

Blueprint 3D How-To Guide: Renewable Resource Planning for Rural Communities

Introduction

[The Energy Efficiency and Conservation Block Grant \(EECBG\) Program Blueprints](#) are model projects and programs that EECBG participants can pursue, covering a range of areas in energy planning, energy efficiency, renewable energy, transportation electrification, clean energy finance, and workforce development. This Blueprint How-To Guide is a companion for rural communities interested in planning for and implementing renewable energy projects (related to [Blueprint #3D: Renewable Resource Planning for Rural and Tribal Communities](#)). This document is a starting point for rural EECBG recipients focusing on the activities that can most easily be managed by the community directly. Where applicable, we indicate where technical assistance could be available to assist.

The Rural Community Context

Renewable resource planning is a crucial part of the ongoing energy transition – energy demand continues to grow, and larger portions of our country’s energy is being derived from renewable sources. Many rural communities have renewable energy resources in abundance that offer them strategic and financial opportunities.

Any renewable project, regardless of location, will include elements like conducting a market or resource assessment, administering stakeholder engagement, and developing an action plan for execution of the project. The rural landscape and community distribution patterns may provide some unique challenges and opportunities. For example, resource

KEY ACTIVITY CHECKLIST: BLUEPRINT 3D

1. Market Assessment

- Identify and analyze renewable resource potential
- Assess economic feasibility
- Understand the regulatory environment

2. Stakeholder Engagement

- Identify stakeholders
- Provide educational materials
- Develop an engagement plan
- Develop a vision, goal document, and associated action steps
- Engage additional relevant stakeholders

3. Act on Plan Development

- Define goal(s) and vision, and a strategy and action step roadmap
- Incorporate permitting and regulation requirements
- Adopt the plan

assessments often leverage local natural resources like large scale access to wind, solar, and biomass. Economic feasibility studies may emphasize the potential for job creation and local economic benefits over localized energy use, given the smaller economic base. Stakeholder engagement in rural areas can often involve a smaller, more tight-knit group of stakeholders, including local government, farmers, and community leaders and where public meetings and workshops are crucial for building consensus and addressing local concerns. Action plans might focus on smaller-scale projects that can be implemented quickly and provide immediate benefits.

Technical Assistance

Accessing technical assistance may be critically important for rural community governments with limited personnel resources. There are several resources available to supplement your organization’s capacity to develop and complete a project under the EECBG Program. Consider using the [EECBG Technical Assistance Voucher](#) option to advance project elements like data collection, savings estimates, or modeling that might be needed. In addition, the Department of Energy and partner Federal agencies offer several technical assistance programs that are specific to various clean energy technologies, policies or programs. For a complete list, visit [Energy Efficiency and Conservation Block Grant Program Technical Assistance Opportunities](#) and email questions to TechnicalAssistance@hq.doe.gov.

Key Terms in this Document

Scenario analysis: A strategic planning tool used to explore and evaluate possible future events by considering different hypothetical scenarios. It involves creating detailed and plausible scenarios based on varying assumptions and variables to understand their potential impact on a project, investment, or business. This method helps organizations anticipate and prepare for different outcomes, assess risks, and make informed decisions. Rural communities may want to consider scenarios that compare seasonal variations that could affect their renewable resource, different resources (e.g., using a site for wind power versus solar power), or to compare types of technologies (e.g., solar panels that track movement of the sun versus solar panels that are mounted statically).

Environmental impact study (EIS): A comprehensive evaluation conducted to determine the potential environmental effects of a proposed project or action, such as installation of a large-scale renewable energy project. This study assesses both the positive and negative impacts on the environment, including effects on air, water, land, wildlife, and human health. The goal is to identify, predict, and mitigate any adverse environmental consequences before the project is approved and implemented. In rural communities, this could include ground disturbances and runoff, vegetation and opportunities to increase native plants and diversity or avoid unnecessary removal of vegetation, and additions to the project to help divert and minimize interactions with wildlife.



Assistant Secretary Janice Schneider, US Department of the Interior and researcher Walt Musial tour the NWTC. Source: Dennis Schroeder / NREL

Key Activities



KEY ACTIVITY 1: MARKET ASSESSMENT

- **Goal: Understand the renewable resources in your community and assess their potential.**

Step 1: Identify Potential Sites for Renewable Energy Projects

How? Follow the checklist:

- Define the Assessment Scope.** Coming from a local government or community perspective, it is important to define upfront the focus and intended use of your market assessment. For example, is your project aimed at informing renewable energy projects that could be developed by your organization, or are you looking to understand the communitywide economic energy generation potential? Define the geographic focus for your assessment and associated key points of contact.
- Determine Technical Suitability.** Identify renewable technologies that are most suitable for your local context. For example, [NREL's Renewable Energy Data Explorer](#) can help determine the best-fit technologies based on resource availability and site-specific conditions. Energy output will vary in different conditions (e.g., seasonal variations and technology performance), so your analysis should consider these fluctuations and any potential effects on the energy user or project goals.
- Consider Impact on Local Ecosystems.** Renewable energy projects can have an impact on local wildlife, vegetation, water resources, and air quality. A baseline study can help you to understand the current state of local ecosystems and develop and implement mitigation measures to minimize adverse environmental impacts. While a communitywide assessment could provide a sense of what types of ecosystems could be affected, site-specific analysis will provide more granularity and understanding of mitigation options. Work with a Technical Assistance provider or prepare an Environmental Impact Study if required, following [guidelines from the Council on Environmental Quality \(CEQ\)](#).

What to consider:

- **Data is important.** Sources like [NREL](#), [DOE](#), and [USGS](#) can be used to gather data on [solar irradiance](#), [wind speeds](#), [biomass availability](#), or [water flow](#). Identify local biomass resources such as agricultural residues, forestry residues, and organic waste. These datasets will help you determine which type of renewable energy project could make the most sense in your community.
- **On-Site Surveys.** While online data is a helpful starting point to understand the renewable energy generation potential of a site, working with a technical assistance provider on-site can validate the data and assess the physical characteristics of potential locations. For example, an on-site assessment can refine the solar potential calculations by examining the available space, incident solar radiation, potential light obstructions, and the suitability



KEY ACTIVITY 1 RESOURCES

[Renewable Energy Resource Assessment Information for the United States](#)

[Energy Analysis Data and Tools for State and Local Energy Planning](#)

[Renewable Energy Data, Analysis, and Decisions: A Guide for Practitioners](#)

[Renewable Energy Maps and Tools](#)

of the site for the necessary equipment and maintenance.

- **Resource Mapping.** Geographic Information System (GIS) software can take a site assessment further by analyzing spatial data and identifying optimal locations for solar and wind energy projects. The [National Renewable Energy Laboratory's Geospatial Data Science team](#) offers various GIS tools and datasets to explore.
- **External Support.** Partnering with contractors, renewable resource developers, or university programs can provide technical support and skills, such as GIS mapping expertise, to supplement the work of your organization's staff. Consider available Technical Assistance programs or using your EECBG funding award to bring in external expertise where needed.



INL employees consulting on a microgrid at Utah's Dugway Proving Ground. Source: Idaho National Laboratory

Step 2: Assess Economic Feasibility

How? Follow the checklist:

- Perform Cost and Benefit Analysis.** Estimate the capital, operational, and maintenance costs of renewable energy projects. Calculate the expected benefits, including energy savings, revenue from energy sales, and environmental benefits. Use financial metrics like Net Present Value (NPV) and payback period to evaluate the economic feasibility of projects.
- Identify potential customers.** If your community plans to support development of large-scale renewable energy projects and sell the energy, identify potential customers such as local utilities, large commercial or industrial users, and on-site uses for renewable energy.
- Develop a Financial Plan.** If you have identified a specific project site, such as a location owned by your organization, compile a financial plan with funding sources, budget, and cash flow projections.

What to consider:

- **Job Opportunities.** Identify the potential benefits for jobs added in the project's development.

- **Infrastructure Compatibility.** Analyze the existing infrastructure and its capacity to integrate renewable energy systems. This includes grid compatibility and the need for upgrades. Utility companies often provide technical assistance and incentives for renewable energy projects.
- **Technical Potential Modeling and Simulation.** Understanding the potential energy output from identified resource can help further focus your project. Tools like the [System Advisor Model \(SAM\)](#) provided by NREL can be used to calculate the potential energy output from identified resources. SAM helps estimate the performance and financial feasibility of renewable energy projects.
- **Technical assistance providers and/or renewable energy consultants.** Technical experts can help by completing feasibility studies, resource assessments, and economic analyses.
- **Federal tax incentives and rebates.** [The IRS offers several clean energy tax incentives](#) that may help with your project’s financing. Eligible tax credits are available to state, local, and tribal governments; businesses; and entities through “elective pay,” which is also colloquially known as “direct pay”. Explore whether your project can utilize these tax credits and/or other incentives.

Step 3: Understand the regulatory environment

How? Follow the checklist:

- Review permitting rules in your state and local jurisdiction.** Use the Database of State Incentives for Renewables and Efficiency ([DSIRE database](#)) search tool to find relevant policies using your zip code. An example of navigating relevant regulation would be the state of [California’s Solar Permitting Guidebook](#). Each state is different, but this guidebook can help frame the process and questions to ask.
 - **TIP: Identify Funding Sources.** Research available grants, loans, and incentives from federal, state, local, and utility programs (e.g., [DSIRE database](#)).
- Document Permit and Approval Requirements.** Understand and incorporate the requirements, fees, and approval timelines for your project area(s). Confirm the steps of any regulatory agency

RURAL UTILITY STRUCTURES

Electricity providers and utilities serving rural communities in the United States come in various organizational structures. Each of these structures plays a crucial role in ensuring that rural communities have access to reliable and affordable electricity.

- **Electric Cooperatives.** *Distribution Cooperatives:* These are member-owned entities that provide electricity directly to consumers in rural areas. Members are both the customers and owners, having a say in the cooperative’s operations. *Generation and Transmission (G&T) Cooperatives:* These cooperatives generate or procure electricity and transmit it to distribution cooperatives.
- **Municipal Utilities.** These are owned and operated by local governments. They provide electricity to residents within a specific municipality. Municipal utilities are typically non-profit and focus on serving the local community’s needs.
- **Investor-Owned Utilities (IOUs).** IOUs are private, for-profit companies owned by shareholders. They serve a significant portion of the U.S. population, including some rural areas. IOUs are regulated by state public utility commissions to ensure fair pricing and reliable service.
- **Federal Utilities.** Entities like the Tennessee Valley Authority (TVA) and the Bonneville Power Administration (BPA) are federally owned and provide electricity to rural areas. They often work in conjunction with local cooperatives and municipal utilities.
- **Public Utility Districts (PUDs).** These are non-profit, community-owned entities that provide electricity, water, and other services. PUDs are governed by elected boards and focus on serving the public interest.

special approval processes and ask for examples. Staff in your or neighboring localities’ planning departments may be able to assist based on their knowledge of local regulations and experience with other projects.

What to consider:

- **The Rural Utilities Service (RUS)** provides loans and grants to support the development and modernization of rural electric infrastructure, including renewable energy projects. They offer technical assistance to help rural utilities plan and implement renewable energy projects. RUS projects often aim to improve the economic opportunities and quality of life in rural areas. See what resources are offered by the [Rural Utilities Service \(USAGov\)](#) office in your area.
- **Types of Regulatory Entities.** Learning about the utilities that serve your area and their decision-making structure and programs could help you identify resources to support your project and the applicable implementation requirements, depending on project locations.



KEY ACTIVITY 2: STAKEHOLDER ENGAGEMENT

- **Goal: Involve impacted communities and businesses in the planning process.**

Step 1: Identify stakeholders and plan engagement activities and materials

How? Follow the checklist:

- Identify Stakeholders.** Develop a list of stakeholders to engage, such as local government officials, community leaders, landowners, residences and businesses adjacent to potential sites or on construction delivery routes, environmental groups, utility companies, potential direct users or purchasers of the generated energy; and applicable permitting/regulatory agencies.
- Provide educational materials.** Identify relevant information related to your community’s interests and about renewable energy resource projects. Educational engagement materials often highlight economic, health, social benefits, and community or workforce development impacts from renewable energy. Educational materials can be developed in stages, with initial rounds of engagement informing what topics and questions are important to address. Sharing the findings of a renewable resource market study is one form of educational engagement.
- Develop an engagement plan.** Consider events such as workshops, meetings, and small group discussions and their appropriate timing to gather input, communicate about your project vision, establish priorities, address concerns, and support discussion and consensus-building. This can be especially important for locality-led renewable energy projects on public property and for private projects that require special zoning approval and involve community buy-in.
- Develop a vision and goal document, and associated action steps.** For government-led projects, collaboratively develop a shared vision for renewable energy deployment that aligns with community and organizational



**KEY ACTIVITY 2
RESOURCES**

- [Community Engagement and Equity in Renewable Energy Projects \(NREL\)](#)
- [Solar Power in Your Community \(DOE\)](#)
- [Renewable Energy Siting through Technical Engagement and Planning \(DOE\)](#)
- [Community Energy Planning: Best Practices and Lessons Learned in NREL’s Work with Communities \(NREL\)](#)

priorities. This can be used as a basis for future engagement and planning activities, and/or for applying for project funding.

- ❑ **Engage additional stakeholders, relevant permitting authorities, and local utilities/cooperatives.** These entities may be able to provide information that could shape the scope of resource development potential, uses of generated energy, and build understanding of the required steps for completing a renewable energy project. This type of input could be useful in developing an action plan to implement the community’s vision and goal(s) and determining what is feasible.

What to consider:

- **Inclusive Participation:** Ensure that all relevant stakeholders, including local government, community members, businesses, and environmental groups are involved in the planning process. This includes sharing accessible information and materials throughout the planning process, by publishing resources in multiple languages, alternating event times, and including online options to allow the whole community to participate.
- **Transparent Communication:** Maintain transparent communication with stakeholders to build trust and address concerns. Use public meetings, workshops, and online platforms to facilitate dialogue.
- **Community Benefits:** Highlight the potential benefits of renewable energy projects for the community, such as job creation, economic development, and environmental sustainability.
- **Conflict Resolution:** Be prepared to address and resolve conflicts that may arise among stakeholders. This requires effective facilitation and negotiation skills.



Over 10,000 tracking heliostats focus solar energy at the receiver on the 640 foot power tower at the Crescent Dunes Solar Thermal Facility, in Tonopah, NV. The facility, built with US sourced steel, glass and technology, provides more than 500,000 megawatt hours of electricity per year, available day or night through molten salt storage. Source: Dennis Schroeder / NREL



KEY ACTIVITY 3: ACTION PLAN DEVELOPMENT

- **Goal:** Create a detailed plan to implement renewable energy projects, including the community's goal(s) and vision, and identify strategies and actions.

Step 1: Combine findings and input into a formal adopted plan document

How? Follow the checklist:

- Provide a summary of current context and renewable generation within the community and the region.** This information will often be included in a market assessment report and identified by local community knowledge.
- Identify strategies and specific action steps.** Informed by engagement and technical expertise input, identify and list the steps needed to complete a renewable energy project as well as related and supporting strategies. Examples of related strategies could include identification of funding resources and action steps identifying who and how potential resources will be evaluated and pursued, pursuit of workforce and job skills development, and maximizing economic benefits of renewable energy projects to benefit the community.
- Include timeframes, leading actors and potential partners, and permitting and regulation requirements.** Outlining specific actions, timelines, and responsibilities for project execution will support and guide next steps after the plan is adopted.
- Adopt the plan.** Work with your community's processes to adopt the completed plan as an official piece of policy or policy framework.

What to consider:

- **Strategic Partnerships:** Develop partnerships with local businesses, educational institutions, and government agencies to support project implementation and workforce development.
- **Funding and Financing:** Identify and secure grants, loans, private investments, and consider financing models like power purchase agreements (PPAs) and community solar programs.
- **Implementation Timeline:** Create a detailed timeline for project implementation, including key milestones and deadlines. Ensure that the timeline is realistic and allows for flexibility.
- **Monitoring and Evaluation:** Establish a system to monitor progress and evaluate renewable energy project impacts, including regular reporting and adjustments based on performance data.



KEY ACTIVITY 3 RESOURCES

[Bright Ideas: Federal Resources to Boost Energy Efficiency in Rural America \(USDA\)](#) – includes renewable energy project highlights and funding resources

[U.S. Departments of Agriculture and Energy Host Virtual Listening Sessions on Clean Energy Siting on American Farmland \(DOE\)](#) – includes linked guides, reports, and resources for communities

[EECBG Blueprint 1: Energy Planning \(DOE\)](#)

[Farmer's Guide to Going Solar \(DOE\)](#)

[Agrivoltaics: Solar and Agriculture Co-Location \(DOE\)](#)

[Solar@Scale \(ICMA\)](#)

[WINDExchange: Wind Energy Economic Guide \(DOE\)](#)

[WINDExchange: Wind Energy Community Benefits Guide \(DOE\)](#)