



Tribal Renewable Energy Development

Literature Review

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Executive Summary

The Tribal Renewable Energy Projects literature review is intended to provide a comprehensive, but abbreviated, summary of the information and sources available to the Bureau of Indian Affairs (BIA) Division of Energy and Mineral Development (DEMD) and Indian Energy Service Center (IESC), and to Indian tribes related to renewable energy project development and deployment on Indian lands. The sources reviewed include:

- federal laws, regulations, and guidebooks;
- federal agency websites, guidance, reports and other work products;
- industry information, reports and research;
- other state government information;
- academic information and
- law review articles.

This review covers major topic areas, including background information on tribal energy resources, project options, market considerations, transmission and implications of state law and regulations. Focus is placed on the complex federal legal scheme that influences, controls, and regulates renewable energy projects on Indian lands. In addition, there is a more in-depth review of project development phases and resources available to support project development. Further, the review provides a summary of the major federal funding programs for financial assistance. Finally, the document concludes with a discussion of challenges, success factors, examples of various tribal projects, and an overall summary of the tribal renewable energy development process.

It is important to note that the renewable energy industry is a fast and ever moving industry in terms of markets, incentives, tax benefits, and technologies. So, while this review attempts to capture a summary of relevant information as of the date of this document, it is highly recommended that both the BIA and Indian tribes continue to keep track of major developments in the industry.

Introduction

The Department of the Interior BIA contracted with Kauffman and Associates, Inc., for consulting services for the Renewable Energy Accelerated Deployment for Indian Country (READI). One task of the services includes the completion of a literature review that will establish a baseline of current statutes, regulations, standard operating procedures and handbooks, as well as current conditions for renewable and distributed energy development in Indian Country. The report is intended to inform topics and priorities for tribal engagement.

As defined in the scope of work, this report includes:

- a) Renewable and distributed energy resources and applications including, but not limited to, solar, wind, hydroelectric, geothermal, biofuel, microgrids, energy storage, hydrogen, and supporting infrastructure.
- b) An understanding of the development activities, including, but not limited to, planning, permitting, financing, development agreements, construction, operation and maintenance, and reclamation in relation to renewable and distributed energy resources and applications.

Further, the report is intended to assist the BIA, in its tribal engagement, with understanding what tribes need from the BIA to promote renewable energy development opportunities, and what the BIA can do to provide assistance to tribes. Many additional Federal Agencies have a role with energy development on Indian land. The primary focus of READI is to improve BIA programs and procedures, however the roles of other federal agencies are also considered regarding related programs and coordination.

Sources Consulted

To identify resources that are most relevant to tribal energy development and address the BIA's objectives and inform answers to the BIA's goals, a search strategy was developed that focused on manual searches of:

- relevant federal laws, statutes, regulations, and standard operating procedures;
- all data available through BIA, including available programs and incentives;
- federal agency websites for published reports and information;
- known reliable sources of market information, such as nonprofits, foundations, industry associations, and governmental associations;
- scholarly papers related to renewable and distributed energy programs; and
- conference proceedings and unpublished literature, including independent research studies and dissertations.

A full bibliography of all sources reviewed for this report is included starting on page 38.

Part I: Tribal Renewable Energy Resources

Part one of this document provides introductory information related to tribal renewable energy resources. This includes types of renewable energy resources, types of projects, tribal roles and options, project ownership and current market conditions. Altogether, this background information provides a foundation for tribal renewable energy resource options offering definitions of key industry terms, and an overview of tribal renewable energy development opportunities.

Types of Renewable Energy Resources

In 2013, the National Renewable Energy Laboratory (NREL) published the first Geospatial Analysis of Renewable Energy Technical Potential on Tribal Lands. In this analysis, NREL reported that "the technical potential on tribal lands is about 6% of the total national technical generation potential. This is disproportionately larger than the 2% tribal lands in the United States, indicating an increased potential density for renewable energy development on tribal lands." Table 1 summarizes the estimated technical potential across several renewable energy resources.

Table 1: Summary of Tribal Technical Potential by Capacity and Generation

Technology ¹	Tribal Capacity Potential ² (MW)	National Capacity Potential ³ (MW)	Tribal Generation Potential (MWh)	National Generation Potential (MWh)	% of National Capacity	% of National Generation
Solar PV (Utility-Scale Rural)	6,888,339	152,973,829	14,322,522,713	280,613,216,903	4.5%	5.1%
Solar PV (Utility-Scale Urban)	8,199	1,217,699	17,578,618	2,231,693,746	0.7%	0.8%
Solar CSP	1,818,185	38,066,401	6,139,851,743	116,146,244,587	4.8%	5.3%
Wind (80 m height, >=30% GCF)	347,505	10,954,759	1,146,044,229	32,784,004,656	3.4%	3.5%
Geothermal (EGS)	763,252	3,975,735	6,017,487,000	31,344,696,024	19.2%	19.2%
Geothermal (Hydrothermal)	641	30,033	5,050,724	236,780,000	2.1%	2.1%
Biomass (Solid)	551	50,707	4,340,642	399,774,091	1.1%	1.1%
Biomass (Gaseous)	85	11,232	673,465	88,551,445	0.8%	0.8%
Hydropower	1,687	60,000	7,390,196	258,953,000	2.8%	2.9%
Total ⁴	9,855,444	207,340,394	27,660,939,330	464,103,914,451	4.8%	6.0%

¹ Each technology is evaluated separately; the same land area might be available for many technologies.

² Lopez, A. et al. (2012). U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis. NREL/TP-6A20-51946. Golden, CO: National Renewable Energy Laboratory.

³ Lopez, A. et al. (2012). U.S. Renewable Energy Technical Potentials: A GIS-Based Analysis. NREL/TP-6A20-51946. Golden, CO: National Renewable Energy Laboratory.

⁴ Technical potential calculated for each technology individually and does not account for overlap (i.e., the same land area may be identified with potential for wind and solar and would be counted twice in the total). Some technologies may be compatible with mutual development.

In 2018, NREL updated its analysis to focus on utility scale applications. Table 2 shows the technical potential of tribal lands in the contiguous 48 states.

Table 2: Utility-Scale Technical Potential on Tribal Lands in Contiguous 48 States

Technology	Tribal Capacity Potential (GW)	National Capacity Potential (GW)	National Capacity (%)	Tribal Generation Potential (TWh)	National Generation Potential (TWh)	National Generation (%)
Utility-scale PV	6,035	118,918	5%	10,689	197,087	5.4%
CSP	2,114	26,318	8%	7,701	92,994	8.3%
Wind	891	10,119	8.8%	2,394	30,781	7.8%
Geothermal (hydrothermal)	0.033	5.7	0.6%	2	156	1.6%
Biomass (wood)	21	62	34.4%	124	342	36.4%
Total	9,063	155,457	5.8%	20,912	321,401	6.5%

Using the Techno-Economic Renewable Energy Potential on Tribal Lands report, NREL created the Tribal Energy Atlas. This atlas is an interactive tool that allows individual Indian tribes to evaluate and estimate the renewable energy resources within the tribe's lands. The atlas also includes important energy infrastructure information, such as transmission line locations, pipeline locations, other energy generation, and certain market information.

In both the geospatial and techno-economic analyses, NREL has defined the following renewable energy resources in terms of both how they are generated and how they can be used or applied:

Biopower: Types of biomass include wood from various sources (beetle kill, slash, lumber waste), agricultural residues, animal and human waste (methane), and municipal solid waste and landfill gas. Most biopower plants use direct-fired systems to generate electricity from biomass. They burn bioenergy feedstocks directly to produce steam. This steam drives a turbine, which turns a generator that converts the power into electricity. In some biomass industries, the spent steam from the power plant is also used for manufacturing processes or to heat buildings. Such combined heat and power systems greatly increase overall energy efficiency. Anaerobic digestion and waste to energy systems are also included in biopower/biomass resources.

Geothermal: Geothermal technologies use heat from the Earth. Geothermal is a highly efficient method of providing electricity generation. High-temperature geothermal is ideal for power plant production levels, but low-temperature heat pumps can provide heating and cooling energy in any part of the United States. Lower-temperature resources are best suited for heat applications. Geothermal technologies exist commercially for either small-scale (distributed) or large-scale (central) electricity generation.

Hydropower: Hydroelectricity refers to electricity generated using the gravitational force of falling or flowing water, called hydropower. Both large and small-scale power producers can use hydropower technologies to produce clean electricity.

Concentrating Solar Power: Concentrating solar power (CSP) technologies use mirrors to reflect and concentrate sunlight onto receivers that collect solar energy and convert it to heat. This thermal energy can then be used to produce electricity via a steam turbine or heat engine that drives a generator. While CSP offers a utility-scale, firm, dispatchable renewable energy option that can help meet demand

for electricity, it is most economical in the southwestern United States. Factors that influence project economics are the cost of the technology, the quality of the solar resource, and the cost of the energy being displaced. CSP systems can be successfully installed on landfills, brownfields, and greenfields, with minimal disturbance to native vegetation and wildlife. Types of CSP systems include linear concentrator, dish/engine, power tower, and thermal storage.

Solar PV: Photovoltaic (PV) technologies produce electricity directly from the energy of the sun. Small PV can provide electricity for homes, businesses, and remote power needs. Larger PV systems provide more electricity for contribution to the electric power system. PV technologies work in all parts of the United States, but economics are dependent on technology cost, quality of solar resource, and cost of energy being displaced. Flat plate is the most common PV array design, which uses flat-plate PV modules or panels that can be fixed in place or designed to track the movement of the sun. An off-grid, flat-plate solar PV system would be useful for remote locations or for self-sufficiency in the event of a power interruption. Concentrator PV systems use less solar cell material than other PV systems because they make use of relatively inexpensive materials such as plastic lenses and metal housings to capture the solar energy shining on a large area and focus that energy onto a smaller area—the solar cell.

Wind: Wind energy technologies use kinetic energy in wind for practical purposes such as generating electricity, charging batteries, pumping water, and grinding grain. Most wind energy technologies can be used as stand-alone applications, connected to a utility power grid, or even combined with a PV system. Wind energy today is cost competitive in many locations throughout the United States. Utility-scale wind consists of many turbines that are usually installed close together to form a wind farm that provides grid power. Several electricity providers use wind farms to supply power to their customers. Stand-alone turbines are typically used for water pumping or communications. However, homeowners and farmers in windy areas can also use small wind systems to generate electricity.

Types of Projects

The literature is replete with definitions of the scale, uses and applications for renewable energy resource projects. The following definitions are the more commonly used:

Commercial or Utility Scale: Commercial or utility scale renewable energy projects are typically greater than 10 megawatts (MW, installed capacity). These projects typically sell power to utilities or other off takers, which require interconnection to either the bulk transmission system or the "middle" grid.

Distributed Energy: Distributed energy generation projects are typically located within the distribution grid, and can include rooftop solar, small wind, community solar or wind, energy storage, diesel/natural gas generators, and microgrids (multiple generation technologies). Installed capacity for a project is typically less than 10 MW and is intended to be used directly by single or multiple buildings (or homes). These projects can be interconnected to the distribution system either "in front of" or "behind" the customer's meter(s). The following types of projects are considered "distributed energy" projects:

Community-Scale: Typically, a ground-mount system that serves multiple buildings, homes, or facilities. Interconnection is typically "in front of" the meter but can be considered behind the meter if the utility allows virtual or aggregate net metering.

Community Solar/Wind: Community solar (or solar gardens) or wind— sometimes referred to as shared renewables—allows residents, small businesses, organizations, municipalities and others to "buy-in" to the renewable energy project and receive credit on their electricity bills for the power produced from their portion of a solar array, offsetting their electricity costs. While typically connected in front of the

meter, virtual net metering or aggregate net metering are required to allow for the project to reduce customers' electricity costs.

Microgrids: These systems are localized load and generation resources (such as solar, wind, storage, fuel cell, diesel or natural gas gen set) which normally operate connected to and synchronous with the traditional grid but can disconnect and function autonomously as an island within the grid.

Rooftop residential or commercial solar or wind: Unlike the previously discussed projects, these projects are located on individual buildings, homes, and facilities (such as water treatment plants, wastewater plants, cell towers, etc.). Projects can also be co-located, such as solar canopies or small ground mount. Interconnection is through the customer's meter, and these are almost all behind the meter projects to take advantage of net metering. Figure 1 is an example of a distributed energy system.

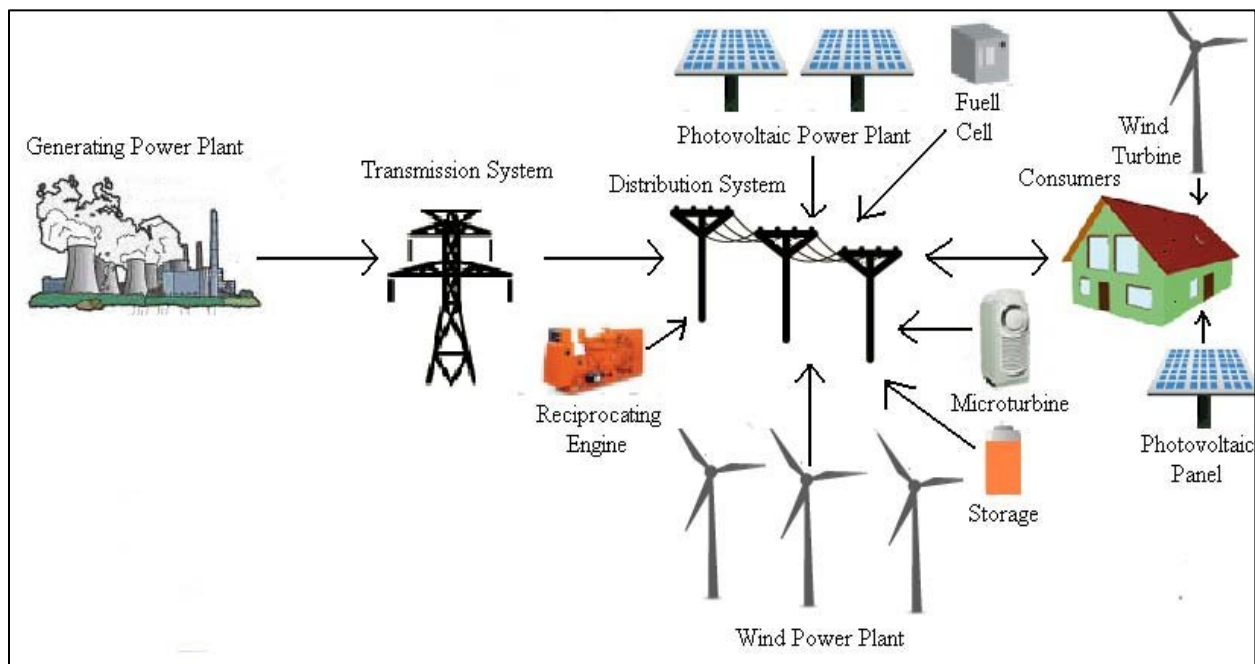


Figure 1. Example of a distributed energy system.

Tribal Roles and Options

In the DOE Office of Indian Energy training modules and workshops, there is considerable discussion about the roles tribes can perform in renewable energy development. These roles include project company, resource/landowner, sponsor/developer, EPC contractor, operator, feedstock supplier, product off-taker, lender, and tribal host. Table 3 provides a description of each type of role.

Table 3: Tribal Roles and Options in Renewable Energy Development

Title	Role
Project Company	Legal entity that owns the project, also called special purpose entity.
Resource/Landowner	Legal and/or beneficial owner of land and natural resources.
Sponsor/Developer	Organizes all the other parties and typically controls project development and makes an equity investment in the company or other entity that owns the project.
EPC Contractor	Construction contractors provide design, engineering, and conduction of the project.
Operator	Provides the day-to-day O&M of the project.
Feedstock Supplier	Provides the supply of feedstock (i.e., energy, raw materials) to the project (e.g., for the power plant, the feedstock supplier will supply fuel)
Product Off-taker	Generally, enters into a long-term agreement with the project company for the purchase of all energy.
Lender	A single financial institution or a group of financial institutions that provides a loan to the project company to develop and construct the project and that takes a security interest in all the project assets.
Tribal Host	Primary sovereign of project site.

Each role comes with its own set of benefits and risks. As a tribe undertakes its energy planning efforts, one of the elements of such plans should include an assessment of the best and most appropriate role for the tribe, given its circumstances, goals and objectives. One aspect of this evaluation should also include the specific risks associated with the role and the type of project. These risks are outlined in Table 4.

Table 4: Tribal Risks in Renewable Energy Development

Development Area	Risks
Development	<ul style="list-style-type: none"> • Poor or no renewable energy resource assessment • Not identifying all possible costs • Unrealistic estimation of all costs • Community push-back and completing land use
Site	<ul style="list-style-type: none"> • Site access and right of way • Not in my backyard (NIMBY)/build absolutely nothing anywhere (BANANA) • Transmission constraints/siting new transmission
Permitting	<ul style="list-style-type: none"> • Tribe-adopted codes and permitting requirements • Utility interconnection requirements • Interconnection may require new transmission, possible NEPA
Finance	<ul style="list-style-type: none"> • Capital availability • Incentive available risk • Credit-worthy purchaser of generated energy
Construction/Completion	<ul style="list-style-type: none"> • EPC difficulties • Cost overruns • Schedule
Operating	<ul style="list-style-type: none"> • Output shortfall from expected • Technology O&M • Maintaining transmission access and possible curtailment

Project Ownership

Another element of planning should include whether a tribe should own, co-own or have a third-party own the renewable energy project. As identified in the DOE Renewable Energy Project Development Basics, each option has its own set of benefits, risks, responsibilities, and legal considerations.

Tribal Ownership: Tribes, including tribal owned enterprises, utilities, and other instrumentalities, that directly own renewable energy projects will enjoy the primary benefits generated by such projects, such as revenue generation or cost savings. Furthermore, these projects will not be subject to state jurisdiction, taxation, or regulation. Nor are these projects likely to invoke the federal regulatory scheme for leases or right of ways, as there is no third-party involvement. With the passage of the Inflation Reduction Act, there is new legal support for tribal ownership of renewable and clean energy projects. Direct ownership, however, also entails taking on all the risk and responsibility of developing, financing, constructing, operating, and maintaining such projects.

Partnerships: Tribes can mitigate some of the risk and responsibility through partnerships with developers or other investors to develop and own projects. For example, tribes can negotiate co-ownership (or co-development) agreements that allocate risk and responsibilities across parties.

Third-Party Ownership: Third-party ownership has been the norm for utility scale projects, as these projects require, among other things, expertise in substantial development activities, capital and financing, tax equity investment, utility, and off-taker negotiations, construction, and operations. Third-party leases will be subject to BIA approval (unless the tribe has approved leasing regulations under the Helping Expedite and Advance Responsible Tribal Home Ownership Act (HEARTH Act), thereby invoking NEPA and other related environmental review requirements. But, with third-party ownership, there is little risk to the tribe.

A note about tribal participation via tribal enterprises. As the BIA Handbook on Tribal Structures points out, tribes can establish different types of enterprise structures—Section 17 federally chartered companies, tribally chartered companies, or state-chartered companies. Tribes can also establish other types of enterprises, such as tribal utilities, or leverage tribal housing authorities, to participate, develop, own and or operate renewable energy projects. There are many legal and business reasons to establish a separate tribal enterprise, including segregating legal and business risk, separating business from politics, and being able to respond to market conditions and demands in a business approach.

Current Market Conditions

Another major set of inputs or factors into renewable energy project planning is understanding and incorporating market and industry information, including market opportunities and barriers, technology opportunities and barriers, and access to transmission. Further, tribes should seek to understand the role states and utilities play in tribal energy development projects, whether on or off tribal lands.

Key Market Opportunities

Corporate Offtake Market: According to the Solar Energy Industries Association (SEIA), almost 19 GW of solar has been installed through 2022 for corporate procurement of solar power. SEIA estimates that over the next 3 years nearly 27 GW will be installed through off-site projects. The American Clean Power Association reports that 326 companies have purchased a total of 77 GW of clean energy (solar, wind and storage). These numbers are expected to rise with the Inflation Reduction Act and continuing reduction in costs.

Local Government Offtake Market: Like many corporations, local governments are also getting into direct procurement to achieve their carbon reduction and other sustainability goals. In March 2020, the World Resources Institute reported that U.S. local governments had signed 335 deals to procure over 8 GW of renewable energy.

Federal Government Offtake Market: The federal government is the largest user of power in the country. In December 2022, President Biden issued Executive Order 14057 "Catalyzing Clean Energy Industries and Jobs Through Federal Sustainability." Under this EO, the federal government strives to achieve 100 percent carbon pollution-free electricity by 2030. Carbon pollution-free is defined as marine energy, solar, wind, hydrokinetic, geothermal, hydroelectric, nuclear, green hydrogen, and net zero carbon produced fossil fuel resources. The Energy Policy Act of 2005 includes a preference provision for tribal energy resources. In 2012, the DOE adopted a policy to implement this preference provision and is now working with General Services Administration, and the Department of Defense to update the preference policy to comport with the new EO.

Electrification of Energy—transportation and building decarbonization: Between the Bipartisan Infrastructure Law (BIL) and the Inflation Reduction Act (IRA), tens of billions of federal dollars (and billions of private dollars) will be invested in the electrification of buildings, housing, industry, and the transportation sector through electric vehicle charging stations, electrification of cars, commercial vehicles and buses. As these sectors become electrified, more electricity demand will result, and the need for more renewable energy and clean energy projects will rise.

State Laws and Regulations: Barriers and Opportunities

As some law review articles included in this literature review have pointed out, state law and regulation and utility policies and practices have a determinative impact on tribal renewable energy projects on tribal lands. While states do not typically have jurisdictional or regulatory authority over energy development on tribal lands, projects on Indian lands may be impacted by state and local policies, laws, and regulations. States exercise legal and regulatory control over public utilities related to retail sales of energy products, as expressed in the Federal Power Act.

This legal and regulatory control extends to:

- how energy rates are set;
- interconnection standards;
- net metering requirements (if any);
- renewable or clean energy portfolio requirements (if any);
- utility renewable energy procurement and resource planning;
- distributed energy programs (if any);
- tax incentives or imposition of certain taxes; and
- siting and permitting of energy projects and infrastructure, such as transmission.

For tribes served by state regulated utilities, these state laws, regulations and policies will apply to energy projects that serve the utilities or ratepayer located on Indian lands. Further complicating this issue for some tribes, some states do not regulate certain types of utilities—such as public power agencies and rural electric cooperatives. These unregulated utilities are free to set their own requirements for energy projects on tribal lands.

On the other hand, over the last decade, states, cities, and other local governments have made a substantial and uncontroverted shift toward energy policies that promote renewable energy, energy

efficiency, climate change mitigation, and sustainable adaptation to climate change impacts. According to the Interstate Renewable Energy Council, many states have adopted laws or regulatory policies related to distributed energy projects, such as net metering policies, interconnection rules and standards, and community solar programs. The National Conference of State Legislatures reports that over 35 states have now adopted renewable energy, or clean energy standards or goals. About half of these states have also actively developed, promoted, and implemented greenhouse gas emissions reduction plans, with an emphasis on market-based solutions. More states are also revisiting their efforts to bring clean energy, energy efficiency, and sustainability programs to low-income and vulnerable communities.

Moreover, many states may have tax incentives to build renewable energy projects, and other taxes on business activities and income. The extent to which these taxes are applicable to projects located on tribal lands will depend, among other things, on the type of tax, the project owner, and the buyer of the power.

Finally, more specific information about state incentives, renewable energy programs, and utility programs is maintained by the NC Clean Energy Center at North Carolina State, through the Database of State Incentives for Renewables and Efficiency database.

Transmission and Distribution System Expansion and Upgrades

In the Energy Policy Act of 2005, Congress recognized the need to study, plan, and financially support the expansion of the current bulk transmission system as a crucial ingredient to large scale deployment of renewable energy utility scale projects. DOE is currently conducting two studies—the National Transmission Needs Study and the National Transmission Planning Study—that seek to identify opportunities and needs for transmission line expansion or capacity upgrades. In addition, DOE is responsible to designate "National Interest electricity Transmission Corridors" throughout the country. DOE is currently developing its process for such a designation.

Notwithstanding these major efforts to understand the transmission issues and identify potential solutions, the renewable energy industry is still concerned about several related issues, including permitting timeframes (it currently takes between 7 and 10 years to fully permit a new transmission line) and interconnection processes and costs. FERC is currently undergoing transmission interconnection reform efforts.

Because the distribution grid is the responsibility of retail electric utilities, sometimes subject to state regulatory oversight, it is difficult to characterize the status of efforts to upgrade the distribution grid. However, as discussed in the next section, the BIL has several billions of dollars for states, tribes, and utilities to address distribution grid upgrades and resiliency efforts.

Part II: Federal Laws, Regulations, Policies and Guidance

The review of relevant federal laws and regulations applicable to tribal renewable energy development, and various law review articles, identify five types of federal laws:

- I. Federal Indian Laws and Regulations—Title 25 of the U.S. Code
- II. Federal Environmental Laws and Regulations
- III. Federal Energy Policy and Regulatory Laws and Regulations
- IV. Federal Tax Laws
- V. Federal Energy Programs Laws

Types I through Type IV of federal laws and regulations are reviewed in this section.

Type I: Federal Indian Laws and Regulations

The federal government regulates energy development on Indian lands in many ways and under several federal statutes. Indian energy development statutes, such as the Indian Mineral Leasing Act (IMLA), the Indian Mineral Development Act (IMDA), and the Indian Tribal Energy Self-Determination Act (ITESDA), in addition to land development statutes, such as the General Right-of-Way (ROW) Act and the Long Term Leasing Act (LTLA), are the more commonly known and invoked legal requirements for the federal government and tribes to regulate and control renewable energy development on Indian lands. The Secretary of the Interior is required to approve geothermal leases under the IMLA or the IMDA. Leases for surface-based renewable energy projects, such as wind, solar, or biomass, are approved under the LTLA, but may also need to receive mineral leases for the use of subsurface minerals in the construction and operation of the surface project. And to the extent that transmission lines, pipelines and or access roads are developed with the project, the Secretary is required to approve ROWs for those facilities. Hydroelectric projects and associated transmission lines are licensed and approved by the Federal Energy Regulatory Commission (FERC), as discussed in the next section. Hydrogen pipelines will likely also be regulated by FERC.

These federal regulatory laws related to tribal lands and energy resources are grounded in the Nonintercourse Act, which requires federal approval to convey interests in Indian lands. Courts have regularly held that agreements to convey interests in lands that are not approved by the federal government are invalid under federal law.

Long-Term Leasing Act of 1955

Under the LTLA, the Secretary is authorized to approve leases on tribal and allotted lands for certain purposes, including agriculture, business, residential, public, religious, and educational. It is limited to surface leasing, and thus is the federal law that controls leasing for solar, wind, and biomass energy projects on tribal lands. While the default term for a lease is 25 years, plus two additional 25-year renewal terms, many tribes have been authorized to enter in to leases up to 99 years. The LTLA requires the Secretary to consider the following factors in approving a lease: (1) whether “adequate consideration has been given to the relationship between the use of the leased lands and the use of neighboring lands;” (2) “the height, quality, and safety of any structures or other facilities to be constructed on such lands;” (3) “the availability of police and fire protection and other services;” (4) “the availability of judicial forums for all criminal and civil causes arising on the leased lands;” and (5) “the effect on the environment of the uses to which the leased lands will be subject.”

The LTLA is implemented through the BIA's surface leasing regulations. The regulations make the LTLA applicable to “Indian land and government land, including any tract in which an individual Indian or

Indian tribe owns an interest in trust or restricted status.” Unless controlled by other statutory authority, a lease is required when a person or legal entity (including an independent legal entity owned and operated by a tribe) that is not an owner of the Indian land wants to lease Indian lands. For example, a “Section 17” corporate entity that manages or has the power to manage the tribal land directly under its federal charter or under a tribal authorization is not required to obtain a lease approval through the BIA. As explained further below, a certified tribal energy development organization (TEDO) is also not required to receive BIA approval for leases with tribes. However, a lease between a tribal-owned entity or a partnership will have to be approved by the BIA.

For energy development purposes, the LTLA regulations do not apply to, among other land rights, ROWs (they have their own regulations); mineral leases, prospecting permits, or mineral development agreements; leases of water rights associated with Indian land, except to the extent the use of water rights is incorporated in a lease of the land itself; or permits. Further, while option agreements, development agreements, or temporary use permits—common in energy development—are not considered leases under the regulations, the BIA requests such agreements be submitted for their records and evaluation of whether the agreement is subject to the regulations.

The LTLA regulations were amended in 2013 to clarify several important federal and tribal interests in leases. The regulations now explain that tribal law applies to leases of Indian lands, and the BIA will comply with tribal law (including environmental, land use, and cultural resource protection laws) unless contrary to federal law. State law only applies to the extent the tribe consents or has adopted state law, or the state has jurisdiction pursuant to federal law. Furthermore, the regulations now include specific disclaimers of applicability of state taxation—both property taxes and transaction taxes. According to the regulations, “permanent improvements on the leased land, without regard to ownership of those improvements, are not subject to any fee, tax, assessment, levy, or other charge imposed by any state or political subdivision of a state. Improvements may be subject to taxation by the Indian tribe with jurisdiction.” Additionally, activities under a lease conducted on the leased premises are not subject to any fee, tax, assessment, levy, or other charge (e.g., business use, privilege, public utility, excise, gross revenue taxes) imposed by any state or political subdivision of a state. Activities may be subject to taxation by the Indian tribe with jurisdiction.

A major innovation in the revised LTLA regulations was the inclusion of subpart E for wind and solar leases. There are two types of leases covered by this subpart: (1) wind energy evaluation leases (WEELs), and (2) wind and solar resource (WSR) leases. A WEEL is a short-term lease that authorizes possession of Indian land for the purpose of installing, operating, and maintaining instrumentation, and associated infrastructure, such as meteorological towers, to evaluate wind resources for electricity generation. WSR leases are leases that authorize possession of Indian land for the purpose of installing, operating, and maintaining instrumentation, facilities, and associated infrastructure, such as wind turbines and solar panels, to harness wind and or solar energy to generate and supply electricity for resale on a for-profit or non-profit basis to a utility grid serving the public generally; or to users within the local community (e.g., on and adjacent to a reservation). However, if the tribe itself will conduct wind and solar resource activities on its own tribal lands, then the tribe does not need a WEEL or WSR lease. This subpart does not cover biomass or waste-to-energy projects as those projects are subject to subpart D (business leases).

In addition to the general provisions in the LTLA regulations, subpart E contains several requirements for a WSR lease, including that the lease itself must include:

1. the tract or parcel of land being leased;
2. the purpose of the lease and authorized uses of the leased premises;
3. the parties to the lease;
4. the term of the lease;
5. the ownership of permanent improvements and the responsibility for constructing, operating, maintaining, and managing WSR equipment, roads, transmission lines, and related facilities;
6. who is responsible for evaluating the leased premises for suitability, negotiating power purchase agreements, transmission, and purchasing, installing, operating, and maintaining WSR equipment;
7. payment requirements and late payment charges, including interest;
8. due diligence requirements;
9. insurance requirements;
10. bonding requirements; and
11. indemnification of the United States and the tribe.

Additional requirements include commencement of construction within two years, or the lessee must provide a reason for delay and continue to make progress; submission and approval of a resource development plan; ownership of improvements upon lease termination; fair market value compensation or waiver by the tribe; and dispute resolution and remedies.

Because approval of a surface lease is considered a major federal action under the National Environmental Policy Act (NEPA), it is subject to the regulatory review process required under NEPA and other environmental review laws, listed here. Thus, the BIA cannot decide on the lease until the environmental review process is complete. Another innovation in the LTLA regulations is related to these environmental review requirements: per the regulations, the BIA “will adopt environmental assessments and environmental impact statements prepared by another federal agency, Indian tribe, entity, or person under 43 CFR 46.320 and 42 CFR 1506.3, including those prepared under 25 U.S.C. 4115 and 25 CFR part 1000, but may require a supplement.”

Prior to submitting a renewable energy project surface lease to the BIA for regulatory review and approval, tribes should review the BIA checklist for approving leases so they have a sound understanding of the information and steps the BIA requires. While not necessary under the regulations, a tribe might want to request a certified appraisal through the Appraisal and Valuation Services Office (AVSO). This appraised value may be able to assist both the tribe and the BIA with verifying the fair market value of the compensation proposed in the lease.

Long-Term Leasing Act Amendments—HEARTH Act

The HEARTH Act, passed in 2012, also allows tribes to take control of leasing tribal lands for energy development. The HEARTH Act amended the LTLA to allow tribes to petition the Secretary to approve tribal leasing regulations for surface leases on tribal trust lands. If approved, the tribe no longer needs secretarial approval of leases entered under the tribe’s leasing regulations. As with Tribal Energy Resource Agreements (TERAs), the tribe does not need to meet any NEPA requirements for leases, but the tribe’s leasing regulations do have to include an environmental review process that complies with the statute. Unfortunately, the HEARTH Act does not apply to allotted lands or subsurface leasing.

The Secretary is required to approve tribal leasing regulations if those regulations are consistent with the Secretary’s leasing regulations and incorporate an environmental review process that includes

evaluation of significant environmental impact, notice and opportunity to comment, and response to comments.

The BIA has not issued regulations for the implementation and administration of the HEARTH Act, but it has published the requirements and process for approving HEARTH Act tribal regulations in its department manual. As of the date of this review, over 100 tribes have applied for and received approval of their leasing regulations, including seven providing wind and solar leasing authority.

Right-of-Way Acts

The General Right-of-Way Act was enacted in 1948 to provide the Secretary with broad authority to enter into ROWs on Indian lands for all purposes. Previously enacted in the early 1900s, specific purpose ROW laws remained in place and there was no intent to repeal ROW authorities under the Federal Power Act (FPA). The 1948 Act grants general authority to approve ROWs, subject to conditions set by the Secretary and with consent and approval of the tribe. Just compensation is required. The Secretary must also issue rules and regulations for the approval of ROWs.

The ROW regulations were updated in 2015 and seek to create uniform regulations to harmonize the regulatory process for all the operative ROW laws. For energy development purposes, the ROW regulations cover transmission and distribution lines, access roads, and pipelines. Like the LTLA regulations, the ROW regulations contain provisions regarding the applicability of tribal law, tribal jurisdiction, and tribal taxation, as well as the inapplicability of state jurisdiction and state taxation. As with leasing approvals, tribes should review the BIA checklist for approving easements on Indian lands. A tribe may request an appraisal from the AVSO to verify fair market value of the proposed compensation for the easement.

Tribal consent is required before the Secretary can grant an ROW, and the common practice now is for tribes to negotiate an easement agreement between the tribe and the grantee that contains provisions related to compensation, tribal governing law, jurisdiction, taxation, dispute resolution, and other terms and conditions related to the use of the easement area. These agreements also usually contain a provision that the easement agreement will be incorporated into the ROW grant, thereby providing a federal remedy and enforcement for the easement terms.

Contracts Act

A little known and often overlooked federal law that also requires the approval of certain agreements related to Indian lands is the Contracts Act. Originally enacted in 1871, the Contracts Act was last amended in 2000 to better clarify other types of agreements with Indian tribes that must be approved by the Secretary. The Contracts Act requires that any agreement that encumbers Indian lands for a term of more than seven years is subject to the Secretary's approval. The statute does not define the term "encumber" or "encumbrance," and the regulations define the types of contracts terms by what they are or are not. But in the context of energy projects, this law might apply when a mortgage or security interest is placed on the energy leasehold interest.

Indian Mineral Development Act of 1982

For geothermal projects, the IMDA is the applicable federal law. The IMDA is intended to create flexibility and give tribes more opportunity to participate directly in mineral mining and development on tribal lands:

Any Indian tribe, subject to the approval of the Secretary and any limitation or provision contained in its constitution or charter, may enter into any joint venture, operating, production

sharing, service, managerial, lease or other agreement, or any amendment, supplement or other modification of such agreement (hereinafter referred to as a “Minerals Agreement”) providing for the exploration for, or extraction, processing, or other development of, oil, gas, uranium, coal, geothermal, or other energy or nonenergy mineral resources (hereinafter referred to as “mineral resources”) in which such Indian tribe owns a beneficial or restricted interest, or providing for the sale or other disposition of the production or products of such mineral resources.

In addition to the statutory leasing authorities, the IMDA regulations govern the approval of mineral agreements to ensure tribal or individual Indian mineral owners enter into mineral agreements consistent with the purposes of the IMDA. Key regulatory provisions include but are not limited to:

- making sure all environmental studies are completed under NEPA, the National Historic Preservation Act (NHPA), the Archaeological and Historic Preservation Act, and the American Indian Religious Freedom Act;
- due diligence related to corporate qualification of the lessee; and
- the multi-bureau responsibilities for the BIA, Bureau of Land Management (BLM), Office of Surface Mining, Reclamation, and Enforcement, and Minerals Management Service (now the Office of Natural Resources Revenue).

Even though mineral agreements are the product of negotiation between the tribe and potential developer/lessee, the IMDA regulations nonetheless create requirements for the form of contract and required elements. Every agreement is required to include (1) identification of parties; (2) duration and term; (3) indemnification; (4) obligations; (5) disposition of production; (6) payment and compensation; (7) accounting and valuation; (8) limitations on assignments; (9) bonding and insurance; (10) audits; (11) dispute resolution; (12) force majeure; (13) termination or suspension; (14) nature and schedule of activities; (15) reporting production; (16) abandonment, reclamation, and restoration; (17) unitization; (18) protection from drainage and unauthorized taking; and (19) recordkeeping.

For geothermal leases and projects subject to the IMDA and its implementing regulations, the BIA follows the Fluid Minerals Handbook and the BIA and BLM have segregated their regulatory and oversight responsibilities through the “Onshore Energy and Mineral Lease Management Interagency Standard Operating Procedures,” adopted in 2013. Furthermore, Section 3102 of the Energy Act of 2020 established a program to improve federal permit coordination through the creation of a national Renewable Energy Coordination Office (RECO). The RECO is intended to encourage collaboration between federal, state, and tribal authorities, with the BLM serving as the lead. It is unclear, though, whether the RECOs will cover geothermal projects on Indian lands.

Indian Tribal Energy Self-Determination Act (Title V of the Energy Policy Act of 2005)

Title V of the Energy Policy Act of 2005 created several new programs and authorities to support tribal energy development, including DOE’s Office of Indian Energy Policy and Programs, Department of the Interior programs, and the ability for tribes to enter into Tribal Energy Resource Agreements (TERAs) with DOI. Additional provisions promote tribal energy development, including a provision that allows federal agencies to give preference to tribes in the purchase of electricity, energy products, and energy byproducts; a provision granting authority to WAPA to buy firm power from tribal projects; a new tribal energy loan guarantee program; other financial and technical assistance programs to promote energy development; and a provision in Title II that creates a double credit for the federal renewable energy standards for the purchase of renewable energy power from projects located on tribal lands.

Tribal Energy Resource Agreements

The Energy Policy Act of 2005 was the first federal law to include true self-governance provisions over tribal energy development. The Indian Tribal Energy Development and Self-Determination Act authorized the formation of TERAs, defined as agreements between a tribe and the Secretary to authorize the tribe or certified TEDO to enter into leases and business agreements for the exploration, extraction, or processing of energy mineral resources; or the construction or operation of electricity production, generation, transmission, or distribution facilities, or facilities to process or refine energy resources. Congress intended to promote complete tribal control over leases, business agreements, and ROWs for renewable energy and energy minerals, transmission and distribution lines, and pipelines.

If a tribe enters into a TERA, then leases, business agreements, and ROWs that serve an energy project on tribal lands will not require the Secretary's approval as long as the lease, agreement, or ROW is for less than 30 years. Because there is no federal approval of leases or ROWs, tribes also avoid NEPA requirements, although tribes must have a substitute environmental review process compliant with the statute's requirements.

Notwithstanding this powerful tool for energy self-governance, no tribe has yet to negotiate and enter into a TERA. This is in large part because prior to 2018, when the TERA provisions were amended, the BIA's regulations and process for applying for and receiving approval for a TERA were too onerous, expensive, and lengthy. In addition, there were multiple unanswered—and unanswerable—questions about the allowed scope of a TERA (whether it includes the BLM functions and the definition of "inherent federal functions" that could not be delegated to tribes, for example), the cost to implement, the tribal qualifications to administer the TERA, and the scope of the Secretary's trust responsibility. While some of these issues were resolved through the recent amendments, many important questions still linger.

Certified Tribal Energy Development Organizations

The 2018 amendments did create a new provision, though, that would allow a "certified" TEDO to obtain an energy resource lease or ROW from a tribe without a TERA or without the Secretary's approval. A "tribal energy development organization" is defined as "any ... business organization that is engaged in the development of energy resources and is wholly owned by an Indian tribe," or "any organization of two or more entities, at least one of which is an Indian tribe." The BIA enacted new regulations in 2019 to implement these new provisions. Under these regulations, a certified TEDO meets certain requirements, including that the TEDO must be majority owned and controlled by one or more tribes, is chartered under tribal law and subject to the tribe(s) jurisdiction, and the projects are located on the lands of the tribe(s). Once certified by the BIA, the tribe and its TEDO can negotiate and enter into energy resource agreements without BIA approval.

The TEDO designation is one of the few authorities that promote the partnership of tribes with each other and with non-tribal energy companies. TEDO designation has multiple benefits, including, as noted above, the ability to enter leases with a tribe (or tribes) without either BIA approval or the need for TERA or HEARTH Act leasing regulations. Additional benefits include access to federal grant programs and the tribal energy loan guarantee program. To date, one tribe has successfully been approved for TEDO designation.

Type II: Federal Environmental Laws

Several other federal environmental statutes also apply to energy project development on Indian lands. These laws range from overall environmental review to laws specific to air, water, waste, and

endangered or protected species. These environmental laws are applicable to Indian tribes and tribal lands either because of the federal approval of action related to the renewable energy project or because of the generally applicable nature of the law.

The National Environmental Policy Act

When tribes must obtain the Secretary's approval for leases or ROWs, or when tribes receive financial assistance such as loans or grants, these approval requirements trigger NEPA, as they are considered a "major federal action" under the Council on Environmental Quality's (CEQ) NEPA regulations. Other federal actions, such as Clean Air Act (CAA) or Clean Water Act (CWA) permitting, BLM or U.S. Forest Service permitting or approvals, or other federal agency actions that may be required for a particular tribal renewable energy project, will also of course trigger NEPA. Of particular interest, though, is the appropriate role of NEPA on tribal lands and the role tribes can, and should, play in the federal NEPA process.

The EPA has summarized the NEPA review process as follows:

Categorical Exclusion (CATEX). A federal action may be "categorically excluded" from a detailed environmental analysis when the federal action normally does not have a significant effect on the human environment (40 CFR 1508.1(d)). The reason for the exclusion is generally detailed in NEPA procedures adopted by each federal agency.

Environmental Assessment/Finding of No Significant Impact. A federal agency can determine that a CATEX does not apply to a proposed action. The federal agency may then prepare an Environmental Assessment (EA). The EA determines whether or not a federal action has the potential to cause significant environmental effects. Each federal agency has adopted its own NEPA procedures for the preparation of EAs. See NEPA procedures adopted by each federal agency.

If the agency determines that the action will not have significant environmental impacts, the agency will issue a Finding of No Significant Impact (FONSI). A FONSI presents the reasons why the agency concluded that there are no significant environmental impacts projected to occur upon implementation of the action. If the EA determines that the environmental impacts of a proposed federal action will be significant, an Environmental Impact Statement is prepared.

Environmental Impact Statements (EIS). Federal agencies prepare an EIS if a proposed major federal action is determined to significantly affect the quality of the human environment. The regulatory requirements for an EIS are more detailed and rigorous than the requirements for an EA.

The EIS process starts with the agency publishing a notice of intent in the Federal Register. The notice of intent informs the public of the upcoming environmental analysis and describes how the public can become involved in the EIS preparation. This notice starts the scoping process, which is the period in which the federal agency and the public collaborate to define the range of issues and potential alternatives to be addressed in the EIS.

A draft EIS is published for public review and comment for a minimum of 45 days. Upon closing of the comment period, agencies consider all substantive comments and, if necessary, conduct further analyses. A final EIS is then published, which provides responses to substantive comments. Publication of the final EIS begins the minimum 30-day wait period, in

which agencies are generally required to wait 30 days before making a final decision on a proposed action.

EPA publishes a notice of availability in the Federal Register, announcing the availability of both draft and final EISs to the public.

The EIS process ends with the issuance of the Record of Decision (ROD). The ROD explains the agency's decision, describes the alternatives the agency considered, and discusses the agency's plans for mitigation and monitoring, if necessary.

As described next, there is no doubt tribes have the inherent authority to regulate and control development on tribal lands. This control and regulation necessarily include the right, authority, and presumably the obligation, to conduct a review of the potential impacts—environmental and otherwise—of development occurring on tribal lands. In the context of a federal decision to approve such development, and thus the federal requirement to comply with NEPA, federal agencies can, and should, defer to tribes on environmental review and impacts analysis. This approach is almost certainly necessary if the principles of respect for tribal sovereignty, not to mention expedited permitting and improved efficiencies of federal approvals, are going to be accomplished.

Under current CEQ NEPA regulations, tribes can be designated as co-lead or cooperating agencies in the NEPA process. To promote efficiencies, agencies are required to reduce excessive paperwork and delay by eliminating duplication with state, tribal, and local procedures, by providing for joint preparation of environmental documents where practicable per § 1506.2 of the CEQ NEPA regulations. This language provides clear support for a federal agency to accept, adopt, or otherwise use an environmental analysis prepared by a tribe as a co-lead or cooperating agency for a lease or ROW that must be approved by the Secretary.

Consistent with the NEPA regulations, DOI's own NEPA regulations also allow for the adoption of tribal environmental review documentation. The regulations provide that "an existing environmental analysis prepared pursuant to NEPA and [CEQ] regulations may be used in its entirety if the responsible official determines, with appropriate supporting documentation, that it adequately assesses the environmental effects of the proposed action and reasonable alternatives."

For purposes of approving leases on tribal lands, the BIA has developed "other federal procedures" for adopting tribal environmental documents. Under the Indian leasing regulations, the BIA will adopt environmental assessments and environmental impact statements prepared by another federal agency, Indian tribe, entity, or person under 43 CFR 46.320 and 42 CFR 1506.3, including those prepared under 25 U.S.C. 4115 and 25 CFR part 1000, but may require a supplement.

National Historic Preservation Act

Every federal agency must consider the effect of any undertaking (a federally funded or assisted project, such as lease or ROW approvals for projects on Indian lands) on historic properties. "Historic property" is any district, building, structure, site, or object that is eligible for listing in the National Register of Historic Places because the property is significant at the national, state, or local level in American history, architecture, archeology, engineering, or culture. Tribal archaeological, historical, cultural or sacred sites also typically meet the definition of a historic property.

Section 106 of the NHPA requires that, before approving or carrying out a federal, federally assisted, or federally licensed undertaking, federal agencies must take into consideration the impact that the action may have on historic properties. For projects located on tribal lands, and that could affect tribal

historic properties, the federal agency must consult with and coordinate with the Tribal Historic Preservation Officer (THPO) to identify historic properties that may be affected by the proposed project and assess adverse effects of the actions. The federal agency must then obtain concurrence from the THPO on the eligibility of the identified historic properties and the effects on them. If there are adverse effects, the federal agency consults with the THPO on ways to avoid or treat adverse effects to historic properties and develops a project-specific Memorandum of Agreement with the THPO that outlines the agreed treatment measures.

While responsibility for compliance with NHPA lies with the federal agency taking the action, tribes may assist the federal agency in carrying out its responsibilities under the act on tribal lands.

The NEPA and NHPA processes are interrelated, as shown Figure 2.

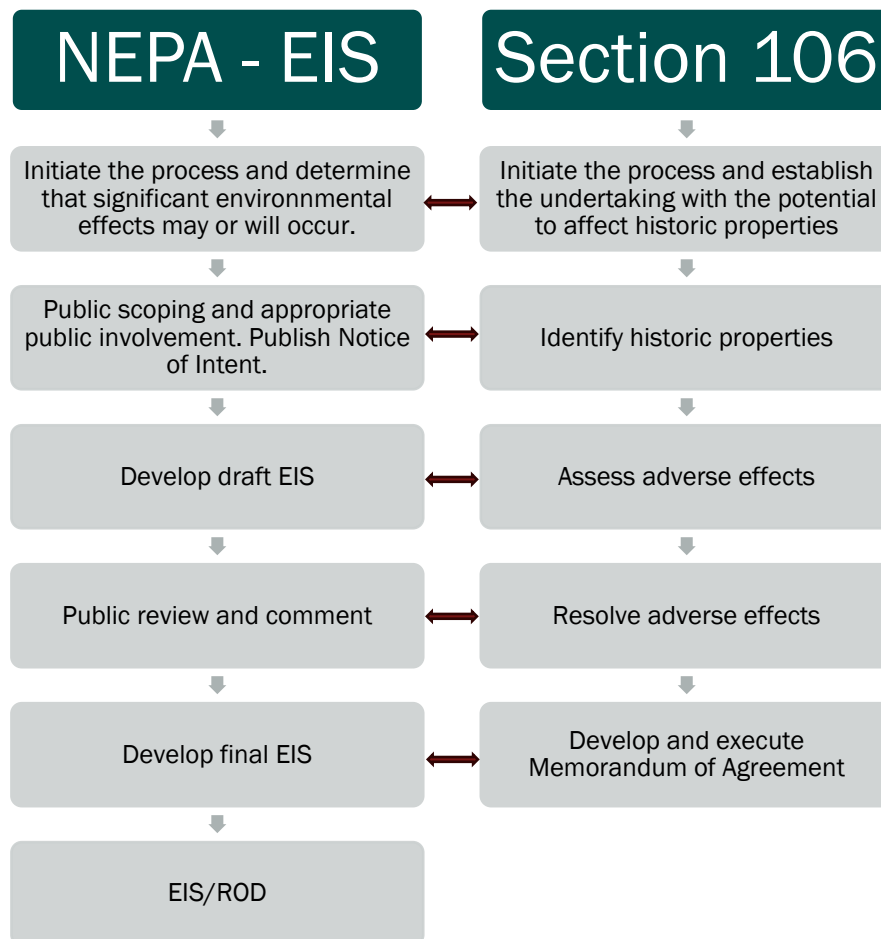


Figure 2. NEPA and NHPA processes related to Section 106

Species Protection Acts

There are three acts that address species protection. This includes the Endangered Species Act, Migratory Bird Treaty Act, and the Bald and Golden Eagle Protection Act. Each act is described below.

Endangered Species Act: According to the U.S. Fish and Wildlife Service (USFWS), "the Endangered Species Act (ESA) establishes protections for fish, wildlife, and plants that are listed as threatened or endangered; provides for adding species to and removing them from the list of threatened and endangered species, and for preparing and implementing plans for their recovery; provides for

interagency cooperation to avoid take of listed species and for issuing permits for otherwise prohibited activities ..." The ESA, through regulations, prohibits the taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct) of endangered or threatened species (plants, animals, fish) without a permit. For purposes of energy projects on Indian lands, the ESA consultation process is typically invoked through the NEPA review process, where the USFWS makes a biological determination or issues a biological opinion about the existence of covered species, mitigation requirements and taking permit requirements.

Migratory Bird Treaty Act: Like the ESA, the Migratory Bird Treaty Act (MBTA)—which implements four international treaties related to migratory birds—prohibits the take (including killing, capturing, selling, trading, and transport) of protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service.

Bald and Golden Eagle Protection Act: The BGEPA also prohibits the taking of bald or golden eagles without permission from USFWS.

While some solar projects might involve the MBTA (such as CSP), typically wind projects will require MBTA taking permits. The USFWS has issued voluntary guidelines for developing wind projects, which follow a "tiered approach" to studying, evaluating, determining the impacts of a wind project on protected species.

Clean Air Act

Title I of the Clean Air Act regulates the emission of pollutants from stationary and mobile sources. If a renewable energy project will result in the emission of pollutants covered under air quality standards, emission standards or emission permit requirements, the project will need to obtain the appropriate permit from either the EPA (which has jurisdiction over all tribal lands) or the tribe (if the tribe has treatment as state status under the CAA to issue permits). Pollutant emissions can result from biomass projects, hydrogen projects, geothermal projects, and construction activities (such as dust emissions) of all projects.

Clean Water Act

The Clean Water Act regulates the discharge of pollutants into the "waters of the U.S." and makes it unlawful to discharge any pollutant from a point source into navigable waters, unless a permit is obtained from the EPA or from a tribe (if it has treatment as state status) through the National Pollutant Discharge Elimination System (NPDES) permit program. Typical project activities that may require a NPDES permit are construction activities that may result in stormwater runoff.

In addition, the CWA covers underground injection activities, and may require permits or authorization to reinject water or pollutants into underground wells or aquifers—if those pollutants could affect waters of the U.S. These requirements may apply to geothermal projects.

Type III: Federal Energy Regulatory Laws

The Federal Power Act (FPA), as amended, the Public Utility Regulatory Policies Act of 1978 (PURPA), as amended, and various Energy Policy Acts, among others, may also apply to energy development on tribal lands. Under the FPA, the Federal Energy Regulatory Commission (FERC) regulates, among other things, hydroelectric dams licensing and safety, public utility interstate electric transmission system and electric wholesale sales rates and services, siting of public utility new interstate electric transmission facilities, and natural gas (and maybe hydrogen) pipelines siting and rates. A public utility is defined as any person who owns or operates facilities for the transmission of electric energy in

interstate commerce and to the sale of electric energy at wholesale in interstate commerce. This can include Indian tribes or tribal enterprises.

PURPA was implemented to encourage, among other things, the conservation of electric energy; equitable retail rates for electric consumers; and expeditious development of hydroelectric potential at existing small dams. PURPA also established qualifying facilities (QFs) as a new class of generating facilities that receive special rates and regulatory treatment. QFs fall into two categories: qualifying small power production facilities (between 1 MW and 80 MW capacity), and qualifying cogeneration facilities. Under PURPA, QFs have the right to sell energy or capacity to a utility (the utility must buy power from the QF) at avoided cost or negotiated rates. FERC does not have jurisdiction over the following:

- local distribution of electric energy, including sales, rates, terms and conditions;
- rural electric cooperatives;
- Alaska, Hawaii, and Texas (not interstate);
- generation siting;
- transmission siting (except "backstop" siting authority under the IRA); or
- non jurisdictional entities such as the U.S. government and its agencies and instrumentalities (including the federal Power Marketing Administrations, such as the Western Area Power Administration (WAPA) and Bonneville Power Administration), and states and their agencies and instrumentalities (including municipalities)—with certain limited exceptions.

Because the FPA and PURPA are silent as to the jurisdictional status of Indian tribes, it is unclear whether FERC has jurisdiction over tribal energy projects that may be QFs, tribal transmission projects, tribal energy companies, or tribal utility authorities.

Type IV. Federal Tax Laws

Federal support for renewable energy projects includes substantial tax incentives, such as tax credits and accelerated depreciation, for building renewable energy projects, hiring Indian employees, and locating projects on certain Indian lands. The newly enacted Inflation Reduction Act has created new tax credit incentives and benefits that Tribes can use directly, or that can further benefit projects on tribal lands.

Inflation Reduction Act

The recently enacted IRA extended these tax credits for another 10 years, creating credits that can provide as much as 30 to 70 percent of the economic value of a project. Several law firms that support tribes in clean energy development have published summary analysis of the IRA benefits for tribes, which include:

Direct Pay: Most importantly for tribes, the IRA established the ability for applicable entities, including tribal governments, to elect to receive a direct payment from the IRS for the full value of tax credits as if they had paid taxes through a direct payment refund from the IRS (direct pay). Direct pay is available for renewable energy projects (solar, wind, geothermal, storage, interconnection, microgrid controllers), alternative fuel refueling property, clean hydrogen and carbon oxide sequestration projects, qualified commercial vehicles, and advanced manufacturing facilities. To be eligible for direct pay, projects must be placed into service after January 1, 2023, and before December 31, 2033.

Investment Tax Credit/Clean Energy Investment Tax Credit. The IRA extends the current investment tax credit (ITC)—which is calculated as a percentage of the cost to construct or fair market value of the project—for solar, small wind, and geothermal by another 2 years, and creates the clean energy investment tax credit (CEITC) which is available from 2025 through 2033. Projects must begin construction by 2033. Certain technologies are also added, such as thermal solar and wind, standalone energy storage, geothermal heat pumps, and qualified biogas. For projects less than 5 MW, interconnection costs and microgrid controllers are also eligible for the tax credit. The ITC percentage is based on the following projects conditions:

- Thirty percent tax credit if the project meets prevailing wage and apprenticeship requirements. Prevailing wage is based on Davis-Bacon Act wage scales, set at the state and county level. Apprenticeships must be qualified through a registered apprenticeship program, with a certain percentage of hours performed by apprentices and at least one apprentice for every four positions hired. The IRS published guidance in late November 2022 for implementing the prevailing wage and apprenticeship requirements.
- Ten percent additional tax credit for meeting domestic content requirements. Domestic content requirements apply to steel, iron, and manufactured products used in the project. At least 40 percent of the total cost of the project must be attributable to these components that are mined, produced, assembled, or manufactured in the United States. The IRS published guidance in May 2023 for implementing the domestic content requirements.
- Ten percent additional tax credit if the project is in an energy community. Energy communities are defined as: brownfield sites, as defined in the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); areas with significant employment or tax revenue generated from coal, oil or natural gas and has high unemployment; or a census tract where a coal mine has closed or coal-fired electric generating unit has been removed from service or adjacent census tracts. The IRS published guidance in April 2023 on implementing the energy community bonus and provided a list of census tracts that qualify.
- Low Income Community Bonus Credit. For solar and wind projects that are less than 5 MW, the Secretary will allocate "environmental justice solar and wind capacity limitations" (EJ Credits) to eligible ITC/CEITC projects. The allocations are limited to 1,800 MW capacity in each of 2023 and 2024 (for ITC) and 1,800 MW each year for CEITC. For projects that receive the EJ credits, in addition to the above-listed ITC percentages, the projects can receive an additional:
 - Ten percent for projects on Indian lands, or
 - Twenty percent for projects that benefit low-income residents or low-income economic development

The IRS issued guidance in February 2023, and just published proposed rules to implement this bonus credit program. This includes a 200 MW (from the 1,800 MW total allocation) for projects located on tribal lands.

Production Tax Credit: The IRA also extends the Production Tax Credit (PTC) through 2024 and creates a new clean energy production credit" for 2025 through 2033. Solar projects are now eligible for the PTC. Unlike the ITC, which is calculated based on a percentage of the cost basis, the PTC is calculated based on the amount of power produced from a qualifying facility. The PTC is equal to a set amount per kilowatt hour (kWh) produced. Today, that number is approximately \$0.026/kWh. But, like the ITC, the amount of the PTC will be based on the size of the project (less than 1 MW, less than 5 MW) and whether the project meets prevailing wage requirements, domestic content requirements and energy

community location. For projects less than 1 MW, the PTC will be \$0.033/kWh. For projects greater than 1 MW, if all three requirements are met, the PTC will be \$0.026/kWh.

Electric Vehicles and Charging Stations: The IRA creates new tax credits for electric commercial vehicles and electric vehicle charging stations.

- If the commercial vehicle is all electric, then the tax credit is 30 percent with a maximum amount based on the vehicle's weight. For electric commercial vehicles that weigh less than 14,000 pounds, the maximum tax credit is \$7,500. If the electric commercial vehicle weighs more than 14,000 pounds, the maximum tax credit is \$40,000.
- Electric vehicle charging stations are also eligible for a 30 percent tax credit, with a maximum tax credit of \$100,000 per charging station. If a tribe installs 10 charging stations, then each one is eligible for the tax credit (which the tribe receives through its election for direct pay).

Other Federal Tax Benefits

While Indian tribes and tribal enterprises are not taxable entities, several specific federal tax benefits apply that can support renewable energy project deployment. The Indian employment tax credit allows employers who employ Indians on tribal lands to receive a tax credit against those employees' salaries and wages to offset the cost of hiring and employment. This tax benefit promotes Indian employment and supports the preference hiring of tribal members and Indians. The accelerated depreciation provision for Indian lands allows businesses that construct facilities and other permanent improvements on tribal lands to accelerate the depreciation deduction on their investment. A 2017 tax law created "opportunity zones," which allows investors in projects or businesses located within opportunity zones to reduce and delay the payment of capital gains taxes. Because opportunity zones are coincident to low-income census tracts, many tribal lands are included.

The best tax benefit of all is that tribes are treated as states under the tax code for certain purposes. One key purpose is for issuing tax-exempt bonds to finance government services (including operating a utility) and economic development (such as an energy project) (TED) bonds. This low-cost way to finance energy infrastructure, combined with a tribe's lack of tax liability, can provide a financial competitive advantage for tribes and their partners in energy development efforts. According to the IRS, in 2010 at least 16 tribes applied for an allocation for TED bonds to use for renewable energy projects.

Part III. Renewable Energy Project Development

Part three of this literature review focuses on renewable energy project development and provides an overview of federal renewable energy information and describes the five phases of the solar, wind, biomass, storage project development cycle. The five phases include:

1. Project potential
2. Projection options
3. Project refinement
4. Project implementation
5. Project operations/maintenance

Federal Renewable Energy Information

DOE Office of Indian Energy has created or provided over 200 articles, webinars, presentations, studies or reports on renewable energy development activities which are accessible on the program's website. More than 50 percent of those are specific to Indian Country. Starting with the Handbook on Renewable Energy first published in 2010, the Office of Indian Energy has continued to expand its written resources for tribes to consult as they work to determine their options for renewable energy project opportunities. Additional training and presentation materials also include online learning modules and workshops focused on energy planning, commercial, community and facility scale projects.

The DOI BIA DEMD also provides important resource information for tribes. Specific summary information is available on solar, wind, geothermal, biomass and hydrogen resources, and provides outlines of project development processes and considerations. This information is generally limited to technical assistance support, but the website provides additional links and references to other federal resources for certain projects.

EPA has similarly established the Green Power Markets website that provides additional information on accessing green energy markets. Topics include project development toolkits, market information, financing information, and government leadership principles. Multiple other federal agencies have developed, and published information related to renewable energy or clean energy development in general, although none has created tribal specific information.

Tribal Energy Planning

DOE has also suggested that before a tribe begins the development process for any project, the tribe should conduct and develop a strategic or community energy plan. DOE has created two guidebooks for Alaska Native villages and lower 48 tribes to engage in an energy planning process. The primary benefits of a strategic energy plan include political leadership buy-in, community support, roadmap for project assessment and value to the community, and a structured, disciplined, and holistic approach to renewable energy project development.

Federal resources to support energy planning include the DOE Community Energy Planning Guidebooks, DOI Resource Assessment and Capacity Building Grants, ANA Community Economic Development Grants, Commerce EDA Comprehensive Economic Development Strategy (CEDs) grants, and the Federal Emergency Management Agency (FEMA) Resiliency and Analysis Planning Tool and BRIC grant program.

Solar, Wind, Biomass, Storage Project Development Cycle

To standardize the approach to tribal renewable energy project development for solar, wind, and biomass, in 2012 DOE crafted a project development cycle model describing the major phases of development, the major actions and outcomes of each phase, and the critical decision points for tribal leadership. The project development process is also very iterative; that is while the phases typically go in the same order, the actions within each phase may not and will vary, based on the type of resource, technology and project size, the main phases are the same for most projects. The DOE Office of Indian Energy Online Learning Tool presents webinars that can be viewed on demand that cover basic project development for utility, community, and facility scale projects. There are also webinars for more advanced discussions of project development and project financing.

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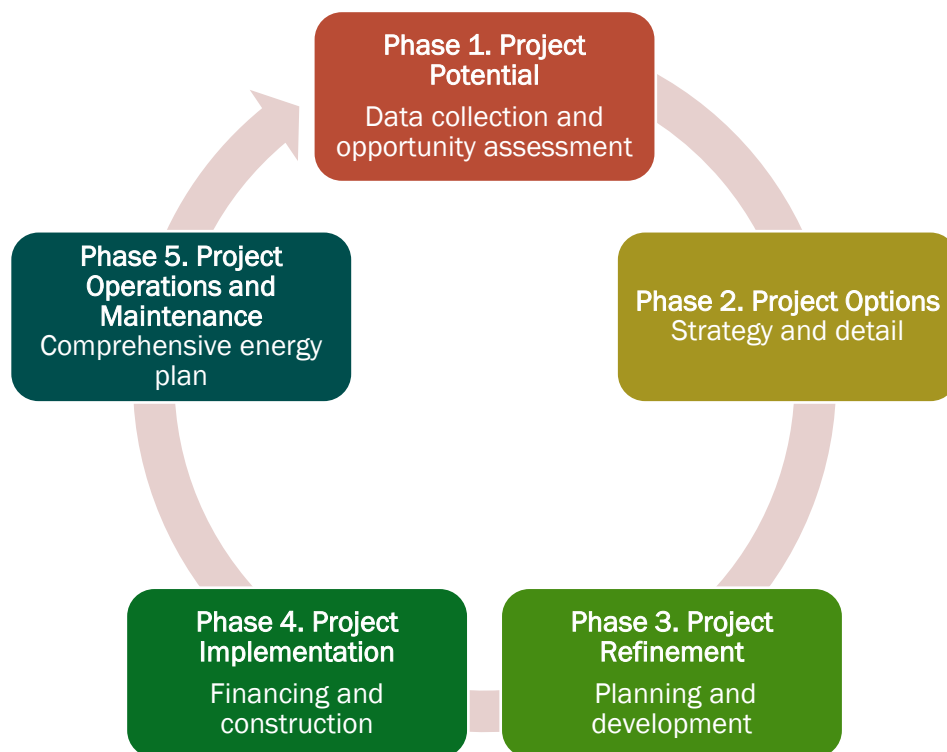


Figure 3. Project Development Cycle

Phase I: Project Potential

The purpose of this phase is to determine whether the basic elements for a successful project are in place. Minimum tasks include:

- a) identify possible sites for project location;
- b) confirm renewable energy resource;
- c) review tribal facility electric cost data, regulations, and transmission and interconnection requirements;
- d) evaluate potential markets and paths for renewable sales;
- e) identify potential partners/off-takers to sell the project's power;
- f) assemble or communicate with the right team, those in positions or with knowledge to facilitate, approve, champion the project.

Key risks to begin analyzing include financing, permitting, construction costs, and utility rules related to interconnection and transmission. Appendix A. shows an example of the DOE's description of major "fatal flaws" in utility scale renewable energy development. Figure 4 lists available federal resources for this phase.

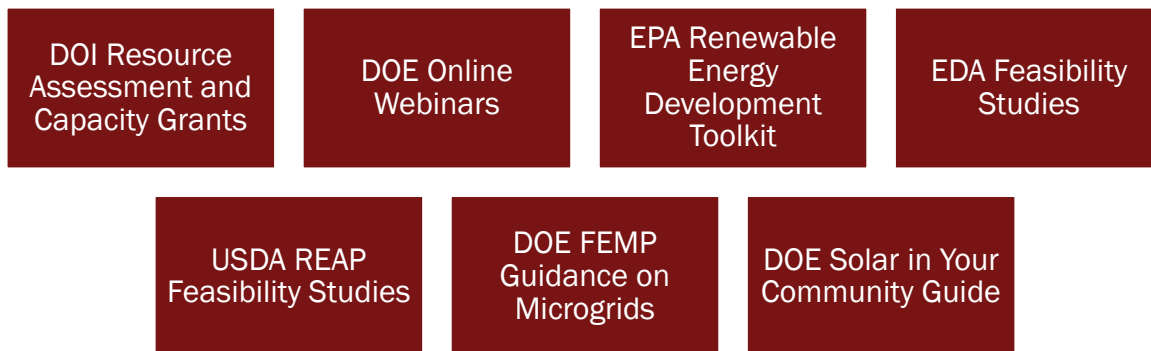


Figure 4. Phase I. Project Potential federal resources

Phase II. Project Options: Siting, Ownership, Technology

The purpose of this phase is to determine ownership structure, permitting considerations, and sources of development capital. Figure 5 lists available federal resources for this phase. Key tasks during this phase include:

- a) identify final resource and project location;
- b) understand ownership structure/tribal role and risk allocations;
- c) narrow financing options;
- d) clarify tax-equity structures, if applicable;
- e) initiate environmental review process and related studies;
- f) understand and plan for permitting, interconnection (and transmission);
- g) negotiate land use agreements (leases, ROW, options, development, site control).



Figure 5. Phase II. Project Options federal resources

Phase III. Project Refinement: Development Agreements, NEPA, Approvals, Funding/Financing

The purpose of this phase is to validate decisions and finalize project structure. Figure 6 lists available federal resources for this phase.

Other tasks include:

- a) finalize ownership structure;
- b) finalize permitting, if applicable;
- c) finalize environmental reviews and receive record of decision;
- d) finalize technology, financing, and development costs;
- e) complete financing/commitments and organization structure;
- f) create detailed economic models;
- g) select vendors; and
- h) negotiate off-take and interconnection agreements.



Figure 6. Phase III. Project Refinement federal resources

Phase IV. Project Implementation

The purpose of this phase is to contract for and implement the physical construction of the project. Figure 7 lists available federal resources for this phase. Tasks include:

- a) finalize preconstruction tasks;
- b) finalize construction and other project agreements;
- c) complete construction and equipment installation;
- d) complete interconnection installation;
- e) commission project.

NREL Best Practices in PV Installation

USFWS Land-Based Wind Guidance

Figure 7. Phase IV. Project Implementation federal resources

Phase V. Project Operations/Maintenance

This phase, project operations and maintenance involves ongoing operations, maintenance, repair, and replacement (OMR&R). This includes: a) equipment maintenance and upkeep; b) gearbox/inverter replacement; c) insurance; d) labor and staffing; and e) extended warranty agreements.

EPA Onsite Solar + Storage Development

EPA has taken a different approach with local government distributed solar energy development. This approach assumes the government will not play an active role in developing a distributed solar energy project, but still has many steps to follow and information to gather. The underlying assumption is that a selected vendor will deliver a "turnkey" system to the customer. This model is more appropriate for community scale or distributed energy projects on tribal lands. It reduces the development risk and provides more opportunities for tribes with limited capacity to develop projects. These types of projects can also be owned directly by the tribe or a third party. Figure 8 shows the solar power development pathway.

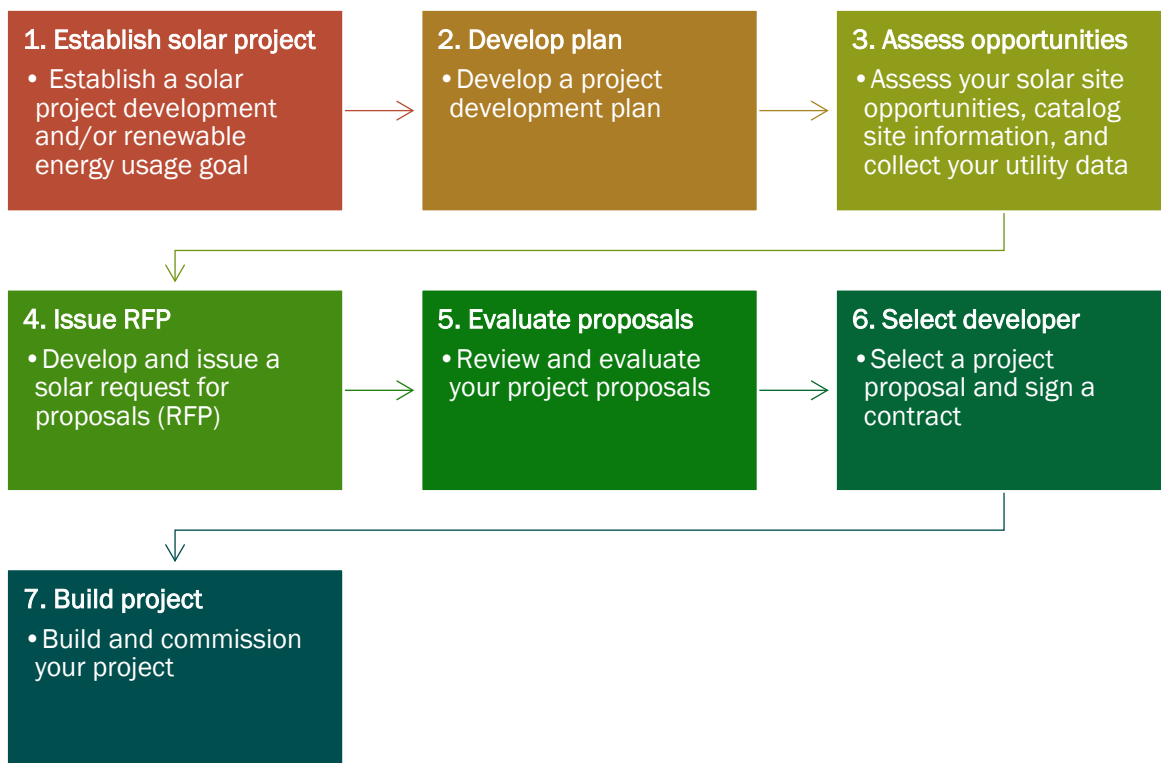


Figure 8: Solar Project Development Pathway

Geothermal Project Development

DOE has also supported efforts to promote geothermal development. However, geothermal, which is regulated and permitted by the BLM, has a much more complicated development and approval process, as shown in Figure 9.

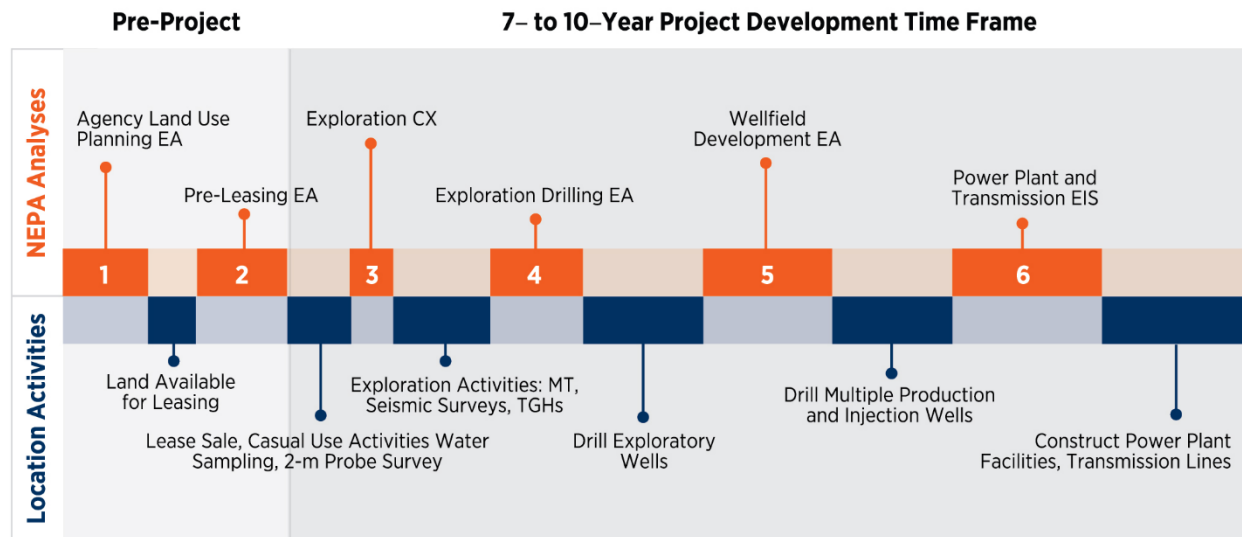


Figure 9: Development and Approval Process

DOE has supported DOI (BLM and BIA) in identifying certain non-technical barriers to geothermal development. In addition, DOE published *GeoVision: Harnessing the Heat Beneath Our Feet*, which covers various aspects of geothermal development, including permitting, non-technical barriers, stakeholder engagement, and commercial and market opportunities. The DOI oversees geothermal development through several internal policies and procedures, including the Onshore Energy and Mineral Lease Management Interagency Standard Operating Procedures, the Fluid Mineral Estate Procedural Handbook, and the recently created Renewable Energy Coordination Office which is responsible for DOI's responsibilities under the federal agency permitting MOU.

Part IV. Federal Financial and Technical Assistance

Part IV addresses and catalogues major federal financial and technical assistance programs that are specifically designed to promote clean energy deployment, some of which are focused on Indian tribes or are general programs that tribes can access. Both the Bipartisan Infrastructure Law and the Inflation Reduction Act have funded hundreds of billions in new programs (or existing programs), most of which are listed in this Part.

Major Technical Assistance

DOI DEMD Branch of Renewables and Distributed Generation. Per the Indian Affairs Manual, this branch "provides assistance to tribes and Indian landowners in evaluating and developing their renewable energy resource potential. Assistance begins at the project's conception, continues through the resource assessment, and ends with agreement negotiation."

DOE Office of Indian Energy. This office offers technical assistance to tribes as requested and at various stages of project development.

DOE Clean Energy to Communities. The C2C technical assistance offers three types of support to communities: in-depth partnerships (3 years), peer-learning cohorts (4-6 months), and expert match (40-60 hours).

EPA Environmental Justice Thriving Communities Technical Assistance. The EPA EJ TCTAC program is a selected national organization to remove barriers and improve accessibility for communities with environmental justice concerns. These organizations will provide training and other assistance to build capacity for navigating federal grant application systems, writing strong grant proposals, and effectively managing grant funding.

U.S. Department of Agriculture (USDA) Rural Development Rural Partner Network. According to the USDA, the Rural Partner Network (RPN) is "an alliance of federal agencies and commissions working directly with rural communities to expand rural prosperity through job creation, infrastructure development, and community improvement. Led by USDA Rural Development, RPN members collaborate to identify resources to help people who live in rural areas. The RPN maintains a website with multiple resources listed, including an interactive financial assistance portal, technical assistance support and collaborative opportunities.

Bipartisan Infrastructure Law

The recently enacted BIL contains over \$70 billion for energy programs, energy infrastructure (including electric vehicle infrastructure), and energy research and development. The White House published the BIL Tribal Playbook with more information about all programs relevant to tribes. The major renewable energy related programs in the act include:

DOE Rural and Remote Community Program. One billion dollars is appropriated for federal financial assistance to rural or remote areas (cities, towns, and unincorporated areas with a population of less than 10,000) for the purpose of overall cost-effectiveness of energy generation, transmission, or distribution systems; siting or upgrading transmission and distribution lines; reducing greenhouse gas emissions from energy generation by rural or remote areas; providing or modernizing electric generation facilities; developing microgrids; and increasing energy efficiency.

DOE Grid Resiliency. Ten billion in federal financial assistance is provided to eligible entities to coordinate and collaborate with electric sector owners and operators to demonstrate innovative

approaches to transmission, storage, and distribution infrastructure to harden and enhance resilience and reliability; to demonstrate new approaches to enhance regional grid resilience, implemented through states by public and rural electric cooperative entities on a cost-shared basis; to supplement existing hardening efforts of the eligible entity planned for any given year; and to reduce the risk of a wildfire caused by any power lines owned or operated by the eligible entity; or to increase the ability of the eligible entity to reduce the likelihood and consequences of disruptive events.

WAPA power purchase funds. Five hundred million dollars is provided for WAPA to purchase power and transmission services, recover purchase power and wheeling services, and transfer lost revenues to the Colorado River Basins Power Marketing Fund.

Transmission line financing. A \$2.5 billion lending authority is created to construct a new or replace an existing eligible electric power transmission line; to increase the transmission capacity of an existing eligible electric power transmission line; or to connect an isolated microgrid to an existing transmission, transportation, or telecommunications infrastructure corridor located in Alaska, Hawaii, or a territory of the United States.

Clean hydrogen manufacturing and pumped storage hydropower. New programs are established to support the advancement of clean hydrogen and pumped storage hydropower projects, with prioritization or preference given for projects with tribes or on tribal lands.

Inflation Reduction Act

The IRA provides three major types of funding for tribes, tribal enterprises, and tribal members. The White House published the Inflation Reduction Act Tribal Handbook, which provides more information about these, and other IRA programs.

Tribal Specific Programs

Grant and loan guarantee programs to implement energy projects for electrification, climate resiliency and energy generation.

DOE High Efficiency Electric Home Rebate program. Provides \$225 million in grants directly to tribes for rebates for electric appliance upgrades (e.g., replace fossil fuel furnaces, boilers, water heaters, stoves), energy efficiency, electric heat pumps and electric wiring upgrades. Rebate amounts are based on type of upgrade, with a maximum of \$14,000 per home. Tribal member eligibility is based on income, with rebates only available to tribal member households that make less than 150 percent of area median income.

DOE Tribal Energy Loan Guarantee Program. Increases the loan authority from \$2 billion to \$20 billion, increases the loan guarantee from 90 to 100 percent and appropriates \$75 million for loan guarantee credit support.

DOI Tribal Home Electrification program. One hundred and forty-five million dollars will be available to:

- Provide electricity to unelectrified tribal homes through zero-emissions energy systems;
- Transition electrified tribal homes to zero-emissions energy systems; and
- Make home repairs and retrofitting necessary to install the zero-emissions energy systems.

Tax Credits and Rebates

Discussed in the previous section, allows for direct payments available to tribes and tribal members to implement clean energy (solar, wind, geothermal, storage), electric vehicles and charging stations, and energy efficiency projects.

Environmental and Energy Programs

Expanded funding and new programs and funding to address greenhouse gas emission reductions, environmental and climate justice, and rural renewable energy projects.

EPA Greenhouse Gas Reduction Fund. The IRA amends the Clean Air Act to give EPA authority to make grants to states, tribes, nonprofits and invest in nonprofit, state, and local financing institutions to deploy low-zero emission technologies. Total funding is \$27 billion and is available until September 30, 2024. The EPA will implement three competitions:

- The \$14 billion National Clean Investment Fund competition will fund two to three national nonprofits that will partner with private capital providers to deliver financing at scale to businesses, communities, community lenders, and others, catalyzing tens of thousands of clean technology projects to accelerate our progress towards energy independence and a net-zero economic future.
- The \$6 billion Clean Communities Investment Accelerator competition will fund two to seven hub nonprofits with the plans and capabilities to rapidly build the clean financing capacity of specific networks of public, quasi-public and nonprofit community lenders—including community development financial institutions (including Native CDFIs), credit unions, green banks, housing finance agencies, and minority depository institutions—to ensure that households, small businesses, schools, and community institutions in low-income and disadvantaged communities have access to financing for cost-saving and pollution-reducing clean technology projects.
- The \$7 billion Solar for All competition will provide up to 60 grants to states, tribal governments, municipalities, and nonprofits to expand the number of low-income and disadvantaged communities that are primed for residential and community solar investment—enabling millions of families to access affordable, resilient, and clean solar energy.

EPA Climate Pollution Reduction Grants. The EPA will receive \$9 billion to achieve or facilitate GHG emission reduction. Funds can be used for planning and implementation grants. Tribes received a \$25 million allocation for planning.

EPA Environmental and Climate Justice Block Grant. The EPA will also provide \$3 billion for the block grant program that will provide funding to community led partnerships between tribes and nonprofits. Funds can be used for climate resiliency efforts, low-zero emission/resiliency technologies, and environmental and climate education efforts in disadvantaged communities to address environmental and public health harms.

USDA Rural Utility Services. The RUS provides direct loans and loan guarantees for energy generation, transmission and distribution and related facilities to eligible borrowers, including tribes or tribal utilities. The IRA authorizes an additional \$1 billion for loans for electricity and transmission projects, and allows for loan forgiveness up to 50 percent, unless a different amount is authorized by the Secretary of Agriculture. According to a recent USDA announcement, tribes will be eligible for up to 60 percent loan forgiveness.

USDA Rural Energy for America Program (REAP). The REAP program provides loans and or grants to agricultural producers and rural small businesses for distributed energy and energy efficiency projects. The IRA provides \$2.2 billion and increased the federal share up to 50 percent. USDA recently announced a quarterly application and award schedule to grant \$1 billion through September 2024. USDA has also clarified that tribal-owned small businesses and tribal utilities are eligible to apply.

Standing Federal Programs

There are several other "standing" programs that provide financial assistance to tribes for renewable energy and clean energy programs. The EPA and DOE Office of Indian Energy have interactive, searchable databases of these federal financial assistance programs.

DOI—BIA Loan Guarantee Program. This program provides loan guarantees for tribes or tribal member loans that will support economic development, business startup, and business operations.

HUD—Indian Community Development Block Grant. This is a competitive grant program offered by the Office of Native American Programs under Native American Housing Assistance and Self Determination Act (NAHASDA), which funds can be used to improve tribal housing or construct community facilities. Approved uses also include energy efficiency and rooftop solar projects for tribal housing.

DOE—Weatherization Assistance Program. A state grant program, with funding based on specific weather (cooling and heating days), that is used to provide weatherization and distributed energy generation technologies for low-income households. Tribes and tribal housing authorities are eligible for direct grants from the DOE.

EPA—Clean Diesel (Diesel Emissions Reduction Act). EPA has a set-aside program for tribes to apply for funds to replace or repower diesel engines, both mobile and stationary. Funds can also be used to replace diesel with renewable energy generation or battery energy storage technologies.

Commerce—EDA Public Works Program. This competitive grant program can be used for feasibility studies, business planning, pre-construction activities (such as design and engineering) or construction costs for economic development projects, including renewable energy projects.

Part V. Putting it all Together

Developing and deploying even the simplest clean energy projects can be daunting, with unique challenges – especially for smaller tribes with less resources and internal capacity. However, several tribes – including very small tribes - have successfully completed projects of different scales and type. The Midwest Tribal Energy Resources Association (MTERA) and NREL have conducted a study to address some of these challenges. This Part provides an overview of key challenges, examples of successful tribal projects and key takeaways for tribal leaders.

Key Challenges

The MTERA study identified twelve (12) major barriers to deploying solar energy on tribal lands, all of which apply to most tribal clean energy development efforts. These barriers are both internal and external in nature. The internal barriers can be addressed directly by tribes, while the external barriers require engagement with, and further action by, utilities, states and the federal government.

Internal Barriers

1. Lack of Tribal representation in utility, state, or federal energy policy decision-making processes. This barrier is related to tribal participation in utility, state or federal regulatory or legislative processes that impact tribal ability to develop energy projects.
2. Tribal Government or enterprise leadership and staff energy-related technical capacity. This barrier is related to a tribe's internal capacity to engage in project development activities.
3. Distributed solar program incompatibility with Tribal facility circumstances. This barrier is related to the physical condition of residential, government, school, enterprise, and other building stock.
4. Lack of land-use planning or land entitlement procedures. This barrier is related to the legal infrastructure of tribal law to support and regulate project deployment.

External Barriers

1. Tribe served by multiple utilities.
2. Net metering limits or lack of net metering.
3. Tribal utility formation conflicts
4. Limit of third-party ownership.
5. Interconnection requirements.
6. Rural electric cooperatives that serve tribes are not state regulated.
7. Development steps can impact the economics of utility-scale projects.
8. State double taxation.

Tribal Case Studies

Notwithstanding these identified barriers—and others encountered by tribes seeking to develop clean energy projects—over 200 tribes have leveraged federal and state funding or market participants to develop and deploy renewable energy projects. A good resource for a list of specific projects is the DOE Office of Indian Energy project database. The DOE Office of Indian Energy also conducts an annual program review, which includes presentations from tribes on their efforts to deploy projects. Those presentations can be accessed through the DOE Office of Indian Energy website as well.

Blue Lake Rancheria (CA) Microgrid

The first tribe in the lower 48 to develop and install two operating microgrids—500 kilowatt (kW) solar, 300kW battery storage and diesel engine backup—the Blue Lake Rancheria (BLR) has had a dedicated effort to create a cleaner and more resilient energy system on the Rancheria, as shown in Figure 10. The BLR microgrid was funded in part with a grant from the California Energy Commission, in-kind donations from equipment suppliers, and substantial technical assistance from the Schatz Energy Center at Cal State-Humboldt. Key success factors included dedicated and committed tribal leadership, a good working relationship with the incumbent utility, and a technical team that supported the tribe.



Figure 10. Blue Lake Rancheria microgrids.

Picuris Pueblo (NM) community solar

The Picuris Pueblo in New Mexico leveraged technical assistance and federal funding to develop and deploy a 1MW community solar project. The Pueblo negotiated for almost a year with its rural electric cooperative to interconnect the system and devise a virtual net metering arrangement to offset the electric bills for tribal members.

Spokane Housing Authority (WA) rooftop

The Spokane Tribe's Housing Authority Children of the Sun Solar Initiative (COSSI) will add 650 kW of solar capacity to tribal buildings and homes, saving the community an estimated \$2.8 million over the next 30 years. The COSSI will both increase resilience to environmental threats and promote sovereignty for the Tribe in the form of energy independence.

Moapa Band of Paiute Indians (NV) Utility Scale Solar

The Moapa Band was the first tribe to host a utility scale solar project on tribal lands as shown in Figure 11. The Moapa Southern Paiute solar project, which is currently owned by a third-party, is 250MW and leases over 2000 acres from the tribe. The project sells its power to Los Angeles Department of Water and Power, and produces enough power for 93,000 homes. The tribe benefits from lease payments, taxes, water supply agreement and jobs.



Figure 11. Moapa Band of Paiute Indians utility scale solar project.

Campo Band of Kumeyaay (CA) Commercial Wind

The Campo Band is the only tribe to host a commercial -sale wind project on tribal lands (Figure 12). The Band leases its lands along a ridgeline to a third party. The project is 55 MW installed capacity and sells its power to San Diego Gas and Electric. As with all third-party owned projects, the Band receives lease payments, but due to double taxation in California it cannot collect taxes. The Band is also developing another 160MW expansion, which the Band seeks to own.



Figure 12. Campo Band of Kumeyaay commercial wind project.

Navajo Tribal Utility Authority Solar Projects

The Navajo Tribal Utility Authority (NTUA) is one of the first tribal entities to develop and own a commercial scale solar project. The Kayenta Solar Project is 55 MW, located near Monument Valley, and provides enough power for 23,000 homes on the Navajo Reservation. NTUA leveraged USDA RUS loans, and tax credits (through the formation of a new company) to finance the project. NTUA is now developing a 70 MW project in Utah, and a 250 MW project near Cameron.

Development and Deployment Key Takeaways

A consistent theme in this literature review is that Indian tribes and their federal partners benefit from continuous education and awareness of the complexities in clean energy development. While there are multiple barriers and challenges to overcome—both internal and external—the opportunities to deploy clean energy for the benefit of tribal communities are now more abundant than ever.

Project opportunities include utility scale projects and distributed energy projects. First steps for tribal renewable energy development may often include planning and project identification focused on tribal goals and realistic opportunities. Utility scale projects, while technically and financially viable for some tribes, present high complexity levels as they are dependent on access to markets and major transmission, they are subject to federal and state laws, and require extensive tribal development experience and access to substantial funding and capital. Conversely, smaller distributed energy projects are achievable by most tribes because upfront capital costs and required tribal development resources are attainable. Smaller projects also lend themselves to being developed in manageable phases that align with the tribal goals and objectives of energy self-sufficiency and climate resiliency.

Additional key takeaways include:

- **Energy Planning.** Developing a community or strategic energy plan to guide a tribe's renewable energy efforts will provide internal guidance and political support for those development efforts. Further, planning offers the opportunity to identify and overcome key project development barriers.
- **Build Capacity/Technical Assistance.** While difficult for tribes that are short on resources, developing capacity in the areas of technical, project, legal, and financial expertise is critical to success in developing tribal energy projects. Tribes may best benefit from developing this expertise directly within the tribal organization or through procurement of these resources. Tribes can also access some of this expertise through federal (or state) technical assistance programs or funding.
- **Starting Small.** Most tribes that have deployed projects have focused on smaller scale projects that directly benefit tribal communities. While these projects can still be complex, and require in-depth technical knowledge and capabilities, they don't tend to implicate the full federal legal and regulatory regime or market mechanisms. But smaller projects offer a good training ground to develop the tribal capacity needed to undertake larger project development efforts and to assist tribal leadership with education and familiarity that maintains political support.
- **Say Informed and Participate.** A subset of building capacity, continuous education and participation in renewable activities supports tribes' critical needs to stay informed of current trends, technology, regulatory, policy and legislative efforts. Tribal leadership may benefit from extending this approach to participating in state and federal efforts, including commenting on consultations related to tribal interests, regulatory development, and other engagement efforts. This could also be a key technical assistance opportunity for federal agencies that want to assist tribes.

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Appendices

Appendix A. Example of DOE descriptions of major “fatal flaws” in utility scale renewable energy development

Site	Resource	Off-Take	Permits	Technology	Team	Capital
Securing site: No site, no project	Engineering assessment (input)	Power purchases: off-take contract-(revenue)	Anything that can stop a project if not in place	Engineered systems (output)	Professional experienced, diverse	Financing structure
Site control	Volume/Frequency	Credit of counterparty	Permitting/ Entitlements	Engineering design plans	Business management	Development equity
Size and shape	Variability	Length of contract	Land distribution	Construction plans	Technical expertise	Project equity
Location to load and T&D	Characteristics (power/speed)	Terms and conditions	Environmental and cultural impacts	Not generic solar panel and inverter	Financial expertise (inclusion tax)	Nonrecourse project debt
Long-term control	24-hour profile	Reps and warranties	Resource assessment	Engineered resource/ conversion technology/ balance of systems designs	Transmission interconnections expertise	Tax equity
Financial Control	Monthly, seasonal, and annual	Assignment	Wildlife impacts	Specifications	Construction contract management	Grants, rebates, other incentives
Clear title	Weather dependence	Curtailment	Habitat	Bid set	Operations	Environmental attributes sales contracts (RECs)
Lease terms	Data history	Interconnection	NEPA. EIS		Power marketing/ sales	Bond finance
Collateral concerns	Std. deviation	Performance	Utility interconnection			
Environmental	Technology suitability	Enforcement	Other utility or PUC approvals			
Access		Take or pay	Lease and/or ROW approvals			
O&M access		Pricing and terms				
Upgradable						

Appendix B: Solar Resource Crosswalk

Appendix B provides a cross walk between solar renewable energy resource, project type, and relevant laws and regulations, education/information, available technical assistance, and available financial assistance.

Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Utility Scale	Long Term Leasing Act (LTLA) General Right Of Way Act (ROW) CONTRACTS Indian Tribal Energy Self Determination Act (ITESDA), Federal Power Act (FPA), Public Utility Regulatory Policy Act (PURPA) National Environmental Policy Act (NEPA) National Historic Preservation Act (NHPA) Endangered Species Act (ESA)	DOE Foundation/Basics - Solar; DOE Professional - Project Dev; DOE Professional - Project Finance	DOI DEMD; DOE IE	DOI DEMD; USDA RUS; DOE RURAL; DOE TELGP Tax Credits
Community Scale	LTLA, ROW, CONTRACTS, ITESDA, PURPA, NEPA, NHPA, ESA	DOE Foundation/Basics - Community Scale Solar; DOE Professional - Project Dev; DOE Professional - Project Finance; DOE Local Government Guide to Community Solar	DOI DEMD; DOE IE; EPA Thriving Communities	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; DOE TELGP; Tax Credits
Shared Solar	LTLA, ROW, CONTRACTS, ITESDA, PURPA, NEPA, NHPA, ESA	DOE Foundation/Basics - Community Scale Solar; DOE Professional - Project Dev; DOE Professional - Project Finance; DOE Guide to Community Solar; NREL Community Solar Guide	DOE IE; DOE FEMP; DOE Clean Communities	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; COMMERCE EDA; DOE TELGP; Tax Credits

Project Type	Relevant Regulations & Laws	Education / Information	Technical Assistance	Financial Assistance
Rooftop	CONTRACTS, ROW, ESA	DOE Foundation/Basic - Facility Scale; EPA On-Site Solar Development	DOI DEMD; DOE IE; USDA RPN; EPA EJ TCTAC	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; HUD ICDBG; EPA DERA; Tax Credits
Microgrids	LTLA, ROW, CONTRACTS, ITESDA, PURPA, NEPA, NHPA, ESA, CAA	DOE FEMP Microgrid Deployment	DOI DEMD; DOE IE; DOE FEMP	DOI DEMD; DOE IE; EPA GGRF; DOE GRID; USDA REAP; USDA RUS; DOE RURAL; COMMERCE EDA; EPA DERA; DOE TELGP; Tax Credits

Appendix C: Wind Resource Crosswalk

Appendix C provides a cross walk between wind renewable energy resource, project type, and relevant laws and regulations, education/information, available technical assistance, and available financial assistance.

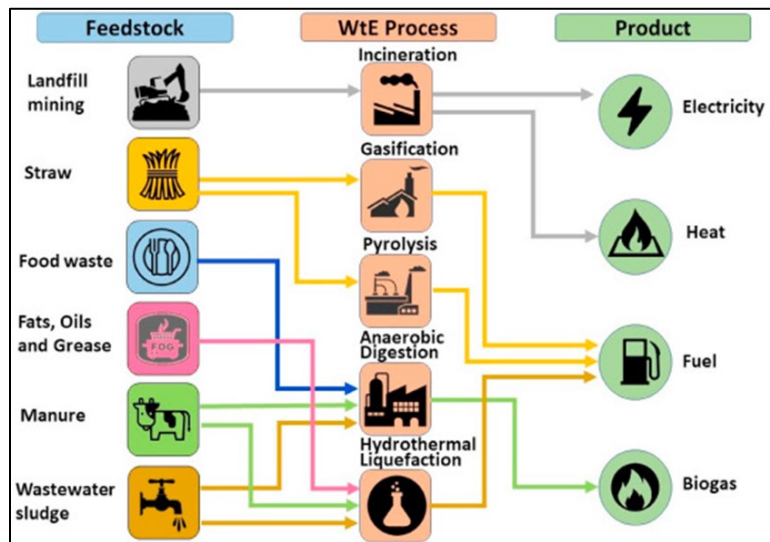
Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Utility Scale	LTLA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, MBTA, BGEPA	DOE Foundation/Basics - Wind; DOE Professional - Project Dev; DOE Professional - Project Finance; USFWS Land Based Wind Guidelines; DOE Land-Based Wind Energy Economic Development Guide	DOI DEMD; DOE IE	DOI DEMD; USDA RUS; DOE RURAL; DOE TELGP Tax Credits
Community Scale	LTLA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, MBTA, BGEPA	DOE Distributed Wind Report; USFWS Land Based Wind Guidelines; DOE Land-Based Wind Energy Economic Development Guide	DOI DEMD; DOE IE	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; COMMERCE EDA; DOE TELGP; Tax Credits
Shared Wind	LTLA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, MBTA, BGEPA	DOE Distributed Wind Report; USFWS Land Based Wind Guidelines	DOI DEMD; DOE IE	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; COMMERCE EDA; DOE TELGP; Tax Credits
Distributed/Rooftop	CONTRACTS, ROW, ITESDA, NEPA, ESA, MBTA, BGEPA	DOE Foundation/Basic - Facility Scale; DOE On-Site Wind Checklist	DOI DEMD; DOE IE; EPA EJ TCTAC; USDA RPN	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; Tax Credits

Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Microgrids	LTLA, CONTRACTS, PURPA, NHPA, BGEPA, CAA ROW, ITESDA, NEPA, MBTA	DOE FEMP Deployment Microgrid	DOI DEMD; DOE Clean Communities	DOI DEMD; DOE IE; EPA GGRF; USDA REAP; USDA RUS; DOE RURAL; COMMERCE EDA; DOE TELGP; Tax Credits

Appendix D: Biomass Resource Crosswalk

Appendix D provides a cross walk between biomass renewable energy resource, project type, and relevant laws and regulations, education/information, available technical assistance, and available financial assistance.

Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Utility Scale	LTLA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, CAA	DOE Foundation/Basics - Biomass; DOE Professional-Project Dev; DOE Professional - Project Finance	DOI DEMD; USDA FS	DOI DEMD; USDA RUS; DOE RURAL; DOE TELGP Tax Credits
Community Scale	LTLA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, CAA	DOE Foundation/Basics - Biomass; DOE Professional-Project Dev; DOE Professional - Project Finance	DOI DEMD; USDA FS	DOI DEMD; DOE IE; USDA REAP; USDA RUS; DOE RURAL; DOE TELGP Tax Credits



Appendix E: Geothermal Resource Crosswalk

Appendix E provides a cross walk between geothermal renewable energy resource, project type, and relevant laws and regulations, education/information, available technical assistance, and available financial assistance.

Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Utility Scale	IMDA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, CWA	DOI DEMD Energy Resource Primer; DOE Tribal Renewable Energy Foundational Course: Geothermal; DOE Energy 101: Geothermal Energy; DOE 2021 Geothermal Report; NREL RAPID	DOI DEMD; DOE IE;	DOI DEMD; USDA RUS; DOE RURAL; DOE TELGP Tax Credits
Community Scale	IMDA, ROW, CONTRACTS, ITESDA, PURPA, FPA, NEPA, NHPA, ESA, CWA		DOI DEMD; DOE IE;	DOI DEMD; USDA REAP; USDA RUS; DOE RURAL; DOE TELGP; DOI IE; Tax Credits
Facility Scale	ROW, CONTRACTS, ITESDA, PURPA, NEPA, NHPA, ESA, CWA		DOI DEMD; DOE IE;	DOI DEMD; DOE IE; DOE RURAL; HUD ICDBG; USDA REAP; EPA GGRF; Tax Credits

Appendix F: Hydroelectric Resource Crosswalk

Appendix F provides a cross walk between hydroelectric renewable energy resources, project type, and relevant laws and regulations, education/information, available technical assistance, and available financial assistance.

Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Utility Scale	ROW, FPA, NEPA, NHPA, ESA	DOE A Comprehensive Assessment of Hydropower Energy Potential in the US; DOE ORNL, Hydropower Development Opportunities for Alaska Native Villages	DOI DEMD; DOE ORNL	DOI DEMD; DOE HYDRO INCENTIVE PAYMENTS; Tax Credits

Appendix G: Hydrogen Resources Crosswalk

Appendix G provides a cross walk between hydrogen renewable energy resources, project type, and relevant laws and regulations, education/information, available technical assistance, and available financial assistance.

Project Type	Relevant Laws & Regulations	Education / Information	Technical Assistance	Financial Assistance
Utility scale	IMDA, LTLA, ROW, CONTRACTS, ITESDA, NGA, NEPA, NHPA, ESA, CAA, CWA	DOI DEMD, Energy Resources Primers	DOI DEMD; DOE REGIONAL HUBS	DOI DEMD; DOE HYDROGEN; Tax Credits