Reliability Entity for the Western Interconnection. Its primary role is to enforce FERC’s reliability standards, and it is directly responsible for ensuring that transmission facilities within its jurisdiction operate consistent with FERC’s reliability directives. Specifically, WECC’s regulatory activities include:

- setting the rules for transmission operation within the interconnection—WECC implements the standards established by FERC taking into consideration the region’s operational characteristics. In the end, WECC’s rules must be approved by FERC.
- conducting regular audits of transmission operations, using transmission operators’ detailed logs of all transmission activities occurring on its lines, and investigating service outages (“blackouts” and “brownouts”), and
- issuing financial penalties to the operators of transmission lines should outages occur. Fines issued by WECC are reviewed and approved by FERC, and have been as high as \$30 million dollars in some cases.

WECC's other duties include developing long-range forecasts for electricity demand as part of its requirement to oversee regional resource adequacy, or whether the overall grid is able to meet demand with the existing generators and transmission system. This function of WECC makes it particularly important in future transmission planning efforts, which often use WECC data as a foundational element of planning and study.

Tribes and transmission project siting and permitting

Tribal governments should explore three areas when confronted by transmission development proposals: the transmission line's purpose, location, and capacity.

Purpose



Exploring the line's purpose will probe who is involved in the project, the generators expected to be connected to the line, and who will benefit from its construction (i.e., where is the power being used?). The answers to these questions will provide important information about the developer's financial capacity to bring the project to completion, the line's actual need, and its value to its owners. In other words, is it truly necessary to support utility operations or are there other options?

Location



Understanding the line's proposed location will allow a Tribal government to determine whether it will cross reservation boundaries, ceded areas, or areas where traditional foods are located. This information will support an analysis of impacts and possible alternatives.

Capacity



Understanding a proposed line's capacity will provide valuable information regarding the facility's proposed physical size and how it will be used. The most common voltage limits for operating transmission systems are 90 kilovolt (kV), 115 kV, 230 kV, 345 kV and 500 kV.³ The higher the voltage, the more power can move through the line at a given time.

Voltage limits indicate the voltage that a line can handle and still remain reasonably efficient. A line run at or near its voltage limit will over time become hotter and therefore less efficient and known to sag deeply between the transmission towers, creating a possible fire hazard. While the operator has an obligation to clear trees and brush from the transmission pathway, a Tribal government facing a development proposal can demand additional safeguards to protect its interests.

Looking to the Future: An Evolving Electrical Grid

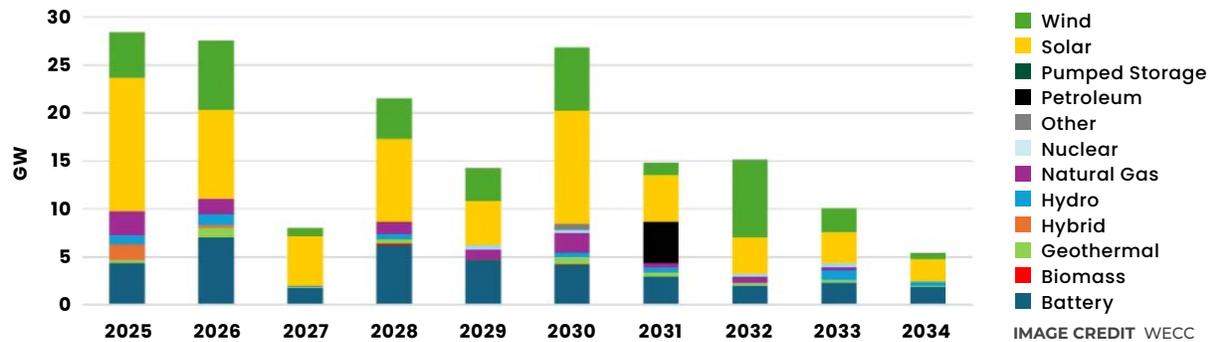
WECC's recent forecast of annual demand in the Western Interconnection shows a 20.4 percent increase in regional demand, growing from 942 terawatt-hours (TWh) in 2025 to 1,134 TWh, by 2034.⁴ This new forecast is more than double the 9.6-percent growth rate forecast in 2022 resource plans and four

³ Typically, FERC has exerted regulatory jurisdiction over transmission lines powered at 115 Kv and above. However, it has been known to exert authority over 90 kilovolts (kV) lines when facing circumstances that impact grid reliability.

⁴ <https://feature.wecc.org/wara/>

times the historical growth rate of about 4.5 percent between 2013 and 2022.⁵ To put these forecasts in context, the region added 74 gigawatts (GW) of new generation between 2014 and 2023. The graph below shows the substantial increase in resource additions that are planned over the next ten years.

Western Interconnection Planned Resource Additions



The expected increase in customer demand over the next 10 years is attributed to policy decisions to electrify the economies of Western states in response to climate change, such as transportation and building electrification to supplant fossil fuels, and the expansion of large loads like data centers, manufacturing facilities, and cryptocurrency mining operations. Combined, these loads can consume massive amounts of energy and are expected to require a steady supply of power during all hours of the day. In the Pacific Northwest, utilities such as those in the Columbia Basin have become targets for large industry and other developers of energy-heavy facilities seeking the region's low cost of electricity (due to historically low costs of hydropower) and availability of development sites.

⁵ <https://feature.wecc.org/wara/>

The Power Side of the Northwest Power and Conservation Council

The 1980 Northwest Power Act authorized the states of Idaho, Montana, Oregon, and Washington to develop a regional power plan and a fish and wildlife program to balance the Northwest's environmental and energy needs. Many Tribes have a long history of engaging with the resulting organization, the Northwest Power and Conservation Council, but have historically focused their engagement on the fish and wildlife side of the council's work. The council also plays a significant and influential role in anticipating the Pacific Northwest's energy needs, and is now in development of its 9th Power Plan to ensure an adequate, efficient, economical, and reliable power supply for the region, which will in turn influence regional transmission investments.

✓ ACTION ITEM ▶ Tribes may build on their existing knowledge of the council's work by engaging more deeply in the council's power planning efforts. Doing so would help to leverage existing relationships while giving Tribes an opportunity to engage with an influential regional energy planner and, subsequently, influence later decisions by utilities and power marketers such as the Bonneville Power Administration. Contact Chad Madron at cmadron@nwcouncil.org or visit nwcouncil.org for more information.



Planning Transmission Upgrades

The modernization and expansion of the Western electric grid, whether considered through the lens of responding to climate change or generalized economic growth, can bring both positive and negative impacts to Tribes, many of whom have taken nuanced positions relative to certain transmission or clean energy projects. While ATNI and many Pacific Northwest Tribes are supportive of a clean energy transition, and are actively working to develop Tribally-owned and operated infrastructure, Tribes seeking to protect their treaty rights have also challenged the development of certain green energy development in this region. There is no question that the increased pressure on the region to build more transmission lines and produce more electricity will place even greater burdens on Tribal governments and communities that seek to protect their treaty rights.

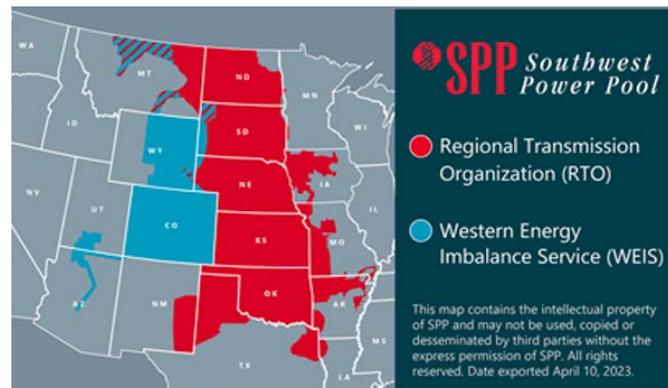
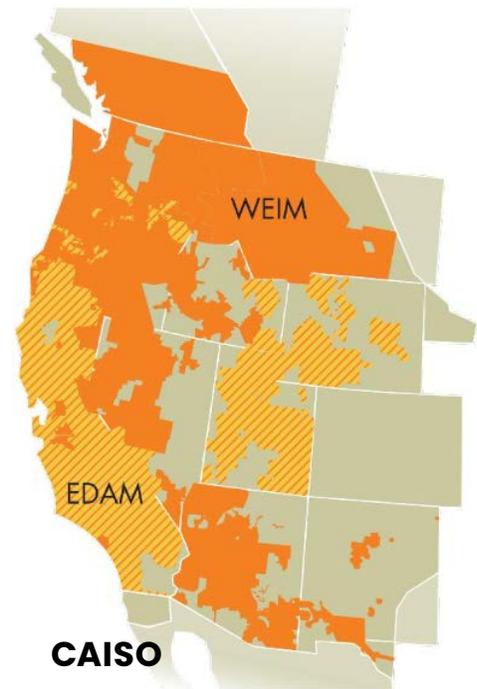
- ✔ **ACTION ITEM** ▶ Recently, a number of regional utilities, including BPA, have organized efforts to plan the next generation of transmission development in the Western Interconnection and how the region's transmission facilities would be managed. In 2023, the Western Transmission Expansion Coalition ("WestTEC") was formed to plan for the needs of the West's future energy grid. BPA is supporting WestTEC's work and has contributed technical and leadership resources to the organization. While Tribes have played a role in WestTEC's early work, its ongoing transmission planning efforts should be the focus point for a broader initiative promoting positive Tribal engagement that would meaningfully impact WestTEC's planning output. For more information on the WestTEC effort, contact Sarah Edmonds at Western Power Pool, who is managing the project at sarah.edmonds@westernpowerpool.org.
- ✔ **ACTION ITEM** ▶ BPA is a major player in the PacificNorthwest Transmission System. Review more detail and potential areas of Tribal engagement in the BPA briefing document that is a companion piece to this guide.
- ✔ **ACTION ITEM** ▶ Transmission lines are planned and paid for in myriad ways across the West. For information about in-state transmission planning, reach out to your local utility transmission planners. For information about multi-state transmission planning reach out to BPA Tribal Affairs at tribalaffairs@bpa.gov and to an organization of utility transmission planners known as Northern-Grid at northerngrid.net.



Today, utilities are looking to centralized markets to capture the economic and reliability benefits of sourcing clean electricity from across the Western grid. In the last several years, two opportunities to participate in centralized markets have emerged. Today, both opportunities seek to expand and “win the West”:

- The California Independent System Operator (CAISO) is currently developing what’s known as the Extended Day-Ahead Market (known as “EDAM”) to expand its existing Western Energy Imbalance Market, which has operated since 2014. CAISO’s centralized market offerings were the first of their kind in the West, starting with participation from California utilities and others in the West like PacificCorp, Portland General Electric, and Bonneville Power Administration. California proposed an expansion of its regional market to include day-ahead market services in 2021. If the proposal receives federal approval,⁶ utilities like PacifiCorp could take advantage of the expanded services as soon as 2026.⁷
- In a competing offer, the Southwest Power Pool (SPP), based in the Great Plain states, is offering its version of a day-ahead market, called Markets+, to expand on its existing Western Energy Imbalance Service market. SPP has been operating centralized markets in the Great Plain states since 2007. Markets+ is in phase 1 of designing its market structure. Multiple utilities across the West are actively participating and funding phase 1.⁸ Markets+ is set to launch in 2026.

There is a strong likelihood these two organizations could expand their markets into full Western regional transmission organizations (RTOs) in the future, which is one reason why there is competition between the market proposals from CAISO and SPP. Markets are just one service of RTOs, which also provide transmission planning and procurement as well as transmission operations. Western utilities, their customers, regulators, and stakeholders are at a critical junction in the decision between the two organizations and any eventual transitions into a single West-wide market or RTO. Further complicating discussions are issues of whether the West should focus on



CAISO’s market offering is shown at the top, SPP+ market offerings are shown above. These maps are approximate and were accurate as of 2023.

6 CAISO released a EDAM factsheet with more information and a map of WEIM.

7 PacifiCorp is joining the CAISO’s Extended Day-Ahead market in 2025. Additional utilities may be joining soon, with announcements made here.

8 Arizona Public Service, Bonneville Power Administration, Chelan County Public Utility District, NV Energy, Powerex Corp., Puget Sound Energy, Salt River Project and Tucson Electric Power.

one market, or allow the development of two competing markets.

BPA's choice in which market to join will have long-lasting effects on the future of the Pacific Northwest energy system and the West on a whole.

There have been various attempts to reorganize transmission system operations in the West over the last few decades. It was heavily discussed during the utility deregulation movement in the late 1990s and early 2000s, in part based on FERC guidance and directives to investor-owned utilities to deregulate operations. While deregulation was not adopted by Northwest utilities, there were successful efforts to establish independent system operators around the country. For example, in California, the non-profit California Independent System Operator, or CAISO, operates the power markets and manages the transmission facilities for most of California.

In the early 2000s, Pacific Northwest utilities engaged in initial market design discussions centered on RTO West and then moved on to Grid West. RTO West, as the name implies, was focused on creating a west-wide regional transmission organization and Grid West was more focused on creating something in the Pacific Northwest. In each instance, these efforts to reorganize the region's electric system into a market-based management structure failed to gain regional support—despite the considerable financial investment of many utilities.

Pre-decisional Engagement and Treaty Rights

Actions planned by BPA and other federal agencies may impact the treaty rights of regional Tribes. When this occurs, it is all too common for these agencies to consult with an affected Tribe after a plan has been fully developed and is ready to be implemented. At that late stage of development, a consultation is simply an opportunity to inform the Tribe of an impending federal action and does not represent a meaningful engagement with the Tribe on potential impacts to its treaty rights or how such impacts could be avoided or mitigated. A federal agency is obligated to protect Tribal treaty rights and a “post-decisional” consultation likely breaches this duty when a Tribe's treaty rights would be affected by agency's planned action. This result can and should be avoided by “pre-decisional” discussions between an agency and impacted Tribe regarding a future action that is being considered but not yet moved to the early phases of development. At this early stage, an action could be modified to avoid impacts to treaty rights or resources. If necessary, the Tribe can request more formal Government-to-Government meetings with the agency or its governing department wherein the Tribe's treaty rights are acknowledged and discussions between the sovereigns focus on honoring treaty rights and the protection of treaty resources.

Political changes at the federal level may also impact whether and how federal agencies engage Tribes and interpret Tribal treaty rights. However, it's important to remember that Tribes have the right to advocate for their views if they feel that federal agencies are not upholding their legal duties. In such cases, Tribes may also consider reaching out to allies to support their positions in federal affairs, including state government partners, federal congressional delegations, and numerous NGOs working on climate and energy issues. If a Tribe feels that federal agencies are shirking in their responsibilities to uphold treaty rights, among the many actions a Tribe may take (including initiating legal proceedings) is to reach out to ATNI for support and to connect with allies. Contact ATNI staff, including Eli Duncan-Gilmour (eli@atnitribes.org) and Reuben Martinez (reuben@atnitribes.org) for assistance.

A particular challenge in the Pacific Northwest is the status of the Bonneville Power Administration, which controls the largest transmission grid in the region and is not subject to FERC jurisdiction. From the early days, most parties recognized that Bonneville's operating structure and how it priced electricity delivered to its numerous publicly-owned customer utilities would have to change in a market construct. In the end, both of these early Pacific Northwest markets efforts failed to move forward, for a variety of reasons, including:

- The political fallout resulting from the California energy crisis and its cost to consumers;
- Concerns about BPA losing its independence and becoming FERC jurisdictional, raised primarily by its preference customers and some members of the Congressional delegation;
- Concerns about losing BPA's control over the electricity generated by the Federal Columbia River Power System and having to share it with utilities outside the Columbia Basin; and,
- Ultimately, the lack of support from the Pacific Northwest Congressional Delegation.

BPA's choice in which market to join will have long-lasting effects on the future of the Pacific Northwest energy system and the West on a whole.

 **ACTION ITEM** ▶ The future of Western electricity markets is now in the development stage, and will likely change how major utility decision-making is conducted. Tribes may wish to follow these initiatives and related governance discussions, such as the “Pathways Initiative” in the near-term. The Extended Day-Ahead Market (“EDAM”) is expected to be offered by the CAISO in 2026, while SPP's market offering is under FERC review. For more information on the Pathways effort and to follow markets offerings generally, contact ATNI energy staff Eli Duncan-Gilmore at eli@atntribes.org.

What is the Pathways Initiative?

In 2023, a coalition of Western state public utility commissioners, state officials, utilities, public interest organizations, customer groups, and other interested parties organized a formal process to discuss a more independent and regional-oriented governance model for energy markets currently operated by the California Independent System Operator (CAISO). While many Pacific Northwest utilities and other regional parties had previously joined the CAISO's Energy Imbalance Market, as conversations moved to creation of a regional Extended Day-Ahead Market (EDAM), it became clear that a less California-centric governance model would give comfort to regional parties that are deciding between two different options for a day-ahead market, the other being the Southwest Power Pool's Markets+ offering. The Pathways Initiative is focused on increasing and ensuring that market participants and other stakeholders have appropriate influence over market operations so that the services created by CAISO and that exist outside the state are no longer under the control of the California government and are instead governed regionally in a new structure which is under development. Following extensive regional engagement and feedback, Pathways participants are currently in the process of refining their governance-related recommendations.

The Convergence of Utility and Tribal Interests

Tribes have long fought to protect their treaty rights and Tribal lands from the development of transmission and power plant facilities. The region is now facing a future power supply shortage and is planning to construct huge tracts of wind and solar resources to meet the forecast demand. These new resources will need to find transmission paths to load centers. There is no question that this historic need for new carbon-free generators will only exacerbate the tension between energy development and the protection of Tribal rights and interests. To ensure that Tribal rights are recognized, acknowledged, and have impact in energy planning and development processes, Tribes may take the following steps:



- **Participate in transmission and power planning forums where the details of future power plants and transmission lines are deliberated and determined.** WestTEC, WECC, BPA, and CAISO are currently performing this work. Also, the Northwest Power and Conservation Council is now working on the region's 9th Power Plan and its work will provide valuable insight into the adequacy of the region's power supply and its future dependency upon the Columbia River Power System.
 - Consider formation of a consortium of Tribal governments tasked to increase Tribal participation and control over electricity planning processes and outcomes and to protect Tribal rights and resources such as through efforts at ATNI. Contact ATNI Energy Staff Eli Duncan-Gilmour at eli@atntribes.org and Reuben Martinez at reuben@atntribes.org for more information.
- **Develop plans to be used by your Tribal government when a transmission or energy development proposal includes Tribal lands or ceded lands/traditional use areas.**
 - The plan would include a checklist of subjects that must be addressed by project developers, including impacts to cultural and traditional resources, ecology/environment, hunting and fishing rights, protection of traditional foods and medicines, and other treaty rights (right to trade/travel, etc.)
 - Identify individuals at the Tribe required to review and monitor development plans and identify impacts to treaty rights and the Tribal community.
 - Develop an end-game strategy that contemplates oversight of project construction and operations, as well as any revenue sharing agreements, etc.
- **Develop a land-use plan for your reservation that includes where energy projects could be located and any limits to project size and/or proposed technologies.**
- **Develop an internal process for your Tribe's review of potential transmission projects** that establishes rules and protocol for when (e.g., pre-decisional stage) and where (e.g. Tribal Council Chambers) your Tribal government or designee should be approached about a proposed project. Consider in advance what your Tribe's standards for review will be and what review process may be conducted by Tribal government officials.
- **Review any existing lease agreements for transmission corridors located on your reservation**, including a review of expiration dates and a general term review.
- **When negotiating new leases**, determine the utility's cost to move a transmission line off-reservation. This will set a baseline for annual lease payment negotiations. Establish standards for transmission corridor maintenance to decrease risk of wildfire and protect impacted fish and wildlife habitat and cultural resources.



ATNI ENERGY

In 1953 farsighted Tribal leaders in the Northwest formed the Affiliated Tribes of Northwest Indians, and dedicated it to Tribal sovereignty and self-determination. Today, ATNI is a nonprofit organization representing 57 Northwest Tribal governments from Oregon, Idaho, Washington, southeast Alaska, Northern California and Western Montana. ATNI is an organization whose foundation is composed of the people it is meant to serve.

atniTribes.org