



# Understanding Market Context Vital to Renewable Energy Project Success

## DOE Office of Indian Energy Programs and Tools Help Tribes See the Big Picture, Evaluate Options

In response to the requests of Tribes and Alaska Native entities for support in developing renewable energy projects, the U.S. Department of Energy (DOE) Office of Indian Energy Policy and Programs (Office of Indian Energy) is providing technical assistance and helping build tribal knowledge, skills, and capacity through education and training initiatives and the Strategic Technical Assistance Response Team (START) Program.

Before embarking on a specific project, developing a long-term energy strategy and a clear path to reach tribal goals is often key, as Tribes that have succeeded in moving their vision into reality can attest. Following this best practice helps tribal leaders and staff understand, internalize, and clearly communicate tribal goals in order to minimize project risks and garner the community support needed to promote project success.

Having done the up-front planning needed to lay the groundwork for a project, Tribes often identify a need for project development support. The Office of Indian Energy has developed an educational curriculum (available at [www.nerlearning.org](http://www.nerlearning.org); search for “Indian Energy”) that follows a five-step process tailored to meet this need by outlining a clear path to successful renewable energy development for Tribes. Based on the experience of many successful project managers, this framework includes council check-ins at key decision points that are critical to the success of any energy project.

In response to tribal requests for help getting clean energy projects off the ground, the Office of Indian Energy uses the five-step process as a framework for providing a range of project development support, from education and training to on-the-ground technical assistance. This document focuses on “Step 1: Project Potential” and “Step 2: Project Options.”

## Market and Resource Assessment Helps Tribes Gauge Project Viability, Narrow Options

Through the training and technical assistance it provides in the initial stage of project development, the Office of Indian Energy walks Tribes through these first two steps, working with tribal leaders and key stakeholders to answer questions such as:

1. How will the potential project meet the community’s short- and long-term energy goals?
2. What renewable energy resources are available and how much energy can those resources produce?
3. What is the potential market for using and/or selling the power generated from those resources?



The first two steps in the project development process, which are highlighted in this document, are to assess project potential and narrow project options.



While many Tribes have conducted initial studies to gauge project potential, they often request additional support in determining a project's viability. Through training and technical assistance, the Office of Indian Energy provides analysis that helps Tribes understand the market context. Identifying possible project sites and confirming what renewable energy resources exist in those areas are key components of the analysis that help Tribes prioritize which renewable energy resources to develop based on how they can generate tribal revenue. The market context analysis can also help Tribes determine the best options for allocating limited funds, identify new opportunities they may not have considered, and prioritize the available options.

“It is important to understand the whole environment in which a Tribe operates to know what opportunities are viable,” said DOE Office of Indian Energy Strategic Technical Assistance Response Team (START) member and National Renewable Energy Laboratory (NREL) project leader Colton Heaps. “And to avoid the unnecessary costs of traveling down a dead-end road, it is even more important to fully understand those resources before embarking on a big project effort.”

Evaluating project potential and options holistically can be time- and labor-intensive, but the effort pays dividends because it brings the Tribe to a critical decision point in the project development process. Once these two steps are completed, the Tribe should have sufficient information to decide whether moving forward with the project makes sense—*before* it has invested a great deal of money.

**Step 1: Assess Project Potential.** The first step in the project development process is to frame the project within a bigger picture, which helps tribal leaders evaluate whether the surrounding market will support the project. To do this, START technical experts analyze the following:

- **Baseline.** The baseline energy assessment looks at the various factors that dominate the existing energy market, such as the supply, fuels, regulations and policies, growth, and cost trends, and determines whether they support or hinder renewable energy development.
- **Economics.** The driving factor for many projects, this key element of the market context analysis considers the rate structure, the future cost of grid power, policies, utility fuels and inputs, finance rates, what the future looks like for tribal use, and market growth.
- **Policy.** In addition to federal regulations, tribal policy requirements can be either a hindrance or a help when developing a renewable energy project. These are important considerations in a market context analysis, as are financial incentives such as rebates and tax credits that make a project more economically viable (though they

may have project ownership implications since only tax-paying entities are eligible to receive tax credits).

- **Technology.** This factor addresses logistics—Will the technology work? Is it appropriate for the location and market? How can the resources be captured and converted into electricity most effectively and cost-efficiently? What size system is appropriate for tribal use versus for a commercial-scale project?
- **Consensus.** A vital factor in project success, consensus is often contingent upon the commitment and influence of key community leaders who can help rally tribal leadership and the community around the project.

As part of the market context analysis, a calculation is performed to determine the levelized cost of energy, or LCOE. The LCOE captures all of the costs, including capital investment, operations and maintenance, and fuel, over the life of an energy system and provides an “apples-to-apples” comparison for various systems with different kinds of costs.

“Renewable energy technology installations are typically more expensive than what you are paying now for energy, but their costs escalate at a much slower, more predictable rate,” explained START member and NREL project leader Liz Doris. “At some point, energy from the renewable project will be less expensive than the cost of fossil fuel or electricity from the grid.”

At the end of Step 1, the Tribe should be confident that there is an adequate renewable resource at an appropriate location, and, based on preliminary analyses, the potential return on investment should justify the risks and costs.

**Step 2: Evaluate Project Options.** Step 2 consists of identifying and narrowing project options. This is the time to finalize the location and determine the Tribe's role. If the plan includes partners to help finance and/or develop the project, this is also the ideal stage at which to identify those partners and begin structuring the Tribe's relationships with them. For example, although the Tribe is not a taxable entity, it can partner with third-party tax investors and/or developers to take advantage of tax-equity incentives. This can lower capital costs for qualifying projects by as much as 40%–50%. For more information on tribal energy project financing options and ownership structures, access the project development course curriculum at [www.nerlearning.org](http://www.nerlearning.org) (search for “Indian Energy”).

The recommended tasks to be performed in Step 2 include identifying and understanding permitting requirements and other site use considerations, initiating the procurement process, and investigating interconnection agreements and utility requirements.



## Assessing Project Potential and Evaluating Options: Steps 1 and 2 in Action

Through the START Program, the DOE Office of Indian Energy provided technical assistance to the Pueblo of Zuni and the Passamaquoddy Tribes to enable them to make informed decisions about their projects.

### Pueblo of Zuni

Like many Tribes, the Pueblo of Zuni in New Mexico lacks funding for renewable energy projects, yet the need and desire are great as the Tribe faces a very serious threat—a potential outage of its water delivery system. A market context analysis conducted as part of the technical assistance the Tribe received in November 2012 aimed to identify solutions to the problem and help prioritize renewable energy projects by reviewing the economics, available technologies, and tribal policies.

Community growth and arsenic contamination in local wells had forced the Pueblo to procure a community-wide water resource, which meant drilling a well about 12 miles from the town. With that came new logistical challenges associated with delivering water from the new well to the community cost-effectively and reliably.



During a START site visit to the Pueblo of Zuni in New Mexico, NREL's Otto VanGeet (right) discusses the layout of the site's water well with Strallie Edaakie Sr. of the Zuni Utility Department. Photo by Colton Heals, NREL 23642

According to Director of the Office of Special Projects Darrell Tsabetsaye, the Pueblo was spending close to \$1 million a year running water well pumps 24/7 to supply the community with 300,000 gallons of water per day. Furthermore, it had no way to deliver water from the new well in the event of a power outage. “Without any backup generation power to run the pumps, 12,000 people would be out of water in the case of a blackout,” said Tsabetsaye. The solution the Tribe was interested in pursuing—using a solar photovoltaic (PV) system as a backup electricity source for the well pumps—was not a revenue generator, which made it challenging to secure funding sources.

The market context analysis addressed the budgetary and system resiliency issues and identified a funding source designed to finance drinking water infrastructure. “Our research uncovered a state revolving fund that is perfect for the project,” said Heaps. “It’s a great opportunity, with lower interest rates and subsidies, that they didn’t know about before.”

Heaps said the analysis also steered the Tribe away from using a PV system as backup for the centralized water system because it was cost-prohibitive. “Based on our input, they decided to pursue a diesel-generator backup system, which is being funded by Indian Health Services (IHS),” said Heaps. “And we suggested they install a PV array in a standard, grid-following configuration designed to lower the well facility’s energy costs.”

Moving forward, the Pueblo of Zuni will continue to collaborate with DOE, the U.S. Department of the Interior, IHS, the Bureau of Indian Affairs, and the Pueblo’s Tribal Management Team to help bridge the financing for the initial costs and the operational costs of the project. “Tribes may be cash poor,” said Tsabetsaye, “but there is a critical need to tap into renewables.”

### Passamaquoddy Tribes of Indian Township and Pleasant Point

When they applied to receive technical assistance, the Passamaquoddy Tribes of Indian Township and Pleasant Point in Maine were looking for an independent assessment of a potential 20-megawatt (MW) wind farm on newly acquired tribal lands, with the potential to add an additional 40 MW.

During a strategic energy planning session facilitated by the START team, tribal leaders and staff outlined key project activities such as siting, resource assessment, permitting, electrical interconnection, off-take market research, and identification of financing options.

The START team analyzed the project site to gauge whether it would be suitable for the size of the proposed wind projects and help characterize the range of available options.





Photo by Dennis Schroeder, NREL 27197

“The Tribes had previously hired a wind developer to collect data through a met tower,” said START member and NREL senior engineer Robi Robichaud. “START provided an independent assessment of the data and developed recommendations based on that analysis to help the Tribes better understand the project potential and make informed decisions.”

The analysis showed that the highest winds were in the middle of the day, which could have added value in meeting peak demand across a utility’s territory. However, the analysis also indicated very high turbulence, which is not good for wind turbines or energy production. There was no reasonable explanation for this given the relatively flat, non-treed landscape, other than turbulence embodied in the wind itself.

Based on this, the START team recommended that the Tribes install one or more 60-meter (m) met towers for at least a year to collect additional data, and to augment the data collection for three to six months with a sonic detection and ranging unit to help determine the wind speed at 80 m and 100 m, which are more typical of modern utility-scale turbine hub heights.

“Collecting one year of on-site wind data is a common ‘mantra’ in the world of would-be wind farm owners,” explained Robichaud. “However, having quality wind data that has been analyzed and explained so that the wind characteristics and its suitability for a wind farm are well-understood is a more worthwhile goal.”

The START team also helped identify the New Market Tax Credit (NMTC) as key to the economic viability of the project, and brought in an NMTC expert to explain how this tax credit works, its intended target projects and beneficial outcomes, and how the Tribes were well-positioned to utilize it.

“Like many commercial wind projects of the past decade, this project’s success will be dependent upon the wind resource, the competing cost of electricity, and the incentives available to enhance the project economic viability,” Robichaud said.

### Learn More

To read more success stories in tribal energy development and access helpful resources for strategic energy planning and renewable energy project development, visit DOE Office of Indian Energy Resource Library at [www.energy.gov/indianenergy/resources/energy-resource-library](http://www.energy.gov/indianenergy/resources/energy-resource-library).

Learn more about the START Program at [www.energy.gov/indianenergy/resources/start-program](http://www.energy.gov/indianenergy/resources/start-program).

Learn about the renewable energy technology potential on tribal lands at [www.nrel.gov/docs/fy13osti/57748.pdf](http://www.nrel.gov/docs/fy13osti/57748.pdf).

## Renewable Energy Curriculum and Technical Assistance for Tribes

The DOE Office of Indian Energy offers a series of online educational courses specifically for tribal leaders and professionals. These free, on-demand webinars provide an overview of renewable energy technologies, strategic energy planning, and renewable energy project development and financing. Access the webinars at [www.nterlearning.org](http://www.nterlearning.org) (search for “Indian Energy”).

Tribes can apply to receive up to 40 hours of free technical assistance from DOE to help with strategic energy planning. Apply online at [energy.gov/indianenergy/technical-assistance](http://energy.gov/indianenergy/technical-assistance).



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November 2013 • DOE/IE-0030  
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