



Project Refinement Identifies and Addresses Outstanding Project Risks

DOE Office of Indian Energy Technical Assistance Helps Tribes Validate Decisions, Finalize Project Structure

In direct 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, training, and technical assistance programs.

Developing a long-term energy strategy and a clear path to reach tribal goals is a proven best practice that is often key to a project's success, as Tribes that have succeeded in moving their vision into reality can attest. The strategic energy planning process is outlined in the DOE Office of Indian Energy publication *Developing Tribal Energy Projects: Community Energy Planning* (www.nrel.gov/docs/fy13osti/56272.pdf).

Once Tribes have completed the planning needed to lay the groundwork for their projects, they often identify a need for guidance on project development. The Office of Indian Energy has developed an educational curriculum tailored to meet this need by outlining a clear path for Tribes to follow in developing successful energy projects. This five-step project development framework is featured in the Office of Indian Energy publication *Developing Tribal Energy Projects: Project Development Fundamentals* (www.nrel.gov/docs/fy13osti/57961.pdf).

Building off its educational curriculum, the DOE Office of Indian Energy follows this project development process in responding to tribal requests for hands-on technical assistance with moving specific clean energy projects forward. In Steps 1 and 2, that assistance is focused on performing objective, third-party market and resource analyses that provide Tribes with vital information for gauging project viability and evaluating project options such as location, tribal role, and ownership structure. The Office of Indian Energy publication *Developing Tribal Energy Projects: Evaluating Project Potential and Options* covers the first two steps in the project development process and highlights how the work performed during these steps benefited three START projects.

Tribal Benefits of Project Refinement

- *Effective use of natural resources*
- *Greater levels of confidence in project benefits*
- *Shared sense of project ownership*
- *Better understanding of revenue stream, power generation, offsetting energy costs, and fuel use*
- *Using incentives to maximum benefit*
- *Understanding policy considerations*
- *Validated decisions*



Photo by Dennis Schroeder, NREL 26958

Project Refinement Supports Tribes in Making Foundational Decisions

This document focuses on “Step 3: Project Refinement.” At the project refinement stage of a renewable energy project, Tribes focus on validating previous decisions, completing permitting, nailing down system specifications, and cementing the project structure.

To support tribal leaders in making these crucial decisions that form the foundation of a successful project, the Office of Indian Energy provides technical assistance designed to help them answer the following questions:

1. Who will be the project developer?
2. Who will be responsible for securing the required permits, and does the project meet the regulatory requirements?
3. What size and type of renewable energy system will the Tribe install, and from which vendor?
4. What will the Tribe’s role be in the project ownership structure, and how will the project be financed?

“Technology refinement is understanding the resource available and the best ways to use it,” said Alex Dane, DOE Office of Indian Energy Strategic Technical Assistance Response Team (START) member and project leader at DOE’s National Renewable Energy Laboratory (NREL). “It is understanding the systems, including the generation capacity and the intended use of that power, and then working out the technical aspects of that.”



The third step in the project development process, project refinement involves key decisions that form the basis of a successful project.

Specific tasks to be completed during this step in the project development process include confirming capital requirements and potential return on investment, solidifying other goals to be met, selecting vendors, completing environmental reviews, and finalizing permits and interconnection agreements.

At this stage of the project, technical support might include assisting the Tribe with economic models, financing agreements, vendor selections, environmental reviews and permits, off-take and interconnection agreements, and transmission feasibility and system impact studies.

Step 3: Refine the Plan, Mitigate the Risks. The goal of the refinement stage of project development is to identify the outstanding risks a project faces and, more importantly, develop a plan of action to address those risks. As part of the technical assistance it provides to Tribes, the Office of Indian Energy helps address various elements of project risk that NREL has identified through its experience in energy project development. These risk factors, which are encompassed in the acronym SROPTTC, include the following:

- **Site.** This component of project risk pertains to securing the site, since without a site, a project cannot exist. Related tasks include identifying who is in short- and long-term control of the site, drawing up lease terms, and addressing collateral, environmental, and access concerns.
- **Resource.** Typical tasks undertaken to address resource risks during project refinement include performing an engineering assessment and evaluating the data to validate the resource.
- **Off-Take.** Addressing off-take risks requires a solid understanding of how much energy the community will use versus what will be placed back on the grid, with the goal of using that information to establish power purchase agreements (PPAs). Related tasks include finalizing issues such as terms and conditions, contract length, pricing, and interconnection.
- **Permits.** Tribal lands often have unique permitting considerations, and failing to understand all of the requirements can bring a project to a standstill. To mitigate this element of risk, all required permitting is secured during the project refinement step.
- **Technology.** While the renewable energy technology has already been selected at this point—wind versus solar, for instance—project refinement entails defining specifics such as system type and size. For example, at this stage, a Tribe would determine whether a photovoltaic (PV) array or a solar water heater would best meet its energy needs. To address the risks inherent in technology selection, Tribes can make use of specialized models and tools such as PVWATTS®, SolOpt, and In My Backyard to guide key decisions related to project scale and system design that



factor into the task of obtaining bids from contractors. These tools are available on the NREL website at www.nrel.gov/analysis/models_tools.html.

- **Team.** Mitigating the risks associated with the project team involves identifying and engaging a professional, diverse, and experienced team in which key players have expertise in business management, law, finance, and important renewable energy technology issues, such as transmission interconnection.
- **Capital.** Available capital is a primary consideration for any renewable energy project, and determining the project structure during the project refinement phase is key to a Tribe's ability to address the risks associated with project ownership and financing.

The work performed during project refinement enables the Tribe to mitigate the various project risks and confirm that everything is in place before moving forward with system implementation.

Project Refinement: Step 3 in Action

As an objective third party in the project refinement process, the START team serves as an experienced resource for Tribes, which often lack the technical expertise to identify renewable energy project risk factors and make informed decisions in addressing



START members conducted a wind site assessment on the Campo Indian Reservation in September 2012. From left to right: Bob Springer of NREL, Laura Quaha of the Campo Kumeyaay Nation, Melissa Estes with the Campo Environmental Protection Agency, and Robi Robichaud from NREL.

Photo by Alex Dane, NREL 22724

them. Through the START Program, the Office of Indian Energy is providing technical assistance to the Campo Band of the Kumeyaay Nation in California and the Organized Village of Kake in Alaska.

Campo Wind Project

No stranger to wind farm development, the Campo Band of the Kumeyaay Nation requested technical assistance in reviewing developer-generated plans for a large, 160-MW wind farm on its reservation. With an existing wind farm already on-site, Campo had an understanding of wind development and was interested in potential ownership options in the proposed project

The START team reviewed the plans and validated data collected through anemometer testing, and provided tribal leadership with background information on partnerships and ownership options currently used in the marketplace.

“Having a greater understanding of the available ownership options and project financing structures put the Tribe in a better position to explore its options for expanding its role in a project and to accrue benefits beyond income generated from the land lease,” said Dane.

The START team also briefed tribal leaders and staff on the various project ownership configurations potentially available to Campo, such as the sale-leaseback, which would give the Tribe the option to buy into the project at years 10–15, when tax-eligible investors have utilized their tax credits from the project.

“The Tribe was pleased with the [sale-leaseback] ownership option and determined that it was a more realistic path to ownership for them,” said START member and NREL project leader Colton Heaps.

Kake Solar Project

The Organized Village of Kake's reliance on expensive diesel fuel to operate its energy-intensive commercial fish processing and hatchery was limiting economic development potential. After exploring various renewable energy technology solutions to address these challenges, Kake was pursuing the installation of a 1- to 2-kilowatt (kW) wind turbine to be funded with a \$31,000 Energy Efficiency and Conservation Block Grant (EECBG) from DOE. To keep transmission costs down, the turbine had to be located near the Kake tribal office. However, the trees on-site limited the turbine's generation potential. When the Southeast Alaska Conservation Council suggested Kake could install almost 6 kW of solar energy for the same cost as the wind turbine, the Village opted to pursue that lead and turned to the Office of Indian Energy for technical assistance with project refinement through the START Program.



In addition to validating Kake's decision to pursue solar energy, the START team also identified an opportunity for the Village to fund the installation costs and allocate all of the EECBG funding for hardware. The Village also sought support in addressing site challenges that arose at this stage. With assistance from START in the early stages of project development, the Tribe had identified the roof of the cannery as the optimal site for its solar system, but there was a glitch: the rooftop installation placed the building's status with the National Historic Registry in jeopardy. The START team assisted the Tribe in negotiating an alternate location for the solar panels that met the National Park Service's criteria for historic sites while still offering plenty of solar exposure and keeping transmission costs in check.

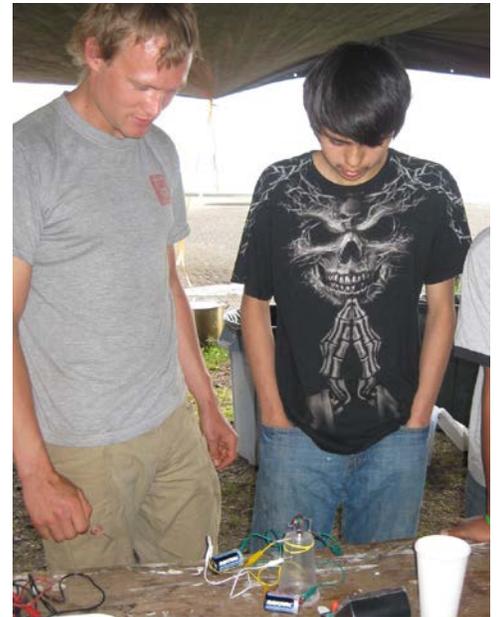
Another consideration for Kake was whether to install tracked solar panels or a fixed array. Southeast Alaska is a coastal rainforest and has not been considered ideal for solar. However, as the technology costs have come down, solar is becoming a more viable option for the region. The question of which system configuration is ideal remains an open question, however, and this presented Kake with an opportunity to lead on the clean energy front.

"Models can simulate and project," said START member and NREL project leader Levi Kilcher, "but by installing one of each type of system, Kake could have the best of both worlds while contributing some data points on the ground for others to benefit from. The Tribe was happy to have its project serve as a test for the region to help settle the question of which solution is the most economical, and they're sharing the results with NREL."

With the details of the system design settled, the Village issued a request for proposals in May 2012. The START team reviewed the six proposals they received and provided technical insights that facilitated the Tribe's selection of a contractor to install the solar system. One of the Tribe's criteria was willingness to partner with the Kake energy team and broader community to make the project an educational

opportunity. The effort to garner community buy-in, which included involving two high school students in the installation, paid off.

Because EECBG and other funding covered the full cost of the project, Kake avoided the need for financing and retained full ownership of the solar system. To avoid conflicts of interest, the START team had recommended engaging the local utility early in the project, and during the project refinement phase the team helped negotiate an agreement that allows any excess power the solar system produces to be placed back onto the grid. Because the amount of power the system will produce is relatively small, no PPA was necessary.



NREL's Levi Kilcher gives a technology demo during the youth energy training at the Kake Culture Camp.
Photo by Connie Fredenberg, NREL 22725

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.

Learn more about the START Program at 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.

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.nerlearning.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.



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