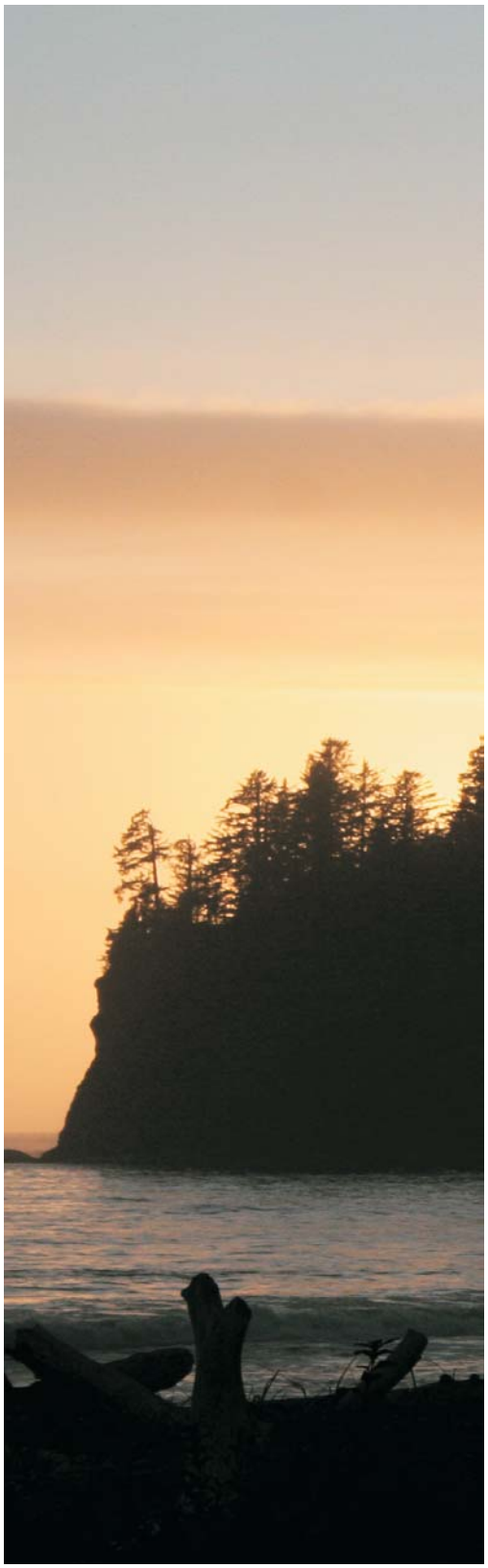
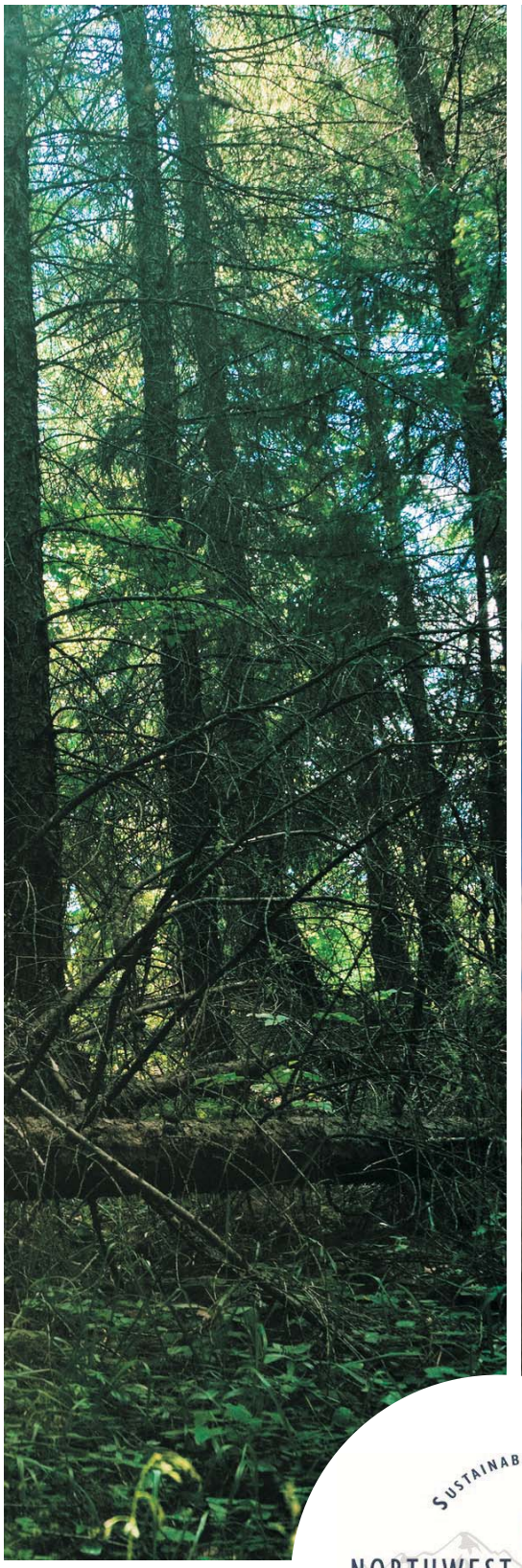
Energy Planning:
A Guide for Northwest Indian Tribes





Developed by:

Northwest Sustainable Energy for Economic Development

SUSTAINABLE ENERGY FOR ECONOMIC DEVELOPMENT

NORTHWEST S·E·E·D

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Northwest Sustainable Energy for Economic Development (Northwest SEED) works to establish a clean, diverse, and affordable Northwest energy system based on efficient use of renewable resources, with maximum local control and ownership of energy issues. Working collaboratively with motivated communities, Northwest SEED researches and implements clean energy solutions that provide economic benefits while creating a healthy and secure energy future.

The Bullitt Foundation is a private philanthropic foundation providing funding to nonprofit organizations working to safeguard the natural environment by promoting responsible human activities and sustainable communities in the Pacific Northwest.

The Foundation's geographic focus is Washington, Oregon, Idaho, western Montana (including the Rocky Mountain range), coastal Alaska from Cook Inlet to the Canadian border, and British Columbia.

This guidebook was written, reviewed and produced by Northwest SEED. The authors are solely responsible for errors and omissions.

Table of Contents

1- INTRODUCTION

Purpose of the Northwest Tribal Energy Planning Guide

Energy is a precious resource, and our energy choices have long-term impacts on the environment, as well as the economic and social fabrics that make up our way of life. Individuals, communities, and governments are deciding everyday how to use energy. Cost, access, convenience, and quality of life are all factors that play into the decisions made and often long-term wisdom is overshadowed by short-term needs. The energy we use to heat our homes, power our workplaces, and fuel our vehicles often contributes to pollution and greenhouse gases. However, opportunities to conserve energy and use less polluting energy sources are abundant. With these issues in mind, tribal governments and communities across the United States and around the world have recognized a responsibility to craft a plan for their own energy future.

The goal of a comprehensive energy plan is to provide a roadmap to meet current and future energy needs in an economically, socially, and environmentally sustainable fashion. The steps to include in an energy plan depend on the unique set of challenges, opportunities, and goals of individual tribes.

Deciding how best to implement these goals can be technically complex and requires expertise that many may not have. Even after energy projects are identified, it may become clear that the projects that would have the greatest impact are not affordable, or are not supported by enough members of the group; a delicate balance must be struck between the needs of the group and the desires of the individuals. Moreover, the infrastructure must be put in place to make the projects practical. The group needs to have the funding, personnel, permits, etc., to carry out the chosen projects for their full extent and duration.

Native American Indian tribes have unique needs for energy planning. According to the Affiliated Tribes of Northwest Indians, their constituent tribes desire the following: "Energy development and transmission programs should honor our sovereign governmental status. Our land rights should not be adversely affected by changes in the energy industry. Our cultural resources and fish, wildlife and treaty resources should not be harmed by energy operations. Indian people are energy consumers. Tribes are also owners of energy resources and are seeking to use those resources, whether renewable or non-renewable, to generate electricity and economic development and need access to transmission. Lastly, tribes seek a continued voice in public processes regarding energy matters." Although there are many sustainability and energy planning resources, there is a need for a single comprehensive reference that addresses the specific interests of Pacific Northwest tribes.

With this in mind, the Northwest Tribal Energy Planning Guide aims to provide information to Native American tribes in the Northwest that addresses the challenges inherent in the energy planning process. It contains resources to help select and implement projects to conserve energy, generate clean renewable energy, construct efficient and environmentally friendly buildings, and other energy-related community or business projects—all tailored to the geography of the Northwest and the people of its tribes.

What is a Tribal Energy Plan?

An energy plan is a statement of long-range actions and policies to help guide the future of a tribe's energy use. Energy plans include policy recommendations and identify energy project opportunities that will help meet the established energy use goals of the tribe. Energy plans also take into account long-term economic, environmental, and social factors.

Benefits of an Energy Plan

Consider the tribe's priorities- the basic programs that need to flourish for the tribe to flourish: commerce, education, health, families, safety, natural resources, and housing. The tribe may have a long-term strategic plan in some of these areas because it has been determined that these topics are important enough to warrant extensive and directed tribal resources and attention. Energy can be an essential part of the tribe's planning endeavors for the same reasons. Just like food or water, the tribe and its members will consume energy. Just like education, energy can be either a drain on tribal resources or an opportunity to build tribal capacity.

Since energy issues create interrelations between planning areas, energy planning is most effective when it is done centrally and holistically. This allows a tribe's energy resources, as well as human and monetary resources, to be utilized to their full extent and directed where they are most needed.

A good energy plan will work seamlessly with other tribal plans and help all programs run more efficiently. Creating an energy plan makes it possible not only to make electricity and fuel affordable and clean; it is also a chance to create jobs, build homes and offices, reduce the tribe's ecological footprint, and save money for tribal households or for the tribe as a whole. Moreover, energy planning empowers tribes to be more self-sufficient at a time when external resources are becoming increasingly volatile. Energy planning is a self-directed process of deliberately choosing to interact with the human and natural worlds in ways that align with the tribe's values.

Topics Covered in this Guidebook

This guidebook is designed to help tribes tackle energy planning in three primary ways. First, the guidebook presents information on the *process* of developing an energy plan. Included are topics such as developing goals, determining leadership, developing a work plan, and garnering community support for the energy plan itself. Second, the guidebook provides in-depth information and case studies about the following types of energy projects: conservation and efficiency, renewable energy, green building, and transportation. These sections offer examples of the many energy *project opportunities* and *measures* that a tribe may wish to identify and prioritize in their own plan. Finally, the guidebook includes a full section on resources and financing for both developing and *implementing a tribal energy plan*. As individual energy plans are developed, planners may find it useful to pair project recommendations for their tribe with financial resources for implementing such measures.

The guidebook breaks down the energy project types by section, addressing conservation, efficiency, and renewable energy discretely. This

is primarily due to the volume of information available and is necessary to adequately explore each topic. However, there are obvious links and overlaps between the various types of energy projects and there are also general rules of thumb for prioritization. Just as healthy eating guidelines can be recognized in the form of the "food pyramid," the "energy pyramid" (shown below) depicts a basic principle to guide the consideration of the broad array of energy projects that planners may face in the course of developing an energy plan. Energy conservation and efficiency are presently the most powerful tools in a transition to a clean energy future. Renewable energy is an important piece of our energy future and is best harnessed to meet the demands that remain after all practical conservation and efficiency measures have been taken first. This rule of thumb is used throughout this guide when presenting energy options and should be considered when preparing your tribe's energy plan.

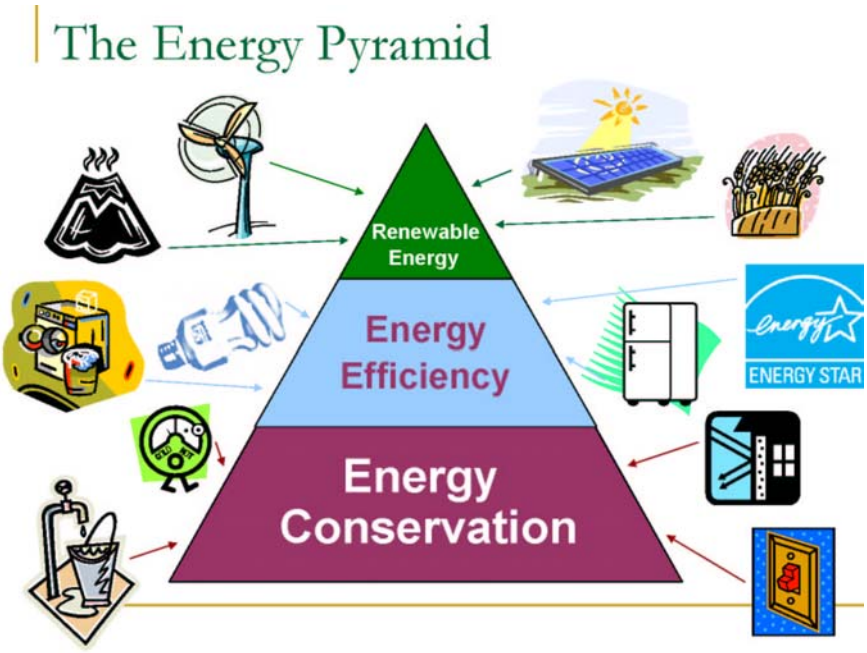

Figure 1.1 - *The Energy Pyramid*

2 - CREATING AN ENERGY PLAN

Define Leadership and Organizational Structure

Energy planning is most effective when done centrally and holistically. That is, there should be central coordination of efforts that span a wide variety of the tribe's departments and activities. At the outset, an inter-departmental group of engaged members should be brought together to evaluate what kind of capacity and expertise are available for energy planning. Most likely this begins with the person or department that first conceives the idea to develop an energy plan. By the end of the first meeting, it should be clear why individuals are interested in developing an energy plan for the tribe, and roles should be assigned. If the tribe has a strong Planning Department, it makes sense that someone within that department would take the lead. While there may be some fluidity to organizational structure, the stronger the appointments of roles like Project Manager are, the more easily an energy planning project will proceed from conception to development to implementation.

As with any major project, the establishment of an energy plan will likely require a resolution from Tribal Council. Involvement of Council members at this initial meeting can certainly be useful. Tribal Council may also be interested in taking on a leadership role.

Conduct Research

Before designing energy goals and the appropriate actions for the tribe to take, the tribe must invest some time in researching and understanding their energy usage history. It is essential to engage those who are, and have been, involved with utilities, facilities, planning, development, and energy management. Energy planners should report and build on knowledge such as:

- What are the predominant uses of energy?
- What sources of energy are used?
- Where does the tribe's energy currently come from?
- What are the costs of current energy sources?
- What are the trends and projections for future energy needs?
- What are the environmental and social impacts of current energy sources?
- What resources are available to tribe members (i.e. weatherization agencies, utility company programs, housing authority programs) and how well are they used?

In addition to providing critical background information, researching past tribal energy efforts and engaging respective individuals will also help build early community support for the energy plan (building community support is discussed in more detail later). This background information should therefore be included in the energy plan, and should be woven into the project goals, outline, timeline, and discussion of team member roles.

Identify Goals and Motivations

The goals and motivations for completing an energy plan are determined by the goals and development plans of the Tribal Council. Clarifying these goals is a necessary step to

creating an energy plan that will be relevant and useful. A discussion along these lines at a council meeting resulting in a resolution is a good way to ensure that the energy plan will address the tribe's needs. A sheet with leading questions for brainstorming motivations and goals is provided in Appendix A. Below are several possible goals that could be brought to the table by whomever is spearheading the energy plan, whether a staff member or contractor. These should be modified to suit the tribe's own situation and are not all applicable to every energy plan.

- Goal 1: To reduce the energy bills of tribe members and administration.
- Goal 2: To minimize the environmental impact of current and/or future development.
- Goal 3: To use local resources sustainably.
- Goal 4: To meet energy needs without relying on an outside utility.
- Goal 5: To encourage economic development through green technologies.
- Goal 6: To set an example for other tribes and communities by living in a sustainable manner.
- Goal 7: To ensure that energy use and production are in tune with cultural values.

The types of projects to be addressed by the energy plan should follow naturally from a clear statement of goals.

Match Projects with Goals

After the energy plan goals have been defined, a thorough assessment of the type of projects that will most likely achieve these goals should be conducted. Projects will typically fall in the following categories:

Conservation and Efficiency Education Projects

Energy conservation and efficiency education projects address all of the goals suggested in the previous section and can be conducted on the residential or commercial level. Working to reduce energy use through education reduces energy costs and impacts on the environment, and promotes awareness of the issues associated with energy use. These projects can range from a booth at a residential housing fair to energy audit training for facilities managers. Energy efficiency and conservation education are addressed further in Section 3.

Conservation and Efficiency Implementation Projects

Once people know how to conserve energy and use it efficiently, it is important to provide opportunities for implementing energy-saving measures. Low-cost measures include providing materials such as compact fluorescent light bulbs to residents. More residential measures might involve an appliance replacement program or weatherization for inefficient homes. Commercial projects that upgrade heating and cooling and lighting systems will save significant amounts of energy. More conservation and efficiency projects are discussed in Section 3.

Renewable Energy Generation Projects

Tribes whose energy goals include energy independence and economic development through the sale of energy will require energy plans with detailed information on commercial-scale energy generation projects. Tribes focused on increasing sustainability and reducing the energy bills of individual members may be

interested in smaller renewable systems. Section 4 includes a detailed discussion of renewable energy generation projects.

Green Building Projects

If plans for the tribe include growth—whether that be in housing a growing population, expanding economic development with commercial enterprises, or adding to the facilities that meet tribe members' needs—green building projects can be a way to plan for growth in a way that meets certain goals for energy use. The best time to incorporate energy efficiency or on-site generation into a building is during the conception, design, and construction phases. More information on green building measures and how to plan for green construction can be found in Section 5.

Transportation Projects

Transportation projects can address issues of efficiency and conservation and the use of renewable fuels. Increased availability of public transportation and use of efficient or alternatively fueled vehicles in a fleet can contribute to sustainability efforts. Transportation projects are further discussed in Section 6.

Create an Energy Plan Outline and Timeline

Once a Project Manager has been assigned and goals have been established, the next step is to develop an outline for the energy plan. Again, this may be fluid over the course of the plan's development, but a good outline is a necessary starting point to assign more specific roles to team members. The outline will also help divide the energy plan into manageable pieces and provide clarity to roles and responsibilities. For example, the residential sector opportunities may best be researched and written by the Tribal Housing Authority, while the Planning Department may be best to provide the detailed work on transportation options. Also, goals may need to be further developed for each section of the plan before in-depth writing even begins. Some useful considerations include: What specifically are the goals for conservation of energy within the residential sector? What are the goals for the tribe in terms of economic development in the event that renewable energy ownership is pursued? A sample outline and work plan are included on the following pages. Much of the content of this guidebook follows the logical order of an actual energy plan as well.

The Project Manager should also establish a work plan for developing the energy plan. The process may take anywhere from a few months to a few years, depending on the complexity of the plan and available capacity. Realistically, funding for energy plan development may be a key driver to the plan's timeline. Keep in mind that a work plan should include team management, research, writing, editing, garnering acceptance (both from tribe members and officially from Tribal Council), and thinking ahead to implementation. A Gantt chart like the one following is a useful tool for establishing the project timeline, and keeping team members on track.

Sample Energy Plan Outline

1. Summary of vision, mission, and goals
2. Background information
   - 2.1. Why an energy plan is important
   - 2.2. Current energy sources, costs, and demands
   - 2.3. Future energy sources, costs, and demands
   - 2.4. Acknowledgement of partners
   - 2.5. Resources and opportunities for external collaboration
3. Energy conservation and efficiency
   - 3.1. Why energy conservation is important
   - 3.2. Residential energy conservation opportunities and projects
   - 3.3. Commercial energy conservation opportunities and projects
   - 3.4. Other energy conservation opportunities and projects
4. Clean energy generation
   - 4.1. Why clean, community-based energy is important
   - 4.2. Solar, wind, hydro, biomass, and/or geothermal energy opportunities and projects (as applicable)
5. New construction projects
   - 5.1. Why green building is important
   - 5.2. Green building opportunities and projects
   - 5.3. Tribal policy-making for new construction projects
6. Transportation projects
   - 6.1. Why transportation is addressed
   - 6.2. Public transportation opportunities
   - 6.3. Biofuels project opportunities
7. Other energy-related projects
8. Conclusion
9. Appendices and bibliography

Figure 2.1 - *Sample Energy Plan Outline*

Sample work plan for developing an energy plan

Task	Lead	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Establish vision and goals	Mary (Planning)									
Convene partners										
Brainstorm and recommend energy goals										
Take recommendations to Council for approval										
Conduct Background Research	Joe (Utilities)									
Current energy uses, costs, etc										
Plans that impact future uses, costs, etc										
Resources for energy services										
Identify Residential Conservation and Efficiency Projects	Jane (Housing)									
Evaluate residential energy use										
Identify opportunities for efficiency upgrades										
Develop recommendations for res. conservation programs										
Identify partnerships, management, and needs										
Identify Commercial Conservation and Efficiency Projects	Fred (Utilities)									
Identify commercial energy users										
Conduct commercial energy audits										
Develop recommendations for commercial efficiency upgrades										
Identify partnerships, management, and capacity needs										
Identify Clean Energy Generation Projects	Mary (Planning)									
Develop goals for renewable energy projects										
Conduct resource assesment										
Determine desired technology and scale of project										
Evaluate cost, return on investment and financial resources										
Identify partnerships, management, and capacity needs										
Identify Green Building Projects	Roger (Planning)									
Identify construction plans on the reservation										
Evaluate green building opportunities and needs										
Identify partnerships, management and capacity needs										
Recommend policies for long-term green building										
Other Energy Projects	TBD									
Identify topics important to plan vision and goals										
Evaluate opportunities										
Make project development or policy recommendations										
Identify partnerships, management, and capacity needs										
Energy Plan Development Management	Mary (Planning)									
Develop energy plan outline and identify leads										
Overall coordination of the various sections										
Take recommendations to committees or Council for approval										
Involve community and garner support from tribe members										
Edit and Publish										

Figure 2.2 - *Sample Energy Plan Work Plan*

Identify Internal Capacity and External Collaboration

In many cases, the tribe's leadership may be aware of what energy projects need to be done, but lack the time and resources to take action. A tribe's energy plan should acknowledge the existing capacity to take on energy projects, and include external resources, contact information and related opportunities. Speaking with people from diverse agencies about various programs for energy plan development will also help establish the relationships necessary for implementation.

The following are some of the agencies, organizations, and companies that offer resources and technical assistance for energy plan development:

- Electric and gas utilities
- Bonneville Power Administration
- Community Action Agency or local weatherization agency
- Low Income Home Energy Assistance Program (LIHEAP)
- State energy office
- State energy funds (ie. Energy Trust of Oregon)
- Local, state, and regional non-profit organizations
- US Department of Housing and Urban Development (HUD)

For specific funding resources, see *section 7: Financial Resources for Energy Plan Development and Implementation.*

In addition to leveraging external resources, an energy plan may include recommendations for internal capacity-building in order to make the implementation of energy projects more feasible. It may be productive to hire an Energy Manager, Sustainability Coordinator, or other such position for the tribe as a first step- prior to tackling energy efficiency programs and renewable energy development.

Depending on the size, administrative structure and existing capacity of the tribe, hiring an Energy Manager may be considered a high priority for the plan. Most tribes have some variety of overlapping, and sometimes inconsistent, policies and practices that cross departmental lines, making it difficult to coordinate energy projects across all sectors. A staff person dedicated to looking for energy saving opportunities can also save the tribe money, often saving enough to offset the salary of the staff person. The duties of a tribe's Energy Manager could include:

- Conducting building inventories and cost benefit analysis for all tribal buildings with regard to energy efficiency and renewable energy measures,
- Coordinating services with external partners,
- Seeking funding for the capital costs of energy projects,
- Conducting conservation education for tribal members,
- Overseeing the implementation of energy projects prioritized in the plan,
- Tracking costs and life-cycle cost savings of

efficiency upgrades and other energy projects,

- Communicating and coordinating with other tribes to strengthen regional clean energy efforts.

Although Energy Managers for cities and corporations throughout the country have demonstrated that the money they save on reduced energy costs more than compensate for their salaries, a tribe may still struggle with finding the upfront cash before the position's benefits are realized. Creating a new position while the tribe faces immediate needs in other essential services may not be feasible. Recommending a phased-in position over time (e.g. starting quarter-time or half-time) could be a practical way to demonstrate an Energy Manager's positive impact on the budget. A successful energy manager should be able to quantifiably reduce energy use and costs for the tribe and tribe members.

Building Community Support

Community support can make or break successful implementation of an energy plan. Even if the content is agreeable to the tribe, without a broad range of awareness, understanding, and support for the final document the plan itself is more likely to sit on a shelf collecting dust. An even graver result of foregoing community support would be a plan that contradicts tribe member's values and faces strong opposition.

If energy planners work from the outset to:

- make the process inclusive,
- establish broad representation of tribal sectors in energy plan roles, and
- work with Tribal Council to establish goals based on the tribe's values,

then the plan should not encounter the barriers that occur when a project lacks community support. However, even with the best of planning processes, adoption and implementation of bold changes will require even more education, capacity, skill, and momentum than the planning itself. It is therefore critical to the plan's success to build in plenty of time and resources for outreach and education.

There are multiple levels of outreach and education that should be explored. First, there is the presentation of high-level information to the broadest constituency (the tribe members) about what the plan is, why it has been created, and what it might mean to tribe members' lives. This type of outreach is often done through the existing social infrastructure of the tribe. For example, energy planners may want to host a dinner to announce the plan, or it might work best to simply staff tables at other events and informational fairs.

Second, there is outreach to business and community leaders about specific opportunities presented in the plan. This may be conducted through more formal meetings and/or site visits. Again, engaging these leaders early in the planning process may help pave the way for broad support later on.

Finally, those involved in the implementation of the energy plan may need specific education. Examples include training housing staff on residential conservation measures and programs and educating business owners about

opportunities to participate in efficiency programs. If the tribe's energy plan includes green building recommendations, then energy planners must offer training opportunities for those in the development and construction field. If the plan includes pursuit of renewable energy project development, leaders will need access to technical assistance on resource assessment, siting, business plan development, etc.

Energy planners should not expect to be experts on every single energy issue and implementation measure. A lack of in-depth knowledge on how to develop a renewable energy project, for example, should not prevent a tribe from pursuing such plans. It is important, though, to understand that within the energy plan there may be easy, moderate, and difficult actions that require various levels of community input, understanding, advanced knowledge, or the ability to obtain outside assistance.

Putting the Energy Plan into Practice

The successful implementation of any energy plan depends vitally on its careful and comprehensive development. Time and consideration given to each of the areas outlined above—establishment of strong leadership, performance of background research, development of goals and corresponding energy project ideas, creation of an energy plan outline and work plan, and expansion of project capacity through external and community support—will be effort well spent towards the successful implementation of specific projects based on the energy plan.

Examples of specific energy projects are outlined in Sections 3-6.

3 - ENERGY CONSERVATION AND EFFICIENCY

Reducing the amount of energy used daily in households and businesses is an important step towards achieving energy sustainability and independence in any community. This makes energy conservation and efficiency projects the cornerstone of any energy plan.

Energy conservation is the process of reducing energy use through changes in everyday behaviors. Turning off lights when leaving a room and lowering thermostats are some easy and effective examples of energy conservation—and changing behavior generally doesn't cost anything yet saves money.

Energy efficiency is the process of ensuring that mechanical systems—such as homes, businesses, and appliances—use energy as effectively as possible. Replacing leaky windows, using more energy efficient light bulbs, and buying ENERGY STAR appliances are some examples of easy systems modifications that save energy and money.

Heating and Cooling Homes And Buildings

More energy is spent in heating and cooling a home or business than in any other activity. A typical household spends 40% of its energy on heating and cooling, while an office building will spend 50–65% on heating, ventilation, air conditioning, and cooling (HVAC). This means that heating and cooling inefficiently can waste more money and energy than any other activity. It also means that conservation and efficiency efforts focused on heating and cooling are high priorities.

Conservation Strategies

Changing occupant behavior to conserve heat and cool the home or building is an easy and inexpensive way to conserve energy. The following are examples of occupant conservation that can save energy and keep utility bills lower:

- Choose the lowest comfortable thermostat setting in the winter and the highest in the summer.
- In the winter, save energy by simply opening blinds on sunny days and closing them at night to trap the heat generated during the day.
- Similarly, close blinds on hot summer days and open windows at night to keep homes cooler in the summer.
- Turn the home's thermostat down when individuals leave for a work day (or longer, say, for vacation).
- Program thermostats to heat or cool commercial space for the hours of occupancy. According to the Department of Energy, a 10 to 15 degree setback for only eight hours will save from 5 to 15 percent of total heating costs.

There are many other daily changes in behavior that can save heating and cooling energy. The list is really only limited by creativity. In general, the best way to help individuals save energy is by raising awareness through education and outreach projects (which are discussed later in this section). The more tribe members know—for instance, about how crucial efficient home heating and cooling is to conservation of money and energy resources—the better they will be able to make daily adjustments that help them

save money and energy.

Other great ideas to conserve heat and cooling energy can be found in the "Heating and Cooling" section of the DOE's Energy Savers Website: http://www1.eere.energy.gov/consumer/tips/index.html.

Efficiency Strategies

Prefabricated and older homes are particularly bad culprits when it comes to inefficient heating and cooling. These homes can be drafty and difficult to heat in the winter, forcing residents to use large amounts of expensive fuel or electricity to provide enough heat. Homes can be made more efficient in two ways: through direct improvements to the heat source and HVAC equipment, or through weatherization and home improvement projects that increase heat retention.

Direct improvements to heating equipment can include upgrading older furnaces and boilers to newer, more efficient models. Particularly for homeowners, furnaces tend only to be replaced at the end of their lifetime. Unfortunately this often happens unexpectedly and at the worst possible time (air conditioners fail in the hottest part of the summer and furnaces fail during the coldest months of winter). This leaves people vulnerable to quick decision making with consequences that can last for years to come. First of all, it can be difficult to compare and understand energy differences in different types of heating systems. Second of all, being thrown into an emergency situation, people are usually unprepared to think long-term about costs. The more support provided to individual decision makers during these emergencies, the better. Tribes, either through education or through contracts and bulk purchasing (particularly for low-income housing) can help steer individual decision makers toward better long-term decisions rather than just acting on impulse. For all efficiency strategies, it is particularly crucial to understand the difference between an upfront cost and a lifetime cost. Most inefficient furnaces (and appliances) are cheaper at first, but over time will cost much more to operate. Even "affordable" housing, can quickly become unaffordable with exorbitant monthly bills due to inefficiency.

Weatherization can include insulation upgrades, replacement of single-pane windows with more efficient models, and repairing leaks in walls and roofs. While these projects are crucial to improving a building's efficiency in the long-term, there are also low-cost improvements that home owners can easily do themselves anytime to increase efficiency. Examples include:

- Using rope caulk to seal leaks around drafty windows
- Installing door sweeps under drafty doors

Other ideas for weatherization and home improvements to conserve heat can be found again on the DOE's Energy Savers Website or in their Consumer Guide to Energy Efficiency and Renewable Energy: http://www.eere.energy.gov/consumer/your_home/.

Appliances And Lights

After space heating and cooling, electric appliances are the next biggest energy cost for a house. Similar to heating and cooling, energy used by appliances and lights can also be reduced through conservation and efficiency.

Conservation Strategies

Conservation of energy used by appliances and lights is as simple as turning off the lights when leaving a room or using electronic appliances less. Significant savings of energy can be achieved, again, with the right education and awareness. Appliances and lights are visible energy-users that children understand and thus make good topics for early conservation education. Motion sensors installed in commercial buildings to turn lights on and off based on occupancy are also a technical-solution that can provide significant savings through conservation.

Many appliances still draw small amounts of electricity even when they are turned off. When considering the number of appliances in each building, the number of homes and buildings, and the fact that this occurs 24 hours every day, these "phantom loads" can really add up. The solution is to unplug appliances or use power strips with an "off" function.

Efficiency Strategies

Generally, the most effective way to decrease the energy use and save money on an electric appliance is to purchase a more energy-efficient model. Replacing appliances is more likely to be cost effective if the appliance is relatively cheap, or if there is a large difference in energy efficiency between the old appliance and the new appliance. The greater percentage of a home or building's energy that is dedicated toward a single appliance, the greater the priority to evaluate the efficiency of that particular appliance. There will be more return in replacing an inefficient refrigerator, washer, or dryer with an efficient model, than replacing something like a radio with a new model. Again, when replacing appliances, it is important that decision makers understand the concept of upfront cost versus lifetime cost.

The US Environmental Protection Agency and the US Department of Energy set standards for energy efficient appliances through the ENERGY STAR program. ENERGY STAR appliances use 10–50% less energy and water than average models. The federal ENERGY STAR website (http://www.energystar.gov/) and the regional ENERGY STAR website (http://www.northwestenergystar.com/) each have searchable lists of qualifying appliances and vendors that sell them. Buying ENERGY STAR appliances can save money not only through energy savings, but also through tax credits and incentives — see the Section 7 for more information.

Lighting deserves a special mention. Although individual bulbs do not use much power, many light bulbs used for many hours a day are cumulatively as significant as larger appliances. Just like with other electric devices, there are two ways to reduce energy usage: use light bulbs less, and buy new efficient bulbs. In this case, upgrading to energy efficient light bulbs is very cost effective and strongly recommended. Compact fluorescent lamps (CFLs) use up to 75% less energy than standard incandescent light bulbs. They also have a life span that is up to 14,000 hours longer than standard incandescent bulbs—that's well over a year! The savings and ease of switching to CFLs are so clear that many utilities are offering incentives to switch.

Water Heating

Water heating is the third largest energy cost for a typical household. This is because water

heaters, like refrigerators, draw energy frequently, whether or not it is actively in use. Hot water is used frequently in daily household activities such as bathing, cleaning dishes, and washing clothes. In commercial buildings, use varies depending on the purpose of the building. In a hotel, for example, use will be high.

Conservation Strategies

Measures that use less hot water are doubly cost effective because they save money both on water bills and on electricity bills. Some, like taking shorter showers, are also conveniently free. Others, like installing low-flow faucet heads, cost less than $20 initially and pay for themselves within months.

Efficiency Strategies

Water heating can be made more efficient with upgrades to new energy efficient model heaters. Similar to heating and cooling systems, there are many types of water heaters available and it can be difficult to compare different options, particularly in a crisis when a system unexpectedly fails. The ENERGY STAR program is again, a great guide. In addition to replacing an inefficient water heater, the following strategies can improve the efficiency at which an existing heater operates:

- Use a tank-wrap to add insulation to an electric hot water storage tank to reduce heat losses. Significant heat loss is occurring in any water tank that is warm to the touch.
- Add foam insulation around exposed hot water pipes
- Adjust the temperature of the tank to 120°F (some manufacturers set water heater thermostats at 140°F) which not only wastes energy, but can be a safety hazard.

Solar energy may also be a feasible way to meet a home or building's domestic hot water needs. More information about solar energy technology can be found in Section 4.

Special Concerns for Commercial Buildings

Commercial buildings have the same basic types of energy use as residential buildings—space heating and cooling, water heating, lighting, electric devices—but the balance between these can be quite different. Almost every commercial building dedicates more of its energy budget to lighting than a household. Large commercial buildings require more complicated and more finely controlled HVAC systems to produce a comfortable interior environment. Requirements for hot water, food preparation appliances, communications and entertainment electronics, etc., will vary widely by the purpose of the building. Thorough energy audits (discussed next) are essential to identifying the most cost-effective targets for energy efficiency improvements, and the assistance of a consultant or contractor is highly advisable. Information resources for a wide variety of building types are available on the EERE site at http://www.eere.energy.gov/buildings/info/energysolutions.html.

In the Northwest, commercial buildings are much more likely than residential buildings to have a cooling system. Because the cooling system is only used for a small part of the year, there is no reason to have over-sized cooling equipment. For both heating and cooling equipment, it is important to choose the correct size, which a commercial energy audit will help

determine. It is also crucial to periodically check controls to make sure that settings are correct. The temperature settings for both heating and cooling should correspond with the time and days of occupancy.

Hotels and resorts have a unique energy use profile, strongly weighted towards water heating for laundry and cleaning (see Figure 3.1). This means that switching from top-loading machines to more efficient front loading machines, for example, could make a big difference in the energy savings for a hotel or casino. The energy used by clothes dryers is also significant; using dryers with moisture sensors in the drum for automatic shut-off can save 15% of the drying energy compared to timed drying. The Alliance to Save Energy (http://www.ase.org/section/topic/ee_hotels) and ENERGY STAR (http://www.energystar.gov/index.cfm?c=hospitality.bus_hospitality) have other useful information about energy efficiency for hospitality on their websites.

Energy Audits

An energy audit is an important tool for identifying the most cost effective ways a home or office could be improved to save energy. This is done through an inspection of a home or business to determine where and how the building may be wasting energy, and where improvements can be made. In a home, an energy audit can be as simple as a resident walking through the house with a wet hand to feel for major leaks. See Appendix B for specific steps involved in a residential audit.

A professional home energy audit will provide more detailed recommendations for weatherization, insulation, and appliance upgrades through an on-site inspection. A professional commercial or industrial energy audit is particularly important before major renovations are undertaken. Many utilities, including Avista, Puget Sound Energy, and Idaho Power, offer energy auditing services. If the local utility does not offer energy auditing directly, they should be able to recommend professional energy auditors in the area. ENERGY STAR also partners with professional energy auditors. If the utility offers energy auditing, their service is likely to be less expensive than that of a private energy auditing business.

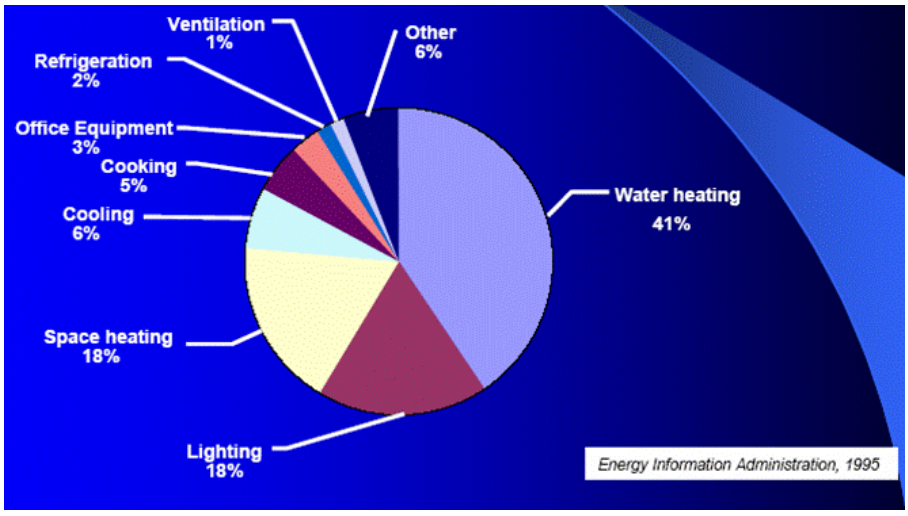

Figure 3.1 - *Major energy expenditures in hotels include lighting for guest rooms and common areas, heating, ventilation and air conditioning systems (HVAC) and motors in equipment such as elevators.*

Source: Energy Information Administration, 1995; from http://www.ase.org/section/topic/ee_hotels

Energy Efficiency Projects

Education Projects

Education and outreach projects focused on conservation and efficiency are perhaps the easiest and most cost-effective way for a tribe to make its energy use more sustainable. Because there are so many free and cheap ways to save energy, education projects are worthwhile to ensure that everyone understands how energy works and are aware of their options and opportunities for energy efficiency. In addition, an education project can be a forum for community discussion about energy, which could guide further energy planning.

Workshops are a traditional and effective educational tool, and they work well for energy conservation and efficiency education. In addition to standard workshop formats, energy conservation and efficiency education can also be particularly effective in home visits that resemble home energy audits with a focus on occupant education. Handing out small, inexpensive energy saving materials (such as CFLs, rope caulk, door sweeps, etc.) at workshops or in home visits is a great way to encourage implementation of conservation and efficiency techniques. Knowledgeable individuals from inside or outside the tribe can conduct workshops and home visits. Utilities, non-profit organizations, or government agencies may be willing to help fund your event and provide basic supplies. Training tribal members to conduct conservation and efficiency workshops and home visits is a great option if the goal is to create a long-term sustainable program. Interested individuals may be identified in initial workshops and home visits. See Appendix C for a list of specific suggestions for each step of planning an energy efficiency education event.

Case Study

Refrigerator replacement programs can make a big difference in the energy savings of individual households. Like water heaters, refrigerators use energy continuously, and those manufactured before 1990 use nearly twice as much electricity as more recent models. In the northwest, the Colville, Upper Skagit, Spokane, Yakama, Quileute, and Nisqually Tribes have worked with the non-profit organization Northwest Sustainable Energy for Economic Development to create successful refrigerator replacement programs. Programs involved conservation education, the distribution of home efficiency materials, and the replacement of inefficient refrigerators with new, Energy Star models. More than 180 refrigerators have been replaced through this program, resulting in approximately 200 Megawatt-hours of energy saved in tribal homes. Funding for these programs came from Puget Sound Energy, Bonneville Power Administration, Washington Consumer Education Fund, WA Department of Community, Trade, and Economic Development, and the Seattle Foundation. This program could easily be adapted to other appliances or to other program management formats.

Equipment Upgrades

Equipment upgrade projects benefit individuals by suggesting appropriate and cost-effective upgrades, providing the necessary supplies or money to purchase equipment, providing a timeline and personal contacts to push the project to completion, and potentially increasing the quality of life at home or work. Equipment upgrade projects benefit tribes by building capacity on technical energy issues, project planning, and securing grants for energy projects.

These projects may be as simple as distributing low-cost energy efficiency supplies—such as CFLs, low flow faucets and showerheads, and some weatherization materials—that residents or employees can install by themselves without assistance. This sort of project is most effective when coupled with an educational component.

Projects that involve more costly and complex appliance replacements or building improvements tend to take a greater degree of planning, financing, and coordination, but they also make a greater impact. Furnace upgrades, serious weatherization projects such as window or roof replacements or repairs, and refrigerator replacements are all examples of programs that may be funded or coordinated by local utilities, non-profit organizations, and governmental agencies. Again, these projects are most effective when coupled with conservation and efficiency education. Targeting those with the greatest need will also increase the impact and return on an equipment upgrade project.

Choosing a Project

Energy conservation and efficiency projects are the most cost-effective way to decrease energy costs. Reducing energy use also makes it easier to meet the remaining needs with clean energy. Some factors to consider when choosing among energy conservation and efficiency projects include the following:

- Budget: existing funds and anticipated ability to raise funds for this project
- Lifetime costs: cost-effectiveness and impact of a project has to do not only with upfront cost and budget, but with the energy savings over time
- Efficiency goals: targets and priorities set in the energy plan to be met through this project
- Other goals: related plans for housing, economic development, education, etc.
- Internal capacity: areas of expertise of tribal members
- External capacity: areas of expertise of non-tribal partners (non-profit organizations, utilities, and contractors)

Budget and internal capacity are often the limiting factors. These two roadblocks can be addressed through grants and other funding opportunities and by supplementing internal capacity with contractors. Table 3.1 prioritizes a few energy conservation and efficiency measures by approximate upfront cost. Section 7 discusses financing for conservation and efficiency projects further.

Table 3.1 *- Energy conservation and efficiency measures and approximate costs*
Sources: Home Depot, Lowe's, ENERGYSTAR, Full Spectrum Solutions, Northwest SEED.
Note: costs do not reflect incentives or rebates.

Measure	Quantity	Estimated Cost
Caulk100	50 bottles	$150
Weather stripping	200 ft	$200
CFLs	50 bulbs	$300
LED exit signs	10 signs	$600
Conservation education meeting Speaker & bags of conservation supplies	20 attendees	$1,300
Conservation education meeting (incl. speaker and bags of conservation supplies)	50 attendees	$2,500
Bags of conservation supplies	100 bags	$4,000
Commercial lighting upgrade	4000 sq ft	$30,000
Refrigerator replacement program (incl. all costs)	60 home visits, 30 refrigerators	$80,000

4 - RENEWABLE ENERGY

There are many reasons a tribe may pursue investment in or development of a renewable energy generation project. While energy conservation and efficiency make up the base of our "energy pyramid," even the most efficient tribe, building, or house will have remaining energy needs. Renewable energy generation allows those needs to be met in a way that is clean and environmentally friendly. Renewable energy projects, unlike traditional fossil-fuel or nuclear power, do not pollute air, water, or land to meet energy needs. In addition, local renewable energy projects offer not only energy independence and security, but also jobs and other economic development opportunities.

Electricity generating renewable energy technologies include solar photovoltaics, wind, geothermal, biomass, small hydropower, and tidal or wave energy. Non-electricity producers include the renewable technologies of solar space heating, solar water heating, direct-use geothermal energy, and biofuels. The intention of this section of the guidebook is to give energy planners an overview of the many options available to their tribe and the considerations necessary in order to focus in on a project of appropriate scope. Finding the right project fit can be a complicated process, and the information provided here is just the beginning.

For more in-depth "how-to" information on renewable energy project development, we recommend visiting http://www.nwcommunityenergy.org

The right renewable energy project for any specific tribe or site has to do with identifying the renewable energy resource that is available (i.e. wind, sun, biomass, etc), determining the technology and scale that appropriately meet the project goals, and evaluating the economic return of the project (which in many cases can hinge on funding opportunities and financial incentives). There is no right order in which to investigate these issues. In many cases an energy planner, project champion, or other leader will have a specific goal or knowledge from which to start. Often, renewable energy projects start with an idea.

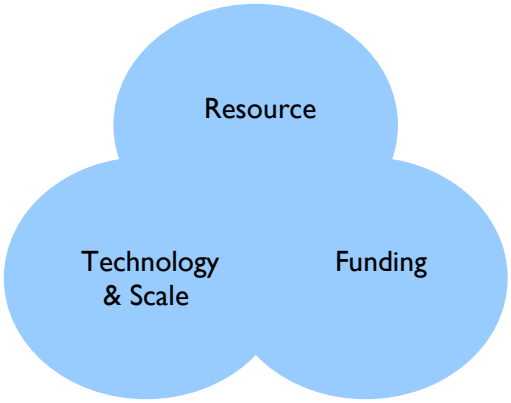

Figure 4.1 *- Successful renewable energy project development requires an alignment of resource, technology, and funding.*

Solar Energy

Solar energy can be harnessed to generate electricity using Photovoltaics (PV), or can be collected to heat water or building spaces. Solar energy technologies come in all sizes. Some utilities are investing in large-scale solar power plants (many multiple megawatt projects can be found in California, Arizona and Nevada), but solar is often used as the smallest-scale of renewable energy applications, meeting the

needs of a single home or business. The different solar technologies are discussed below.

Solar Electricity

Solar Electricity is also called photovoltaics or PV. PV cells are wired together to make modules, and modules are connected into larger PV arrays. PV systems are not inexpensive, but do offer some unique opportunities and values among renewable energy generation technologies. First, PV's size and modularity give it value as a "distributed" resource. Distributed energy resources or distributed generation refer to technologies that are used primarily to meet a local energy load. Because they are on-site, or close to the point of energy consumption, distributed resources do not waste or lose power because they are transmitted over great distances. They can also reduce the need for greater transmission capacity- a costly endeavor for meeting the power needs of growing populations in remote areas. In addition, PV has the added value of providing electricity during the hours of peak energy use (in most climates). Generally, people use more electricity during the day. This can increase the value of the electricity generated, particularly if the tribe's utility distinguishes electricity rates by season or time of day. For many tribes, PV may simply be easier to site, permit, and install than larger scale renewable technologies. Considerations on these topics will be discussed further in this section.

There are four different types/functions of PV systems.

1. Grid-tied Systems

A grid-tied system is one that is connected to electricity lines and generally does not function independently of them. A grid-tied system must include an inverter to convert the solar DC electricity coming from the panels to AC. If the electricity produced by PV does not cover all of the electricity required, the rest is supplied by the local electric utility. Inversely, if the PV system produces more energy than is being used on-site, excess energy flows back into the electric grid. If the system qualifies for a utility net metering program, the electric meter keeps track of this "net" difference as electricity is generated and consumed from the electric grid. This way, the electric grid can serve as a storage system for energy produced. Excess electricity produced offsets electricity that would otherwise be purchased at full retail price from the grid.

2. Grid-tied with battery back-up

Without batteries, a Grid-tied PV system will not supply power when the electric grid is down. It is for the safety of utility line-workers that PV system inverters are engineered to shut down when they do not receive input of matching voltage from the grid as occurs when the power goes out. If there is a need to use the PV system as backup power when the power is out, batteries should be included. Batteries add cost and maintenance to a PV system, but can be worth it in certain applications. For power security, or to run essential loads when grid power is unavailable, batteries can be added to a grid-tied system. A special inverter is needed for grid-tied PV systems with batteries.

3. Off-grid/Stand-alone with batteries

As the name implies, this type of system is not connected to the electric grid, but uses batteries to store its energy for use when the sun is not shining. Stand-alone systems are particularly

suitable for remote applications where the cost of running new electric lines is prohibitive. In addition to storage batteries, these systems also have a charge controller, and often an inverter.

4. Off-grid/Stand-alone without batteries
This type of PV system consists of a module or an array, and a load, such as a light bulb or a pump. It is not connected to electricity lines and generally produces electricity for a single application. The load uses the electricity directly at the time it is produced. This type of system would be appropriate for agricultural use such as water pumping that is needed only on sunny days. These systems do not require a charge controller, batteries, or in most cases an inverter, and therefore have no storage capacity and cannot run during the night or highly overcast days.

Solar Water Heating
Solar water heaters can supply a substantial portion of a home or building's domestic hot water usage (meaning water used for cooking, washing, bathing, but generally not for heating systems that use steam or forced hot water). The amount of hot water the system produces depends on the type, size and location of the system. Solar hot water is best used for homes and businesses such as a restaurants and laundromats that have high hot water usage.

The systems are set up so that fluid flows through a rooftop collector where it is heated by the sun's energy. Heated water is stored in an insulated storage tank until used. On cloudy days and at night when there is not enough solar energy, a conventional backup heater provides the necessary additional energy to heat your water to the desired temperature, usually around 120°F.

Pool heating is another effective application of solar water heating, as the systems are incredibly simple. While the pool serves as its own storage tank, the solar heat can lengthen the swimming season, without adding to utility costs.

For more information on solar water heating visit: http://www.nrel.gov/solar/

Solar Space Heating
Solar space heating takes place when sunlight heats air in one part of a building, and that heat circulates throughout the building to help offset the building's heating load. The circulation of solar-heated air can take place either passively (when no ventilation systems are used), or actively (when a ventilation system is used).

Passive solar space heating is the most popular and cost-effective way to use solar energy in the Northwest. In this and many other US climates, passive solar design techniques can significantly reduce heating and daytime lighting requirements for residential and small commercial buildings. New construction offers the greatest opportunity for incorporating passive solar design features. Buildings designed for passive solar and day lighting incorporate design features such as large south-facing windows and building materials that absorb and slowly release the sun's heat. Passive solar designs can also include natural ventilation for cooling.

Active solar space heating systems can offset building heating loads by either heating recirculated building air, or by preheating outside or ventilation air. Recirculated air is heated by direct sunlight when it passes through solar panels, then circulated back to the building.

Outside ventilation air can be heated effectively with a simple mechanism called a transpired solar collector, which consists of a dark collector surface with perforated metal plates. The collector is mounted on a south-facing wall, leaving space between it and the building wall. Fans pull fresh air in through the holes in the collector, the air is heated just behind the dark collector surface, and then it is circulated throughout the building. Transpired solar collectors work for buildings with large ventilation requirements. For more information on solar space heating visit the Department of Energy's Solar Energy Technologies Program at: http://www1.eere.energy.gov/solar/solar_heating.html

Wind Energy

Wind energy development is a fast-growing venture in the Pacific Northwest, and throughout much of the world. A single modern wind turbine can produce as much as 3 Megawatts of electricity, enough to provide electricity for 300 homes, or can be as small as 1 kW, just enough to power an appliance. A project involving multiple large turbines (a large "wind farm") is considered to be utility-scale, while smaller projects may be community-scale or provide on-site wind generation. Just as with solar electricity (PV) installations, the electricity generated by a wind turbine can be used on-site, interconnected to the grid, or used to charge batteries. The purpose and scale of a wind project will determine which type of application is appropriate.

Wind Technology

The majority of wind turbines have three blades and a generator that sit on a tall tower. The

Case Study

Developing wind as a viable renewable energy source can be a great way for tribes to increase their energy independence and stimulate economic development. In Montana, the Blackfeet have installed a successful 100kW electric generating wind turbine. Funding came from the U.S. Department of Energy (DOE) Tribal Government Energy Assistance Program. Through an agreement with the Glacier Electric Cooperative , the energy generated by the turbine is used to offset the energy costs of the Blackfeet Community College. In fact, the energy produced by the demonstration wind turbine offset the Blackfeet Community College's electric usage almost completely in its first year. Additionally, jobs were generated in construction and in various project monitoring areas, including environmental impact assessments. The real benefits of this project, however, have been in its capacity-building potential. The turbine was built in an area highly visible to both Blackfeet members and tourists to nearby Glacier National Park. This high visibility, along with accompanying educational components, has helped generate awareness and support for wind energy. Currently, the Blackfeet are looking at creating a Tribal Energy Organization capable of purchasing and distributing power to help expand their wind program into a larger scale commercial enterprise.

height of the tower, the length of the blades, and the size of the generator are all important factors when trying to maximize the electricity produced. The height of the tower depends on the site, but the goal is to place the wind turbine well above any nearby structures or trees into a zone where the wind blows smoothly. In general, the wind speed increases with height, so the taller the tower the more electricity the turbine will produce. Beyond wind speed and smoothness, the other major factor that determines how much electricity a turbine can produce is the length of the turbine blades. The circle the wind turbine blades trace is called the swept area. The longer the blades, the larger the swept area which, in turn correlates to more power collected from the wind. A turbine's description includes a rating such as 1 kW or 3 MW. This rating describes how much power the wind turbine will produce under certain conditions. A wind turbine will produce less power when wind speeds are lower and more power when wind speeds are higher. A project typically does not make sense unless there is a wind resource such that the average power from the turbine is at least 25% of the rating.

Small Wind Projects

Small wind projects are generally designed to offset the electricity used at a single site, or generate the electricity if the site is not on the utility grid. Wind turbines in this category are rated between 300 Watts and 100 kW. Components of these wind systems include the turbine and blades, a tower, and an inverter to match the electricity produced by the turbine to that in the electric lines. Systems that include energy storage capabilities will also have batteries and a charge controller. While these turbines will often work at lower wind speeds it is still important to site them carefully for maximum production. The local utility has information about connecting a small wind turbine to their system, and their policy about buying back excess electricity. Small wind turbines can also be used to pump water.

Community Wind Projects

Community projects offer the benefits of wind energy on a scale larger than can be supported by an individual, but focused on keeping the profits in the community. Community projects can consist of multiple small turbines or one or more large turbines. Local stakeholders determine the size and type of turbine(s) that will best meet the need. The electricity generated can be sold back to a utility or used on-site if there is a large enough load. Because larger turbines are often used, more equipment and larger transmission lines are required. The utility will most likely have to conduct a study to determine where the turbine can connect to the grid, and to ensure that the connection is done properly. This size of project is a good way to maximize energy production and local benefit from wind technology.

Large Wind Farms

Wind farms can be comprised of more than one hundred turbines covering a large area. They are generally owned by large corporations who often lease the land from local landowners. These developments require access to substations and high voltage transmission lines and may sell their electricity to multiple utilities. Large wind farms require a substantial land area and verified wind resource. While they do bring income to the local community in the form of land lease payments and tax revenue, they do

not bring in the same benefits as a community project.

Biomass Energy

Bioenergy or biomass energy is really a form of stored solar energy. Plants absorb energy from the sun and convert it into cellulose. This cellulose, or plant matter, is one type of biomass that can be used to create usable energy. Moving up the food chain from plants, animals also produce, and are made up of, biomass. Practically, this means that there are many types of biomass and many types of conversion technologies to turn these resources into electricity and other forms of energy. Typically biomass energy production is divided into the categories of biopower (for electricity generation) and biofuels (for petroleum substitutes). While the ability to store biomass and use it when you require energy is a plus, biomass's diversity also makes it a complicated resource. Some of the forms of biomass commonly used to produce energy are wood and wood waste, corn, soy, and animal waste. In order to be considered a renewable resource, the biomass resource must be harvested sustainably.

The most common way to produce energy from biomass is through combustion. In the Pacific Northwest, the majority of biomass energy is used by the wood products and pulp and paper industries. These industries burn waste wood products to provide heat for their manufacturing processes. The newer, and often cleaner, technologies that are being explored for biomass conversion are:

Anaerobic Digestion / Landfill Gas Collection

Anaerobic digestion is the breakdown of organic waste matter by bacteria in the absence of oxygen. In an anaerobic digester, the methane-rich biogas created can be burned to generate electricity, or used for cogeneration (generating electricity and using waste heat to heat buildings). When anaerobic digestion occurs in a landfill, the methane produced can also be collected for electricity generation. The benefits of anaerobic digestion for the production of renewable energy include:

- The reduction of waste disposal issues
- The reduction of pollution in water run-off
- Reduction of methane flared off from a landfill and released into the atmosphere
- The elimination of odors associated with waste disposal
- The production of value-added products such as fertilizer, bedding, and gas for heat and electricity

Pyrolysis / Gasification

The combustion of biomass without oxygen results in a gas or an oil, which can be stored and used in a generator to produce electricity, or burned for heat.

The advantages of pyrolysis or gasification over direct combustion are lower particulate emissions and flexibility for small-scale electricity production.

Fermentation

Fermented starch or cellulosic biomass can be converted to ethanol to be used as a transportation fuel. Ethanol can thereby replace petroleum in gasoline vehicles to reduce oil imports and greenhouse gas emissions.

Bio-oil / Biodiesel

Bio-oil, or biodiesel, can be made from many

types of oil (canola, soy bean, etc.), and replaces petroleum as a transportation fuel with fewer emissions. As a prospect for community development, there are opportunities at all stages of biodiesel production:

- growing energy crops
- transporting crops to facility and fuel to suppliers
- manufacturing biodiesel.

Opportunities for biodiesel production are discussed further in the context of transportation projects in Section 7.

Geothermal Energy

Geothermal Energy is heat derived from the earth. It is the thermal energy contained in the rock and fluid of the earth's crust, originating from radioactive decay deep within the earth. Geothermal energy can be harnessed for a variety of functions including electricity production, direct heat, and heat pump use.The potential use of geothermal energy depends on the resource's temperature, generally determined to be in one of three classes:

- Low temperature resources (less than 195 degrees F)
- Moderate temperature resources (195 to 300 degrees F)
- High temperature resources (300 degrees F and greater)

High temperature resources are used almost entirely for electricity generation. As there are different types of geothermal reservoirs, there are also a variety of geothermal power plant technologies. Each of these technologies emits only steam, and can operate successfully in sensitive environments.

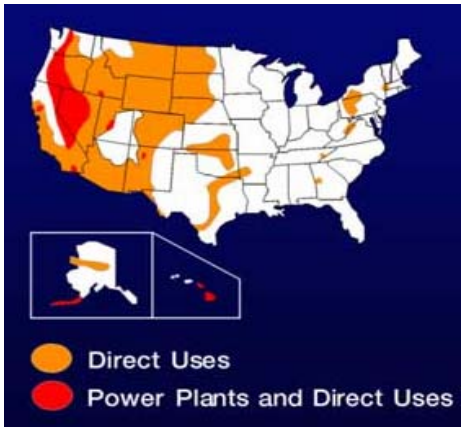

Figure 4.2 *- Geothermal energy availability in the US at temperatures suited for direct uses and power plants. Source: Geothermal Education Office*

Community-scale geothermal power plants have the potential for widespread application, but achieving cost effectiveness in small plant sizes presents a number of challenges. The National Renewable Energy Laboratory's Geothermal Technologies Program is working to determine the performance and value of small-scale geothermal power production through five projects in Western states. To learn more, visit: http://www.nrel.gov/geothermal/georandd.html#field

Uses for low and moderate temperature resources include direct use and ground-source heat pumps.

Direct Use

Direct use of a geothermal resource means using the water's heat (directly) without a heat pump or power plant. Examples of uses include space heat for buildings, district heating (18 systems in the western states), agriculture (soil and greenhouse warming), industrial (product heating or drying), and bathing (hot springs).

Ground-Source

Ground-source heat pumps use the earth or groundwater as a heat source in the winter and a heat sink in the summer.Heat pumps are the most universally applicable geothermal

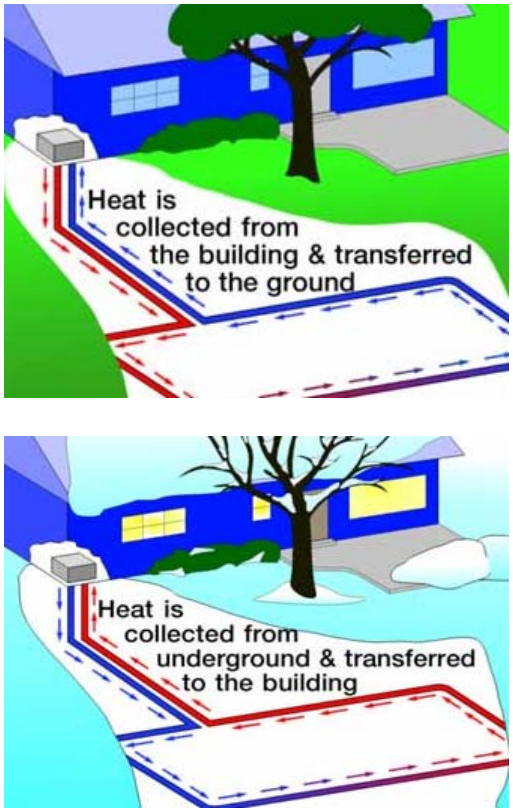

Figure 4.3 *- Ground source heat pumps.*
Source: Geothermal Education Office

technology, as the low temperatures required are available worldwide.

Resource Assessment And Siting

In order to determine if a certain renewable energy project makes sense, tribes will need to assess their renewable resource available. This can mean determining if the wind indeed blows in the quantity and quality necessary to power a wind turbine of the size in question, or what type of biomass feedstock is available for use with a conversion technology. Resource assessment plays a large part (but not the only part) in project siting. The first steps in resource assessment involve community knowledge and maps. Community knowledge simply refers to the fact that tribe members know the ecological characteristics of their land. This embedded knowledge can at the very least determine what resources to investigate further. The next step is to consult with resource maps. Resource maps will put what a tribe might already know about their resource into context for renewable energy project development. For example, a tribe is likely to know that wind speeds are high on a certain hill. A wind map can show average wind speeds and wind power classes for the site which are more precisely relevant to wind energy development.

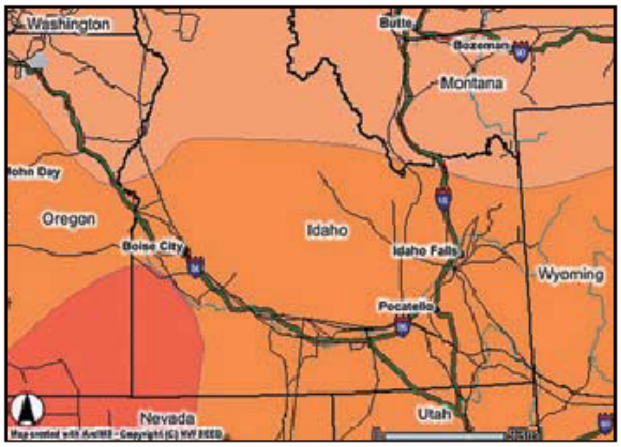

Figure 4.4 *- A sample solar resource map indicates that south and central Idaho's annual average solar insolation ranges from 4.6 to 6.0 kWh/m2/day..*
Source: National Renewable Energy Laboratory 2002.

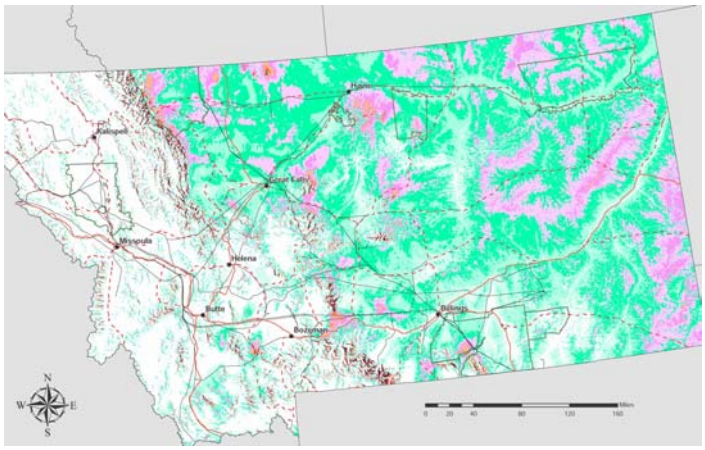

Figure 4.5 *- A sample wind speed map indicates that most of Montana (excluding mountain peaks) has average wind speeds at 30 meters ranging from 0 to 17 miles per hour.*

For more specific mapping and renewable resource information, visit the Renewable Energy Atlas of the West at http://www.energyatlas.org/ and the Northwestern U.S. Wind Mapping Project at http://www.windmaps.org

This level of resource assessment may be detailed enough for residential/individual scale renewable energy projects. As the tribe gets serious about pursuing a community-scale or large-scale renewable energy project, further resource assessment will be required. In the case of wind energy development, sites are monitored with meteorological equipment for at least one year. The intent of this guidebook is to go deep enough so that a tribe can understand how to prioritize likely projects and how to get started. To implement a large-scale project from this point will take considerable resources and professional assistance.

Community knowledge and resource maps can help determine if a general area suits a renewable energy project. However, when it comes to actual project construction, the exact location does matter. "Micro-siting" depends on a variety of considerations, depending on the technology. For solar energy equipment, a good site is one that is free of shade from approximately 9am to 4pm throughout the year. Often solar panels are installed on rooftops, but ground-mounted and pole-mounted systems work equally well as long as there are not

shadows cast by surrounding trees, fences, buildings, etc. Orientation and other elements of system design are also important factors.

A good site for wind energy is one with Class 3 or greater winds and with little turbulence. Wind turbulence is caused when obstacles such as trees, buildings, and large land features affect the smoothness of the wind.

Other Considerations

Determining a renewable energy project fit can involve a wide variety of issues in addition to resource availability, siting, and costs. Two issues worth understanding are interconnection and permitting.

Interconnection refers to the connection between a generating system and the utility grid, enabling power to be moved in either direction. In the case of small-scale systems, interconnection can take place where power comes into a home or business. This allows for net-metering. For larger-scale renewable energy generators, interconnection can take place at a point in the distribution or transmission system. It is possible that upgrades to the transmission system could be required in order to accommodate interconnection. Interconnection, regardless of a generation project's scale is an issue to address with the utility company as early as possible in the project development process. Any professional renewable energy contractor should make sure this contact with the utility happens at an early stage of project development.

Permitting and legal issues at the tribe, federal, and state levels should also be considered when developing a renewable energy project.

Generally, permitting and legal issues vary from tribe to tribe, so while there are a few things most tribes will want to consider, it is always important to consult a legal adviser before a project is undertaken. That being said, here are a few common issues to consider:

- At the tribe level it may be necessary to establish new laws that carefully govern project financing agreements and contracts. Creating clear laws is important as outside groups are more likely to invest in a tribal energy project when the project has a high degree of legal certainty.
- At the federal level, the Environmental Protection Agency (EPA) has an American Indian Environmental Office that enforces environmental protection laws on Indian reservations. If a project discharges pollutants into the environment, for example, federal permitting may be required. Additionally, projects requiring a federal permit or approval require a cultural resource clearance. Finally, if a project requires leasing of Native lands, then the Bureau of Indian Affairs (BIA) must approve these arrangements.
- At the state level, building regulations do not generally apply to tribal projects. In some cases, however, a utility may not agree to integrate a project into the grid until there has been a state inspection.

The majority of this information comes from the Department of Energy: Energy Efficiency and Renewable Energy site, which may be consulted for more information: http://www1.eere.energy.gov/tribalenergy/guide/legal_issues.html.

Renewable Energy Economics

Renewable energy projects are typically long-term investments. In most cases, renewable energy projects are not funded solely based on economic arguments. However, even when other values are the driving factors, cost effectiveness is still of concern for project development. The rate of return depends on many factors including scale, cost, technology efficiency, amount of energy produced, ownership structure, use or sale of power, location, incentives available, financing terms, lifetime of the technology, and more. An understanding of these factors is important, but it boils down to knowing the cost incurred for project development (and maintenance) as well as the revenue or savings generated by the project. Due to economies of scale, larger renewable energy projects are typically more cost effective than small-scale projects. A wind farm has a far greater return on investment than a solar electric system used to power one building. However, projects of larger scales also require greater resources upfront (including capital, time, and renewable energy resource) that exceed the limits of many tribes.

For all project scales, understanding incentive programs, policies, and values is crucial. These opportunities can reduce a tribe's upfront cost for investment or increase the revenue generated by a project over time. Policies and incentives that should be investigated when evaluating renewable energy project economics include:

- Utility net metering programs
- Power Purchase Agreements
- Public Utility Regulatory Policies Act (PURPA)
- Green Power/Green Tag Market
- Renewable Portfolio Standards
- Federal and State Tax incentives
- Bonds
- Buy-down / rebate programs
- Grant programs

Section 7 of this guidebook focuses entirely on financing energy projects and provides a great level of detail on these topics.

Green Power Purchasing

Another option to support renewable energy without investing in the construction of a renewable energy generator on the reservation is to purchase green energy. There are different ways individuals or a tribe can purchase green energy, and each of these allows the tribe to select renewable energy sources to match some or all of their power use.

Delivered Green Power

When a tribe decides to purchase green power from their power supplier they continue to pay their energy bill as usual, but also pay a premium for the green power. This premium ensures that an amount of green power enters the power grid to displace conventional or "brown" power. In order to purchase green power your supplier must have connections with renewable energy providers to deliver the green energy to the transmission pool.

The Green-e Renewable Electricity Certification Program is a widely recognized, voluntary certification program that demonstrates adherence to environmental and consumer protection standards developed by the Center for Resource Solutions. This certification means that the provider meets the environmental and

consumer protection standards established by Green-e.

Most power companies that offer renewable energy sell it in either blocks of 100 kWh (no purchase limit of blocks), or as a percentage of the monthly power need. Different types of renewable energy have different environmental, social, and economic benefits that are valued differently.

When the renewable energy was produced can be as important as *how* it was produced. The purchase of power from new renewable resources (which in the Northwest means projects that were installed after May of 1999) means that the purchase is displacing existing, polluting power generation. Purchases from older renewable resources may just contribute to profits for power that is already accounted for in the electric grid. Green-e certified Renewable Energy Credits must meet strict definitions of new renewables, but the certified delivered green power programs may be more inclusive.

Renewable Energy Certificates

Renewable energy certificates (RECs), also known as green tags, represent the environmental attributes of the power produced from renewable energy projects. RECs are sold separately from electrical power. A tribe or individual can purchase RECs whether or not they have access to green power through their local utility or a competitive electricity marketer. RECs are sold by megawatt hour increments, varying in price from $5 to $50 (or .5-5¢ per kWh). If a tribe is looking to make a large purchase to offset some or all of its electricity use, it is advisable to get several bids from REC marketers to compare options.

As with any purchase, a tribe interested in purchasing RECs should determine what values are important and evaluate green energy products accordingly. Considerations include cost, renewable energy resources from which the RECs were produced, location of the renewable energy generators, and how the investment supports new (versus existing) renewable projects. There are even RECs available from companies that aim specifically to support renewable energy project development on tribal lands (www.nativeeneergy.com). As with a purchase of delivered green power, Green-e certification provides assurance about the quality and legitimacy of the renewable energy source and accounting mechanisms.

To learn more about green power purchasing, visit the Department of Energy's Green Power Network website at http://www.eere.energy.gov/greenpower/.

5 - NEW CONSTRUCTION AND GREEN BUILDING

A community's energy consumption can be broken down into three sectors; the commercial sector, the residential sector, and the transportation sector. Setting aside industrial and agricultural activities, most of the energy used for the commercial and residential sectors has to do with heating, cooling, and powering buildings. When developing an energy plan, it is important to consider not only the existing buildings within the tribal community, but future building construction as well. With the right planning, the negative energy impacts of the construction process itself can be greatly reduced, and building an energy-sound building from the start is the easiest way to reduce long-term operating costs and the environmental footprint for the owners and occupants.

As many tribes face growth-- either in the demand for housing, or facilities to provide tribal services or commercial development, it is crucial to incorporate energy goals into broader development planning. Green building principles and frameworks can help establish goals and strategies for new construction.

What Is Green Building?

Green building incorporates design and construction practices that significantly reduce or eliminate the negative impact of buildings on people and the environment through:

- Sustainable site planning
- Water efficiency
- Energy efficiency
- Conservation of materials and resources
- Indoor environmental quality

The benefits of green building, when compared to conventional building practices, include:

- Environmental benefits: Conserve natural resources, reduce waste, improve air and water quality, protect ecosystems and biodiversity
- Economic benefits: Reduce operating costs, enhance asset value and profits, improve productivity and satisfaction, optimize life-cycle economic performance
- Health and community benefits: Improve air, thermal and acoustic environments, enhance occupant comfort and health, contribute to overall quality of life

New Housing

The importance of constructing safe, healthy, and efficient housing for growing tribal populations cannot be overstated. New construction provides a unique opportunity to get it right the first time- preventing the cost, inconvenience, and effort required for retrofit projects to improve living environments.

While "affordable housing" is often built at the lowest possible upfront cost, the truth is that poorly constructed and inefficient homes are not affordable. Energy costs, as well as building repairs are substantial factors in housing affordability, and are real contributors to mortgage defaults, evictions, and homelessness.

What Is LEED?

The US Green Building Council's Leadership in Energy and Environmental Design (LEED) program is a rating system for designing, constructing, operating and certifying green buildings. While there are many widely accepted green building or energy efficient construction programs including Built Green Washington and

Energy Star Homes, the LEED program provides a great framework for a broad range of building types. For this reason, much of the Green Building section in this guide focuses on (and draws from) the US Green Building Council's LEED program.

The LEED system was created by the US Green Building Council to:

- Define "green" by providing a standard for measurement
- Prevent false or exaggerated claims
- Promote whole-building, integrated design processes
- Establish market value with a recognizable "brand"
- Raise consumer awareness
- Transform the marketplace

LEED Programs include:

- New construction
- Existing buildings
- Commercial interiors
- Core and shell
- Schools
- Homes
- Neighborhood developments

Each LEED program involves a rating system and a certification process. It is important to note that the LEED point system, categories, and principles can be extremely useful to a building project even if that project is not going to apply for LEED certification. The building rating system includes "credits" earned for measures in 5+ categories including site, water use, energy use, materials and resources, indoor environmental quality, and innovation in design.

The LEED certification process involves attaining (and documenting) a minimum number of points earned for green building measures in each of the categories. With a total of 69 points available, the LEED system works like a menu. There are some prerequisites (required points in each category) and beyond that the building design team picks the points most feasible for their project to meet a certain level of certification: Certified, Silver, Gold or Platinum. Most construction projects will not have the ability to earn every point described, however, to qualify for certification a project must achieve all prerequisites and earn at least 26 out of the 69 available points. In addition to attaining and documenting these points for design and construction measures, the certification process also involves registering the project with the US Green Building Council, receiving technical support and going through building certification. LEED certification is voluntary, but does have significant costs associated with the steps. Certification fees are waived for projects that achieve Platinum certification.

Using Green Building Metrics As Guiding Principals (Even Without Certification)

One of the great things about the LEED point system is that it allows a building design team to review opportunities for green building in the context of a single project, and to set realistic goals using a pre-established framework. At an early planning meeting, a design team may scan a LEED checklist and be able to set goals of meeting certain metrics in siting, water use, energy use, etc. On an individual project basis, it is crucial that energy goals are established early

Case Study

In 2007 the Puyallup Tribal Housing Authority, partnered with several businesses to completed the first in a series of green homes demonstrating that elder housing could be provided in a sustainable and affordable way. The home was completed within budget and at the same cost as similar homes in the area. However, this home stood out from others with lower energy and water costs and better air quality. Some aspects of green design incorporated into the home included low VOC products, passive solar design, radiant flooring, Energy Star appliances and a solar hot water system. To learn more about the project visit www.elderhealthyhome.com/about.html.

just as the goals of building function type would be established. While a comprehensive energy plan for the tribe will likely not get down to specific goals for individual buildings, it can include broader principles and goals to encourage these green building practices.

An energy plan can set policy for tribal construction that will encourage, incentivize, or mandate individual green building measures, or the general practice of green building principles. Through energy planning, green building policies that can be established include:

- Codes to mandate certain practices for both private and tribal construction
- Monetary or social incentives to encourage green building applications and professional education
- Commitments/Resolutions (i.e. all new buildings constructed by the tribe will meet certain measures)
- The following are planning-oriented green building examples from many different types of communities:
- Establish policy that all community-owned buildings must meet LEED certification standards
- Establish policy that all community-owned buildings have at least one LEED Accredited Professional on the design team
- Establish building codes for efficiency that exceed current guidelines
- Establish a reward system (ease of permitting or monetary incentive) for development with commitments to certain green building measures

Financing Green Building Projects

Most homes and buildings can achieve considerable energy savings by going beyond minimum compliance with local energy codes. When it comes to monetary metrics, new construction brings into the forefront the tradeoffs between upfront costs and long-term operating costs. Many green features cost the same or are less expensive than traditional features even on a first cost basis. In addition, the margin for more expensive green building features is decreasing steadily over time. While building "beyond code" when it comes to measures such as insulation or the efficiency of

HVAC equipment may increase the upfront construction cost, the decrease in monthly operating costs (primarily utility bills) will often make up for it. If costs are a concern, and they almost always are, it is important to define goals for cost-effectiveness of building practices (taking into account long-term costs of each decision) rather than simply defining a capital budget.

To allow for even more flexibility to build as green as possible, a design team can bundle construction features that vary in cost effectiveness. For example, if increased insulation will be moderately cost effective on its own and will also allow for a downsized furnace to meet the building's reduced heating load, the upfront cost of a furnace will be less, and the combined cost effectiveness of these measures will be great. If the building would also benefit from the use of sustainable materials (for the environmental impact of construction as well as the health of the occupants), but these cost more than the alternatives, then consider bundling the various measures. When looked at together the cost effectiveness of insulation above code, a properly downsized furnace, and certain sustainable building materials may pencil out within the design team's goals for cost-effectiveness.

Funding Opportunities

New construction projects have a large range of funding sources. Utilities, weatherization organizations, and other energy-focused funding sources mentioned throughout this guide (See Section 7 for more details), often have special programs for new-construction. Of course, new construction projects are not just energy projects. Therefore, funding sources include all of those that exist for housing, community development, and the like. With commercial development, private financing is also a major funding source. Rolling green building measures into these "traditional" construction projects early, can provide extra justification when the project team starts looking for capital. In addition, there are organizations that provide additional funds exclusively for the incremental costs of green building. These organizations include:

- Enterprise Foundation and Natural Resources Defense Council- Green Communities Program
- Kresge Foundation- Green Building Initiative
- The Home Depot Foundation- Building Healthy Communities

6 - TRANSPORTATION

This section will discuss various ways your tribe can integrate transportation into your energy plan to reduce energy needs while creating new economic and job opportunities. For more detailed information on the specifics of transportation planning and financing such projects in the Northwest, you may find the Washington Department of Transportation's *Transportation Guide for Indian Tribal Governments* (http://www.wsdot.wa.gov/NR/rdonlyres/4FCC0C73-6C1D-4844-BF10-60D7D515A77A/0/TransportationGuideforIndianTribalGovernments.pdf) or the Northwest Tribal Technical Assistance Program (http://www.ewu.edu/x24920.xml) helpful.

Relating Transportation Planning to Your Energy Plan

While many people think of energy in relation to heating and lighting their homes, transportation and the movement of people and commodities between places expends energy as well, primarily through the use of fuel. The cost of oil at the time of writing was over $100 USD/barrel, up nearly $70.00 USD from 2003 rates. The price of gasoline is not expected to drop significantly either as demand continues to rise with the depletion of supply. In addition, CO2 and other polluting emissions from vehicle use are a significant contributor to greenhouse gas emissions and global warming. In order for communities to adapt to rising oil prices and ensure a healthy environment for future generations, it is crucial to begin considering alternative means of transportation. Reducing individual car use provides extra funds for other necessities including housing, food and clothing, while providing alternative fuels reduces emissions and creates jobs-- resulting in a healthier environment and community.

There are several alternatives to driving your car alone or operating transportation vehicles with traditional gasoline. These include biking, walking, busing, carpooling and using biofuels. While busing, biking and walking may necessitate additional infrastructure in order to make such methods a safe and viable option for the community at large, carpooling can easily be established through educational programs and targeted outreach. These strategies, however, serve as a method of reducing energy demand, similar to energy efficiency and conservation measures, which are important first steps when considering any energy program. Communities with large biomass resources may want to take their transportation plans a step further to consider producing and fueling vehicles with biofuels. Biofuels are a great way to lower emissions, encourage energy independence and promote economic development through fuel sales.

Public Transportation

A good bus system offers tribes an alternative to individual vehicle use and ownership. Designing such a system in a rural area can present challenges different from those in more urban centers however. Shuttle systems such as the Makah Public Transit program (see case study), can create efficient connections between tribal communities and urban centers. Some considerations for designing and operating a bus system include:

•*Education*

Post information about fares, schedules and route maps at stops and throughout the community. Also consider developing a website.

•*Safety*

Well-marked and lit stops create a safe and secure environment for passengers.

•*Schedule*

In addition to stopping at the most convenient locations, the best bus systems run frequently and efficiently, lending them useful to more users throughout the day. Surveying your community to better understand the transportation needs of the tribe will allow you to design a system that operates within budget but to the benefit of the greatest number of users. Depending on the needs of the community you may find a system that caters to the needs of individuals on a case by case basis a more efficient use of resources than a full-time bus service operating on a set schedule and route.

•*Accessibility*

In addition to being accessible to both bikers and pedestrians, buses and stops should be easily accessed by people with special needs. Consider crosswalks, sidewalks and shoulders, lighting, wheelchair accessibility, as well as bike rack options, when planning stop locations and purchasing fleet vehicles.

•*Cost*

The less it costs to ride the bus, the greater incentive people will have to take it. Grants, including the Federal Transit Administration's Tribal Transit Program, and other funding opportunities are available to make taking and operating a bus affordable.

•*Fuel*

When choosing buses or shuttles, it is important to consider purchasing vehicles that are efficient and biofuel compatible.

Case Study

With a Capital Grant and operating assistance from WSDOT, the Makah Tribe, remotely located in the north-western corner Washington State, has successfully been operating a bus and shuttle program since 1999. This program is designed to meet the needs of all members of the Makah Tribe and includes service to the Makah Employees' Park'n'Ride, special door-to-door services for elderly persons over 62 and people with disabilities, as well as extended summer service to meet the needs of tourists visiting Cape Flattery. Aside from providing service to a diverse demographic, the bus system connects members to other transit systems connecting the rural community to urban centers including Port Angeles, Seattle and communities in West Jefferson County. For more information about the Makah Public Transit

Carpools

Many community members may already depend on family members or neighbors to meet their transportation needs; however, in areas not served by buses or shuttles, facilitating a carpooling network can go a long way toward

meeting a community's transportation needs and reducing emissions from single occupancy vehicle use. Following are a few suggestions for encouraging carpools:

•*Rideshare Board*

Post carpooling or rideshare opportunities in a central location like a community center. Those who want to participate can post their information on the board. For ease of use, it is useful to divide the board by general destinations and create a clear distinction between drivers and passengers.

•*Casual Carpool*

Designate areas where passengers can wait to be picked up by drivers going in their direction. Conversations spurred during impromptu meetings may lead to more permanent arrangements between drivers and passengers.

•*Shopping runs*

If communities are located in particularly rural locations where grocery stores, banks, etc. are several miles away, it may be useful to designate a time and location people can meet and do their errands together while sharing the cost of gas and burden of driving. This arrangement can be advertised on fliers, at the community center, in the newspaper or community newsletter, and even at the local gas station if permitted.

•*Carshare*

Carshare programs are meant to meet the needs of people who don't need a car on a daily basis but do for running errands or emergencies, thus reducing individual car use. Tribes wishing to purchase a fleet for community use would most likely wish to consider cars that run on biofuels.

Biking And Walking

Biking and walking are healthy modes of transportation. Unfortunately many communities have not been designed with this in mind. Narrow roads with little or no shoulder and neighborhoods with no sidewalks are a few examples of how many communities have been planned for vehicle use while neglecting alternatives. As owning a car becomes more costly it is becoming more important to recognize the opportunities offered by walking and biking. Integrating these modes of transportation into long-term planning can reduce pollution and the need for fuel while promoting healthy living. Following are some ideas for creating more walkable and bikable communities:

•*Free Bike Rentals*

Similar to purchasing a fleet of cars for community use, tribes may want to consider purchasing bikes for community rental. Bikes could be rented for a fixed period of time, say, to run errands or, if located appropriately, as a way of connecting members to public transit locations nearby.

•*Roads, sidewalks and paths*

Planning future developments and improvements with the needs of bikers and pedestrians in mind is an integral way of ensuring such choices are viable options for the community. When planning new roads, consider integrating wider shoulders, well lit sidewalks and paths, or crosswalks and pedestrian barriers (such as bulbits and

planter boxes) to create safer and more secure environments for those on foot.

- *Education*

  Whether it's a class on bicycle maintenance or a brochure with safety tips for walking and biking in your community, providing tribal members with information to make them more confident about their transportation choices will go a long way.

Biofuels

Similar to turning off the lights and switching to energy efficient appliances, taking the bus, walking or carpooling are all ways of using less energy while still meeting your daily needs. These alternatives still consume some energy in the form of fuel, however, so it is important to give careful consideration to alternative fuel sources. Biofuels are a great way to reduce emissions while encouraging economic development. Examples of biofuels include:

- *Bioethanol*

  This fuel is made from sugary or starchy crops, grasses, and woody/cellulosic biomass. Bioethanol can be mixed with gasoline.

- *Biodiesel*

  Made from oily seeds, algae, or waste oil. Biodiesel can be mixed with or used to replace diesel.

- *Methane-based biogas*

  This fuel can be made through anaerobic digestion of animal droppings, landfill waste, or food or paper processing waste. Biogas can be mixed with or used to replace gaseous fuels like natural gas and propane.

- *Syngas*

  This gas mixture can be made from gasification of a variety of feedstocks and is used for industrial synthesis of fuels and other chemicals.

All of these fuels can be used for on-road personal and fleet vehicles, off-road vehicles for farm or construction use, home heating oil, and boats.

Production

Tribes in the Northwest are in an excellent position to start taking advantage of biomass energy, since every tribe has a forestry, ranching, farming, or restaurant enterprise that produces usable biomass that is currently going to waste. Energy from biomass is renewable, but not all land use and industrial practices associated with biomass energy will be sustainable for your tribe. Another key factor in profitability is scale. In general, it is more economical to build a single larger biomass processing facility that draws biomass from several tribal agricultural or forestry enterprises than for each enterprise to construct its own facility. Such co-ops are beneficial because they reduce the capital and operational investments required from each enterprise and centralize the marketing and sale of the bioenergy products and byproducts. For more additional resources consider the referenced ATTRA publications on bioethanol, biodiesel, and biogas. The Washington State University Extension Energy Program has many resources as well.

Distribution And Sales

The primary source of revenue from a biofuels-for-vehicles project will be the sale of the biofuel or feedstock itself. Wholesale markets for ready-

to-use biofuels include gas stations, fuel distributors, and organizations with vehicle fleets. If your tribal administration, school district, transit service, fishery, or other tribal agency operates a fleet, this is an excellent local market for biofuels (especially if the fleet already includes vehicles or boats that can run on the biofuel supply). If not, potential fleet markets abound in the Northwest.

As interest in biofuels grows, so too will demand, and offering locally-produced biofuel at your tribe's gas station will be an increasingly profitable endeavor. This will provide a market for the biofuel, keep the profits in the local economy, and attract additional business from tourists and neighboring communities. It may also be economical to distribute your tribe's biofuel to gas stations in other areas of the Northwest where demand exceeds supply. Note that the farther you transport your product, the higher your costs and the more fossil fuel you may use—as always, you will benefit from a well-thought-through business plan.

Integrating Programs

When considering transportation in energy planning it is important to take a holistic approach and consider all the various programs and modes of transportation that might alleviate energy needs and reduce consumption. A well-designed program will also make connections between other programs to ensure efficient planning and maximize available opportunities. For example, a website displaying bus information might also have a rideshare board. Or when purchasing a fleet of buses or vehicles for community use, the fleet's compatibility with local biofuel options should be considered. This method of planning provides tribal members with choices and options to meet their specific transportation needs.

7 - FINANCIAL RESOURCES

Overview

This section outlines the financial resources available for energy plan development and implementation. In order to understand the economics of clean energy projects, it is critical to first understand the incentives that apply to clean energy installations. Energy planners should be familiar with available incentives, who and what technologies are eligible, and how incentives work. It's important to recognize that different incentives encourage project technology, ownership, and system size. The trick is to maximize incentives while meeting community project goals.

The following chart outlines different funding mechanisms that are worth evaluating for energy plan development and clean energy projects. Tribes are eligible for all of the opportunities listed in the chart, and in many cases, specific tribal funding set-asides are available. Detailed information on each funding opportunity can be found in the section following the chart.

	PLANNING	IMPLEMENTATION			
TYPE	Energy Plan Development	Conservation	Efficiency	Renewables	Green Building
Grants					
US Dept of Agriculture					
◆ Renewable Energy & EE Grant Program			x	x	
◆ Value-Added Producer Grant				x	
◆ Rural Business Opportunity Grants	x	x	x	x	x
◆ Rural Business Enterprise Grants		x	x	x	x
◆ Rural Community Development Initiative	x	x	x	x	x
◆ Natural Resources Conservation Services – CIG			x	x	
US Dept of Energy					
◆ Renewable Energy or EE Deployment			x	x	
Environmental Protection Agency					
◆ Drinking Water Infrastructure Grants					x
◆ Pollution Prevention Grant Program		x	x	x	
◆ Region 10: Clean Air Act Tribal Program			x	x	x
◆ Region 10: Indian Enviro. General Asst. Program	x				
US Dept of Housing & Urban Development					
◆ Rural Housing & Economic Development					x
US Dept of Health & Human Services					
◆ LIHEAP: Residential Energy Asst. Challenge Option			x	x	
US Dept of Interior					
◆ Energy & Mineral Development Program				x	
Enterprise Foundation					
◆ Planning, Construction & Charrettes Grants					x
Loans					
US Dept of Agriculture					
◆ Business & Industry Guaranteed Loan	x	x	x	x	x
◆ Intermediary Relending Program	x	x	x	x	x
US Dept of Interior					
◆ Indian Loan Guaranty & Interest Subsidy	x	x	x	x	x
Enterprise Foundation					
◆ Enterprise Community Loan Fund - Loans					x
Tax Incentives & Bond Financing					
◆ Production Tax Credit				x	
◆ Renewable Energy Production Incentive				x	
◆ Accelerated Depriciation				x	
◆ Clean Renewable Energy Bonds				x	
◆ Enterprise Low-Income Housing Tax Credit					x
State Incentives					
◆ WA: Renewable Energy Production Incentive				x	
◆ OR: Energy Trust of Oregon Incentives				x	
◆ OR: Business Energy Tax Credit				x	
◆ OR: Small-Scale Energy Loan Program			x	x	
◆ OR: Renewable Energy Feasibility Fund				x	
◆ ID: Low-Interest Loan Programs			x	x	
◆ MT: Alternative Energy Investment Tax Credit				x	
◆ MT: Alternative Energy Revolving Loan Program				x	

Figure 7.1 Funding opportunities for Tribal energy plan development and clean energy projects

Funding For Weatherization

As discussed in Section 3 of the Guidebook, reducing the amount of energy used in households and businesses is an important step towards achieving energy sustainability and independence. One way to reduce energy costs and to make housing more affordable is to weatherize homes. This is an important first step in overall energy planning particularly when considering renewable energy production as a central element of your comprehensive energy plan.

Funding for low-income weatherization has historically come from several sources and represents a partnership of both public and private organizations. By far the largest contribution has come from the U.S. Department of Energy (DOE), totaling more than $5.8 billion since 1978. In fiscal year (FY) 2008, DOE funds totaled $228 million, representing about 40% of the total investment in weatherization for the year from all sources.

Other sources of funding include federal programs that serve low-income families such as the Low-Income Home Energy Assistance Program (LIHEAP), state agencies, utilities, settlements from lawsuits, and other private-sector interests such as landlords of buildings receiving weatherization services.

LIHEAP Contributions to Weatherization

After DOE, the second largest source of weatherization funding is from the LIHEAP, a program administered by the U.S. Department of Housing and Human Services (HHS). Although LIHEAP's mission is to provide direct assistance to the poor to make sure their heating bills are paid, its rules are flexible and allow as much as 25% of overall state funding for weatherization.

The LIHEAP statute allows Indian tribes, tribal organizations, and territories that wish to assist low-income households meet the costs of home energy to apply for a LIHEAP block grant. Block grants allow more flexibiltity in the way money is spent thus, tribal grantees, like their state counterparts, have considerable latitude in the design and operation of their programs.

As of FY 2007, 151 tribes and tribal organizations received LIHEAP funds allowing them to directly operate LIHEAP. Five territories also operated LIHEAP programs. Tribal LIHEAP programs operate in 24 states, with the largest number of tribal grantees in Oklahoma (30), California (24) and Washington (21). While all tribal grantees operate LIHEAP heating/cooling assistance and crisis assistance programs, only a handful operate weatherization. More information on DHHS's Tribal LIHEAP program can be found at: http://liheap.ncat.org/tp.htm.

Utility Low-Income Programs and Weatherization

Another significant source of funding is from electric and gas utilities. By far the largest private investment has come from utilities located in states where their regulatory commissions have supported low-income weatherization. In these states, where utility programs complement and add to services provided by weatherization, energy services to low-income families are the most comprehensive.

The Bonneville Power Administration operates a Tribal Set-Aside Low-Income Weatherization Program to improve the installation of weatherization measures on Native American lands and throughout the service territory of its public utility customers.

Under the Tribal Set-Aside Low-Income Weatherization Program, BPA provides:

- Funding to tribal governments to implement outreach and coordination with tribal members
- Funding for installation of measures, if the tribe has a qualified program that can implement auditing, installation and inspection services
- Coordination with local community action agencies
- Training for certified weatherization auditors and inspectors

For more information on BPA's program, visit: http://www.bpa.gov/corporate/About_BPA/Tribes/set-aside.cfm

Settlements and Private-Sector Investment

Another major source which began in the 1980s was the Petroleum Violation Escrow (PVE) Fund. These funds came from legal penalties assessed against oil companies for violating price controls. Most states had exhausted their PVE funds, and total funding in FY 2002 amounted to only $6.9 million or about 1.2% of the total.

Finally, numerous small and other private organizations contribute funding or in-kind services. For example, landlords of multi-family housing units with low-income clients often contribute their own funds and in-kind services when their buildings are weatherized.

For more information on funding for weatherization, visit the Department of Energy's Weatherization website located at: http://www.eere.energy.gov/weatherization/source_fund.html

Grant Programs

U.S. Department of Agriculture (USDA)

USDA programs are excellent sources of funding and can provide valuable financial support at various project phases, including the difficult-to-fund feasibility phase. Funding limits are based on annual appropriations.

Renewable Energy System and Energy Efficiency Improvements – §9006

The USDA Renewable Energy System and Energy Efficiency Improvements grant and loan program, also referred to as Section 9006 of the Federal Farm Bill, provides grants for purchases of renewable energy systems and energy improvements.

This program supports the purchase and installation of energy efficiency improvements which result in reduced energy consumption for non-residential buildings in rural locations.

▷Eligibility

Rural small businesses – "small" as defined by Small Business Administration and not in a Census-defined Metropolitan Statistical Areas.

Agricultural producers – individuals or business entities receiving at least 50% of gross income from agriculture.

Nonprofits and public projects are not eligible. Utilities are typically excluded from

eligibility.

▷Grant Size

25% of eligible project costs. Up to $500,000 for renewable energy systems, and $250,000 for energy efficiency projects.

▷Match Requirement

75% of the project cost must come from non-Federal funds. "In-kind" contributions from third parties of up to 10% of the project cost may be counted toward the match. "In-kind" contributions from the applicant receive no credit toward the match.

▷Source

http://www.rurdev.usda.gov/rbs/busp/9006grant.htm

Value-Added Producer Grant Program (VAPG)

Grants under this program are intended to be used to plan and implement value-added ventures to increase the revenue of commodity producers.

Farmers, ranchers, foresters and fishermen may receive matching grants for either planning or working capital purposes to implement value-added ventures – i.e. for on-farm renewable energy generation projects.

The proposed "value-added" activity must increase the value realized by a producer for their agricultural commodity – either by an increase in value of the commodity or by the expansion of the market for the commodity – due to either: commodity processing, differentiated production/marketing, commodity segregation, or renewable energy – i.e., on-farm production of renewable energy (wind, solar, biomass, anaerobic digester, geothermal).

VAPG grants may be used for either Planning or Working Capital activities (but not both).

▷ Eligibility

Independent Producers (either individuals or business entities) – i.e., farmers, ranchers, foresters, and fishermen – who will produce a majority of the commodities to which value will be added and who will retain ownership of the commodities throughout the value-added process.

Agricultural Producer Groups – representing and controlled by Independent Producers

Farmer or Rancher Cooperatives – consisting exclusively of Independent Producers

Majority-Controlled Producer-Based Business Ventures – legal business entity that is majority-owned and controlled by Independent Producers.

▷Grant Size

Planning grants – $100,000 maximum per project

Working Capital grant – $300,000 maximum per project (funding amounts are subject to change according federal appropriations)

▷Match Requirement

50% or more of project costs must come from other sources. In-kind matching is allowed but strongly discouraged as it must be fully justified and documented, and it will be subjected to extensive verification. VAPG funds are disbursed only after the grantee has first contributed at least an equal amount for eligible purposes.

▷Source

http://www.rurdev.usda.gov/rbs/coops/vadg.htm

Rural Business Opportunity Grant Program (RBOG)

The RBOG program provides grant funds for strategic technical assistance, training, and planning activities that promote "best practices" in sustainable economic development for rural communities with exceptional needs.

Only rural communities (outside the urbanized periphery of cities with a population of 50,000) may be assisted. RBOGs may be used for the following project types that have a reasonable prospect for economic development success:

- Technical assistance – for analyzing and identifying business opportunities; for developing feasibility studies and business plans; for the creation of new businesses using rural resources; for export market opportunities
- Training – for existing or prospective rural entrepreneurs and managers; for rural leadership development
- Planning – for local or multi-county economic development
- Business support centers – for the creation of new businesses; for training in technology (including interactive communications technologies) and trade development (including international trade)
- Reasonable fees for professional services necessary to conduct the above activities
- The activity must be consistent and coordinated with local and area economic development plans.

▷Eligibility

Public bodies, nonprofit corporations, tribes and rural cooperatives – with sufficient financial strength and expertise to conduct the proposed activity. This is not a grant for individuals or businesses.

▷Grant Size

$50,000 maximum per project, $150,000 maximum for multi-state projects. In 2008, a separate set-aside of $990,000 was earmarked to assist Native American communities. There is no grant size restriction on the Native American funds.

▷Match Requirement

There is no matching requirement, but priority points are awarded to projects with higher leveraging.

▷Source

http://www.rurdev.usda.gov/rbs/busp/rbog.htm

Rural Business Enterprise Grant Program (RBEG)

Grants for "tactical" economic development projects that will assist clearly identified small businesses. The RBEG program provides grant funds for precisely targeted technical assistance, training, and other activities that support the development of small business enterprises in rural areas.

Only rural communities (outside the urbanized periphery of cities with a population of 50,000) may be assisted. RBEG projects must have a reasonable prospect for resulting in the development of a specifically-identified "small and emerging private business enterprise".

A tribally-owned business can be considered a "small and emerging private business enterprise" only if its governing board is independent of the tribal government.

RBEG's may be used for the following project types:

- Technical assistance – a problem solving activity such as business counseling/training, market research, feasibility study, professional/technical report, or product/ service improvement
- Workforce training – including distance learning networks
- Revolving loan funds (RLFs) – to capitalize a loan fund for re-lending to "small enterprises" exclusively
- Capital items (real estate, infrastructure, equipment) – to be leased to or for the benefit of "small enterprises" exclusively

▷ Eligibility

Public bodies, nonprofit corporations, and tribes seeking to conduct a rural business development project. This is not a grant for individuals or businesses. Pass-through grants are not permitted.

▷Grant Size

There is a federal and state allocation. Grants are typically in the $25,000 range.

▷Match Requirement

Priority is given to projects with nonfederal leveraging. As a practical matter, 1:1 matching funds are essential for an application to be competitive.

▷Source

http://www.rurdev.usda.gov/rbs/busp/rbeg.htm

Rural Cooperative Development Initiative (RCDI)

Congress initially created the RCDI in Fiscal Year 2000 to develop the capacity and ability of nonprofit organizations, low-income rural communities, or federally recognized tribes to undertake projects related to housing, community facilities, or community and economic development in rural areas.

The RCDI program provides technical assistance and training funds to qualified intermediary organizations to develop their capacity.

Key points of the program are:

- The purpose of this initiative is to provide a program of technical assistance to recipients to develop or increase their capacity to undertake projects in the areas of housing, community facilities, and community and economic development in rural areas.
- The RCDI grant, which has a dollar-for-dollar matching funds requirement, is made to an intermediary. The intermediary provides a program of technical assistance to recipients to build their capacity and ability to undertake projects related to housing, community facilities, and community and economic development in rural areas.
- The intermediary can be a private or public organization, including tribal, that has been legally organized a minimum of 3 years and has experience working with the recipients eligible for this program.
- The recipients can be nonprofit organizations, low-income communities, or federally recognized tribes, based on the definitions in the Notice of Funds Availability (NOFA). Recipients must be located in eligible rural areas, as defined in the NOFA.

▷Eligibility

Public or private (including tribal

organizations) that have been legally organized for at least three years and have experience working with eligible recipients. Recipients of assistance from the intermediary can be non-profit organizations, low-income communities, or federally recognized tribes.

▷Grant Size

For FY2008, Congress appropriated $6,255,900 for the RCDI. Grants range from $50,000 to $300,000.

▷Match Requirement

Matching funds must be in the form of cash or confirmed funding commitments and must be at least equal to the grant amount. In-kind contributions cannot be used as matching funds.

▷Source

http://www.rurdev.usda.gov/rhs/rcdi/index.htm

Natural Resources Conservation Services – Conservation Innovation Grants (CIG)

The purpose of CIG is to stimulate the development and adoption of innovative conservation approaches and technologies while leveraging the Federal investment in environmental enhancement and protection, in conjunction with agricultural production. CIG fund or projects targeting innovative on-the-ground conservation, including pilot projects and field demonstrations.

CIG has two competitions available each fiscal year --National and State. For the National FY2008 competition several funding concerns relate directly to energy opportunities. Some examples of energy related projects are:

- Bio-based energy opportunities; and
- Identification and quantification of management practices for air quality and atmospheric change concerns at animal operations.
- Development and application of technology tools that measure environmental services (i.e. benefits) in order to document credits for trading;
- Greenhouse gas accounting tools and registries;
- Renewable energy sources such as wind or solar;
- Methane recovery;
- Other innovative farm management or production technologies;
- Automated self energy audit technology;
- Energy audit worksheets; and
- Compilation of on-farm energy audits and audit processes.

The intent of the State Component is to provide flexibility to NRCS State Conservationists to target CIG funds to individual producers and smaller organizations that may possess promising innovations, but may not compete well on the larger scale of the national grants competition. Funding availability and application and submission information for state competitions are announced through public notices (and on State NRCS websites) separately from the national notice. State Conservationists will determine the funding level for state competitions, with individual grants not to exceed $75,000.

Source: http://www.nrcs.usda.gov/programs/cig/statecomponent.html

▷Eligibility

CIG applicants must be a Federally-recognized Indian Tribe; State or local unit of government; non-governmental organization; private business; or individual.

A person or entity is not eligible if the three-year average adjusted gross income (AGI) exceeds $2.5 million with less than 75 percent derived from farming, ranching, or forestry-related sources at the time of application.

▷Grant Size

Natural Resource Concerns category--Up to $10 million available for proposals addressing one or more of the CIG natural resource concerns.

Technology category--Up to $5 million available for proposals addressing one or more of the CIG technology categories. This component was offered in 2006.

The maximum award amount for any project is capped at $1 million. CIG will fund single- and multi-year projects, not to exceed three years.

**For the FY 2008 grant award process, there was a set-aside of 10% of the total funds available for CIG for applications from Beginning and Limited Resource Farmers and Ranchers, Indian Tribes, or community-based organizations comprised of or representing these entities.

▷Match Requirement

At least 50% of the project cost to 25 percent of the total project cost may be from in-kind contributions.

**An exception regarding matching funds is made for projects funded out of the set-aside. Up to three fourths of the required matching funds for such projects (up to 37.5% of the total project cost) may derive from in-kind contributions.

▷Source

http://www.nrcs.usda.gov/programs/cig/

Department of Energy (DOE)

Renewable Energy or Energy Efficiency Deployment in Indian Country

Under the provisions of Title V of the Energy Policy Act (EPAct) of 2005, the Department of Energy's Office of Energy Efficiency and Renewable Energy offers grants for the deployment of renewable energy systems or energy efficiency measures in Indian Country in the lower 48 States. Under this program, DOE seeks project development plans for the large-scale installation of renewable energy systems or energy efficiency measures resulting in substantial energy savings within 12 to 24 months of award, subject to the availability of renewable energy hardware.

Successful applications under energy efficiency must demonstrate the potential for a 30% reduction in energy usage. Applications proposing the use of renewable energy systems for building heating and cooling must meet at least a minimum of 30% of the building load. Renewable energy applications proposing less than 1 MW of generation will not be considered.

▷Eligibility

Indian Tribe or a Tribal Energy Resource Development Organization. In both cases projects must be located on Indian lands

within the contiguous 48 States.

▷Grant Size

Typically in the $500,000 to $1,000,000 range for the total project period.

▷Match Requirement

The cost share must be at least 50% of the total allowable costs of the project. Applications proposing an amount above the 50% will be given preference.

▷Source

2008 solicitation: http://e-center.doe.gov/iips/faopor.nsf/UNID/8D45D258A9BDA2088525740F0052F4F3/$file/Announcement_DE-PS36-08GO98022.pdf

Environmental Protection Agency (EPA)

National - Drinking Water Infrastructure Grants

This fund supports the installation, replacement, or upgrade of drinking water infrastructure. The funds may also be used to support green infrastructure activities such as permeable pavement, rooftop gardens and other measures that help reduce the urban heat island effect and save energy.

The Drinking Water Infrastructure Grants Tribal Set-Aside (DWIG TSA) Program provides grant funds to improve the infrastructure of drinking water systems that serve Indian Tribes. It is a component of the Drinking Water State Revolving Fund.

▷Eligibility

Federally recognized Indian Tribes.

▷Grant Size

Varies. The total amount of funds set-aside each year are allotted, by formula, among nine EPA Regional offices.

▷Match Requirement

Not required.

▷Source

http://www.epa.gov/safewater/dwsrf/allotments/tribes/frequentquestions.html

National - Pollution Prevention Grant Program (P2)

EPA created the Pollution Prevention (P2) Grant Program (formerly Pollution Prevention Incentives for States) under the authority of the Pollution Prevention Act of 1990.

The purpose of the P2 Grant Program is to give States and Tribes the capability to assist businesses and industries in identifying better environmental strategies and solutions for complying with Federal and State environmental regulations. The majority of P2 Grants fund State-based projects for technical assistance, training, outreach, education, regulatory integration, data collection, research, demonstration projects, and recognition programs.

Proposed project activities must meet the following definition of P2/source reduction in order to be eligible for funding:

- Reduce the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment or disposal;
- Reduce the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants; or
- Reduce or eliminate the creation of pollutants through increased efficiency in the

use of raw materials, energy, water, or other resources; or protection of natural resources by conservation.

▷ Eligibility

Any agency or entity of a State including State colleges, universities, and Indian Tribes that meet the requirement for treatment in a manner similar to a State in 40 CFR 35.663 and intertribal consortia that meet the requirements in 40 CFR 35.504.

▷Grant Size

Dependent on the Congressional appropriations and the quality of proposals received. Individual grant awards are typically in the range of $20,000-$180,000.

▷Match Requirement

At least 50 percent match is required. Cost Sharing and Matching contributions may include dollars, in-kind goods and services and/or third party contributions consistent with 40 CFR 31.24.

▷Source

http://www.epa.gov/oppt/p2home/pubs/grants/ppis/ppis.htm

EPA Regional Grants

EPA Region 10 serves the people of Alaska, Idaho, Oregon, Washington and Native Tribes: http://yosemite.epa.gov/R10/TRIBAL.NSF/webpage/Tribal+Grants

Clean Air Act (CAA) Tribal Program Funding – Region 10

The purpose of this program is to assist tribal governments to develop programs to manage air quality in Indian country in accordance with the 1990 Clean Air Act.

Eligible activities include:

Section 105:

- Implementation of programs for the prevention and control of air pollution
- Implementation of national primary and secondary ambient air quality standards, including activities related to the planning, developing, establishing, carrying-out, improving, or maintaining of such programs.

  Examples include: agricultural methane to electricity, biomass, wind, combined heat and power, geothermal, wave/current turbines and photovoltaics (particularly when electricity is required for remote usages).

- Direct Implementation Tribal Cooperative Agreements (DITCAs): Assisting EPA with any activity required to implement the Clean Air Act or supporting regulations.

  Examples include: Become a member of EPA's Green Power Partnership by purchasing green power as a portion of tribal electricity or become a member of EPA's Combined Heat and Power (CHP) Partnership program by promoting and/or developing combined heat and power resources.

Section 103:

Investigations, experiments, demonstrations, surveys and studies relating to the causes, effects, extent, prevention, and control of air pollution.

For additional suggestions of possible activities and objectives relevant to addressing air quality through tribal Clean Air Act grants, the document: *Menu of Options: A Framework for*

Managing Tribal Air Grants for Environmental Results (located on the EPA Region 10 website at http://yosemite.epa.gov/R10/AIRPAGE.NSF/webpage/Tribal+Air+Program+Main+Page) provides templates for a wide variety of goals, including suggested tasks, outputs, outcomes, and measures.

▷Eligibility

All federally-recognized tribes and tribal consortia in Region 10 are eligible to receive funds. A tribal consortium is defined as a partnership between two or more tribes authorized by the governing bodies of those tribes to apply for and receive assistance under the particular EPA grant program.

▷Grant Size

Section 105 project grants range from $25,000 per year up to $150,000 depending greatly on size of tribe. Region 10 may have some funding for a limited number of Section 103 special projects, however these projects are funded only when there is money left over after all Section 105 projects have been granted.

▷Match Requirement

For Section 105: Match of 5%-40% is required. Match is not required for Section 103 grants.

▷Source http://yosemite.epa.gov/R10/TRIBAL.NSF/webpage/Tribal+Grants

Indian Environmental General Assistance Program (GAP)

In 1992, Congress passed the Indian Environmental General Assistance Program Act which authorizes EPA to provide General Assistance Program (GAP) grants to federally recognized tribes and tribal consortia for planning, developing, and establishing environmental protection programs in Indian Country, as well as developing and implementing solid and hazardous waste programs on tribal lands.

Examples of capacity building activities include, but are not limited to, the following:

- An administrative system
- Technical capability to manage environmental programs
- Qualifications and training needs for environmental management personnel relative to the tribe's program needs and plan for program implementation, including planning for and implementation of a training program to address technical competency and capability
- Integrated approaches to environmental protection and natural resource management, such as the development of Integrated Resource Management Plans (IRMP), which fully reflect both tribal environmental and natural resource management goals and objectives, within the limitations of GAP
- The legal infrastructure (codes, regulations, ordinances and standards, and policies and guidance) to implement environmental protection programs
- Enforcement programs to ensure compliance including the development of inventory, monitoring and inspection schemes
- Materials, information and plans for environmental education/public outreach programs for community members (including

tribal leaders and business and civic organizations)

- Multi-jurisdictional opportunities including the feasibility for intergovernmental (Tribal, Federal, State, Local) cooperative efforts

▷Eligibility

All federally-recognized tribes in Region 10. Intertribal consortia that meet the consortia requirements may also receive funding, depending on availability of funding after tribal governments are funded.

▷ Grant size

For tribal governments a minimum of $75,000 and up to $110,000 per year. Tribes with large reservations may receive up to $160,000.

Tribal consortia may be funded provided that Region 10 has sufficient funding for all eligible and qualified tribal government applicants first. EPA will provide funding to consortia in proportion to the number of federally recognized tribes that make up the consortia. No consortia will be provided base funding in excess of $300,000 per year.

▷Match Requirement

Not required.

▷Source http://yosemite.epa.gov/R10/TRIBAL.NSF/webpage/Tribal+Grants#GAP%202008

U.S. Department of Housing and Urban Development

Rural Housing and Economic Development (RHED)

The Rural Housing and Economic Development Program provides for capacity building at the state and local level for rural housing and economic development and to support innovative housing and economic development activities in rural areas.

Funds are available in 2 categories:

1. *Capacity Building and Support for Innovative Housing and Economic Development* activities. Capacity building involves the enhancement of existing organizations to carry out new functions and/or perform more effectively existing functions. Possible activities include: hiring and training staff, purchasing software and other tools, obtaining expertise from outside sources, developing an accounting system, conducting asset inventories, developing strategic plans, seeking technical assistance, improving management capability, and purchasing or leasing office space.

2. *Support for Innovative Housing and Economic Development* activities is intended for, but not limited to, other costs for innovative housing and economic development activities. Possible activities include: preparation of plans, architectural drawings, acquisition of land and buildings, demolition, provision of infrastructure, purchase of materials and construction costs, use of local labor markets, job training and counseling for beneficiaries and financial services such as revolving loan funds and Individual Development Accounts or IDAs. Other possible activities include: homeownership and financial counseling, application of innovative construction methods (e.g. green building); provision of financial assistance to homeowners, businesses, and developers; and the establishment of Coalition of Community Development Financial

Institutions (CDFIs), lines of credit, revolving loan funds, microenterprises, and small business incubators.

▷ Eligibility

Local rural non-profits, community development corporations (CDCs), federally recognized Indian tribes, state housing finance agencies (HFAs), and state community and/or economic development agencies.

▷Grant Size

$150,000 for Capacity Building Grants, $400,00 for Innovative Housing and Economic Development

▷Match Requirement

See program NOFA: http://www.hud.gov/offices/cpd/economicdevelopment/programs/rhed/

▷Source

http://www.hud.gov/offices/cpd/economicdevelopment/programs/rhed/

U.S. Department of Health and Human Services, Low Income Home Energy Assistance Program (LIHEAP)

Residential Energy Assistance Challenge Option Program (REACH)

The purpose of the REACH Program is to provide for the establishment of demonstration projects designed to determine ways to:

- Minimize health and safety risks that result from high energy burdens on low-income Americans;
- Prevent homelessness as a result of inability to pay energy bills;
- Increase efficiency of energy usage by low-income households, and;
- Target energy assistance to individuals who are most in need.

The program supports a limited number of innovative projects that demonstrate the long-term, cost-effectiveness of supplementing energy assistance payments with non-monetary benefits that increase the ability of low-income households to meet home energy costs and achieve energy self-sufficiency.

The REACH authorizing legislation also includes a section that provides a separate, optional (EEES) project that applicants may include in their REACH plan. The EEES Plan must be separate from the REACH Plan and contained in the Appendix to the REACH Plan. To be eligible for this additional funding, EEES Plans must meet additional quality standards.

▷Eligibility

Indian Tribes, Tribal organizations, and Insular Areas, except Puerto Rico, that receive LIHEAP grants directly from HHS and are currently implementing a LIHEAP program.

▷Grant Size

Average grant size for REACH plans is $150,000. Average grant size for Energy Efficiency Education Services component is $25,000.

▷Match Requirement

Not required.

▷Source

http://www.acf.hhs.gov/programs/ocs/liheap/funding/reach/reachdes.html

U.S. Department of Interior, Indian Energy and Economic Development (IEED)

Energy and Mineral Development Program

These grants will fund projects promoting the development of tribal oil, gas and coal resources, the development of construction aggregate markets, and renewable energy projects such as using biomass, geothermal, and solar and wind energy production.

Source: http://www.peoplelandandwater.gov/bia/bia_assistant-secretary-indian-affairs.cfm

Enterprise Foundation - Green Communities Program: Planning and Construction and Charrette

Enterprise offers grants to help cover the costs of planning and implementing green components of affordable housing developments, as well as tracking their costs and benefits. Enterprise administers the Green Communities Grants program in consultation with other collaborating corporations and foundations, which presently include:

- The Home Depot Foundation
- The Kresge Foundation
- Citigroup Foundation
- Surdna Foundation
- JPMorgan Chase
- The Department of Housing and Urban Development (HUD)

The Enterprise Foundation makes grants under two different programs, Planning and Construction and Charrettes.

Planning and Construction grants cover expenses including additional costs of architectural work, engineering, site surveys and costs associated with items such as a more efficient HVAC systems, green materials and energy efficient appliances.

Charrette grants assist housing developers with integrating green building systems in their developments and engaging in serious discussions of green design possibilities. Enterprise will award planning grants to affordable housing developers to coordinate green design charrettes. Please see http://www.greencommunitiesonline.org/tools/funding/grants/charrette.asp for more details.

▷Eligibility

501(c)(3) nonprofits; public housing authorities; tribally designated housing entities; for-profit entities; and for-profit entities participating through joint ventures with qualified organizations.

▷Grant Size

For Planning and Construction grants up to $50,000. Grant amounts will not exceed $1,000 times the number of low-income units in a project, plus $3,000 (not to exceed maximum grant amount). The portion of the grant to be used for planning costs may not exceed $25,000, or $500 times the number of low-income homes-whichever is less.

An applicant may apply for and be awarded a grant for both planning and implementation, but the implementation portion of grants will be automatically cancelled if the project does not meet the Green Communities Criteria at the construction contract stage.

Charrettes Grants, up to $5,000

▷Match Requirement

Not required

▷Source

http://www.greencommunitiesonline.org/

Kresge Foundation- Green Building Initiative

The Kresge Foundation awards planning grants to projects in the U.S. and Canada in the following categories:

- Renovation
- Historic preservation
- New construction designed to achieve LEED – Leadership in Energy and Environmental Design – certification at the Platinum level from the U.S. Green Building Council
- New construction designed to meet the Cascadia Region Green Building Council's Living Building Challenge (also endorsed by the U.S. Green Building Council)
- New construction designed to be net-zero energy efficient (the facility produces as much energy as it consumes each year)

Planning grants will cover costs associated with energy and water use analysis and modeling, site planning, commissioning expenses incurred during the planning process, LEED registration and initial documentation and professional services to facilitate the design process through planning meetings or charettes structured to focus on specific outcomes.

▷Eligibility

- 501(c)(3) organizations that are not classified as private foundations
- Government entities
- Community colleges, colleges and universities that are fully accredited associate, baccalaureate and/or graduate degree-granting institutions
- Elementary and secondary schools that serve predominately students with physical and/or developmental disabilities
- Hospitals that are accredited by the Joint Commission on Accreditation of Healthcare Organizations
- Religious organizations that are operated by or within religious institutions and serve secular needs, have space formally dedicated to their programs, and have financial and governing autonomy from the parent religious organization
- Canadian organizations that would qualify as charitable organizations under United States law and have an independent audit prepared in accordance with their recognized local standards

▷ Grant Size

$50,000-$100,000 planning grants

▷Match

Not required.

▷Source

http://www.kresge.org/content/displaycontent.aspx?CID=59

Loan Programs

USDA Business and Industry Guaranteed Loan (B&I)

The goal of the Business and Industry Guaranteed Loan Program is to encourage the commercial financing of rural businesses thereby,

creating and saving rural jobs and improving the economic and environmental climate of rural communities. The B&I program is lender-driven. USDA guarantees the loan rather than lending directly. A commercial lender requests the B&I guarantee, and, if approved, it makes (and services) the loan.

▷Eligibility

Lender Eligibility: Any Federal or State chartered bank; Farm Credit System; Bank of Cooperatives; Savings and Loan or Building and Loan Association; bank-holding company's mortgage company; credit union; or insurance company – subject to government credit examination and good standing. Other lenders with commercial lending experience and financial strength may also be approved.

Borrower Eligibility: Most types of enterprises qualify – manufacturing, wholesale, retail, service – new or existing. The project must be in a rural area – beyond any 50,000+ population city and its urbanized periphery. Proprietorships, partnerships, corporations, LLC's, co-ops, trusts, nonprofits, tribes and public bodies are all eligible.

▷Loan Details/Mechanics

Federal guarantee for lenders on their rural business loans:

80% (maximum) guarantee on cumulative loans to a single borrower up to $5 million

70% (maximum) guarantee on cumulative loans to a single borrower from $5-10 million

Size of Loans: No minimum; up to $10 million. Usually, B&I loans range from $200,000 to $5 million.

▷Interest Rate, Term, Payment Structure, and Fees

Rate: Lender's customary commercial interest rate – negotiated by lender and business. Fixed or variable (but may not vary more often than quarterly).

Term: Working capital – 7 years maximum, equipment – 15 years maximum (not to exceed useful life of collateral), real estate – 30 years maximum (not to exceed useful life of collateral).

Structure: Balloons are not permitted. Reduced payments may be scheduled in the first 3 years.

Fees: Lender's reasonable and customary fees okay – negotiated by lender and business. USDA charges an initial guarantee fee equal to 2% of the guaranteed amount plus an annual renewal fee equal to ¼% of the guaranteed amount.

▷Authorized Loan Purposes

Real estate, buildings, leasehold improvements, equipment, inventory, and permanent working capital. Loan fees and costs (including B&I guarantee fee), professional services, and feasibility study costs.

▷Source

http://www.rurdev.usda.gov/rbs/busp/b&i_gar.htm

USDA Intermediary Relending Program (IRP)

The IRP program provides low-interest loans to

capitalize revolving loan funds (RLF's) that will finance smaller and emerging businesses enterprises and community development projects in rural areas. IRP borrowers ("intermediaries") must place the IRP loan proceeds in an RLF for re-lending to eligible, rural businesses and community groups ("ultimate recipients"). RLF loans from the intermediary to the ultimate recipient may finance new or existing businesses or community development projects. All collections from the operation of the IRP RLF that are not used for administrative costs, technical assistance to borrowers, or debt retirement must be made available for relending to eligible ultimate recipients.

▷Eligibility

Public bodies, nonprofit corporations, rural cooperatives, and tribes with the legal authority to operate an RLF; a record of successfully assisting rural businesses and communities, normally including experience in making and servicing commercial loans; and an ability to provide adequate assurance of repayment of the IRP loan. Project must be in a rural area (i.e., communities with a population of 25,000 or less).

This is not a loan program for businesses directly, though businesses ultimately will receive loans from the revolving loan funds capitalized with IRP funds. Ineligible businesses include: most types of agricultural production; religious organizations; lending, investment, and insurance companies; golf courses; racetracks; gambling facilities.

▷Loan Details/Mechanics

Loan size: $750,000 is typically the maximum loan awarded on either an initial or subsequent basis. A Native American set-aside is available.

▷Interest Rate, Term, and Payment Structure

1% fixed rate, 30 years, fully amortized (though interest-only payments may be permitted for the first 3 years).

Types of loans from the IRP loan fund:

1) Leverage: can finance up to 75% of the total cost of the ultimate recipient's project.

Loan size: generally, limited to no more than $150,000 per ultimate recipient when the IRP loan fund is using initial loan proceeds. Loans up to $250,000 may be made with revolved loan funds.

Interest rate, terms, and payment structure: set by the intermediary in an amount sufficient to cover the cost of operating and sustaining the RLF.

2) Collateral and Servicing: IRP loans are secured by a lien on the IRP revolving loan fund and on all assets generated from the fund, including notes receivable and all income produced with the fund. The intermediary is liable for the repayment of the IRP loan regardless of the performance of the IRP loan fund. The intermediary is required to maintain a detailed and separate accounting of their IRP loan fund and its associated assets, including the submission of an annual operating budget, quarterly/ semiannual reports, and an audited financial statement.

▷Loan purposes

Real estate, buildings, leasehold

improvements, equipment, inventory, working capital, some refinancing, fees.

▷Source

http://www.rurdev.usda.gov/rbs/busp/irp.htm

U.S. Department of Interior Indian Loan Guarantee and Interest Subsidy Program

The program was established by the Indian Financing Act of 1974 to stimulate and increase American Indian entrepreneurship and employment through establishment, acquisition or expansion of Indian-owned or Native Alaskan owned economic enterprises.

▷Eligibility

Any lender including community development financial institutions (CDFIs) regularly involved in making loans. The borrower must be projected to have at least 20% equity in the business being financed immediately after the loan is funded. The business must be located on or near a federally recognized reservation or recognized service area and must contribute to the economy of the reservation or service area. A borrower must be a federally recognized American Indian Tribe or Alaska Native group or an enrolled member of such tribe or group; or a business organization with no less than 51% ownership by American Indians or Alaska Natives. The borrower may not be delinquent on any federal obligations.

▷Loan Details/Mechanics

Loan Amount: $500,000 is the maximum loan that can be guaranteed for individuals. The program can guarantee loans of greater amounts for tribes, tribal enterprises, or a business entity, subject to program and policy limits.

The percentage of a loan that is guaranteed is the minimum necessary to obtain financing, but may not exceed 90% of the unpaid principal and interest on a loan. The lender must pay a one-time premium payment of 2% on the guaranteed portion of a loan. The lender may charge the premium to the borrower as a one time feed or add the premium to the loan.

The maturity of the loans is determined by the lender, but may not exceed 30 years.

Interest rates are determined by the lender. In some cases, the program can provide interest subsidy. An interest subsidy is a rebate to the borrower of the difference between the lender's interest rate and the rate set for Indian loans by the U.S. Treasury, for up to five years.

Lenders must obtain security, if available, up to the amount adequate to protect the loan without consideration of the guaranty.

▷Source

http://www.doi.gov/bureau-indian-affairs.html

http://www.doi.gov/bia/Loan%20Guaranty%20Brochure.pdf

Enterprise Community Loan Fund

The Enterprise Community Loan Fund offers several lending products to support the development of affordable rental and homeownership housing that adheres to Green Communities Criteria.

Early Predevelopment Loans

Early predevelopment loan funds may be used to fund any or all of the following typical costs:

green building/design charrette and other services from a green building/design professional, architectural drawings or engineering studies, geotechnical studies or surveys; construction feasibility studies incorporating green criteria, phase I environmental report, appraisal, legal, and development consultant fees.

Predevelopment Loans

Predevelopment loan funds may be used to fund any or all of the following typical costs related to affordable housing development prior to closing construction financing: architectural, civil engineering and landscape design fees; electrical and mechanical engineering fees; interior design fees; surveys; environmental phase one and follow-up environmental impact studies; traffic studies; erosion control plans; zoning work; legal and title fees; appraisal fees; loan fees; application fees for debt; equity and subsidy financing and the costs of engaging a green design specialist.

Acquisition Loans

Acquisition loan funds may be used to fund any or all of the following typical costs related to the acquisition of land or buildings intended to be developed as affordable homeownership or rental housing: earnest money deposits or option payments; land or building acquisition costs; title, closing and legal costs related to acquisition closing.

Construction Loans

Construction loan funds may be used to fund any or all of the following typical costs related to the new construction or rehabilitation of affordable homeownership or rental housing: construction contract costs; construction contingency; design, engineering and permitting costs during the construction period; construction management fees; carrying costs and any special costs related to compliance with Enterprise's Green Communities Criteria.

▷Eligibility

Available Funds/Target Projects:

- Projects that involve new construction of residential units or rehabilitation at an estimated cost of more than $3,000 per unit.
- Projects subject to firm site control.
- Rental housing projects that have at least 25 units reserved for renters with incomes below 60% of area median income (Green Communities grantees will consider giving Enterprise the right to submit a bid on the equity investment in the project).
- Homeownership projects that have at least 15 homes that will be sold to buyers with incomes below 80% of area median income.
- Projects in the working drawing or construction stages may be considered, but it is assumed that compliance with Green Communities Criteria may be difficult because the Criteria were not included in the design parameters; potential applicants in this situation may still send a funding application if they believe that the Criteria can be met.
- Rental housing assisted by the Initiative must be permanent housing, not transitional or emergency shelter.
- The sponsor must commit to meeting the Initiative's Green Communities™ Criteria and providing Enterprise with certification

that the Criteria have been met; certifications will be made primarily by the project architect.

▷Source

http://www.greencommunitiesonline.org/tools/funding/loans/

Tax Credits, Depreciation, Bonds

Production Tax Credit (PTC)

The Federal PTC provides an inflation-adjusted tax credit for electricity produced from renewable energy sources. In December 2006, the credit was extended for another year and is currently set to expire on December 31, 2008.

PTC currently applies to the following energy resources:

- wind
- closed-loop biomass
- open-loop biomass
- geothermal energy
- small irrigation power (150 kW - 5 MW)
- municipal solid waste
- landfill gas
- refined coal
- hydropower
- Indian coal

The PTC provides a tax credit of 1.5¢/kWh (in 1993 dollars and indexed for inflation) for wind, closed-loop biomass and geothermal. Currently, the PTC for these technologies is 2.0¢/kWh. The PTC, at 2.0¢, represents a substantial portion of the revenue stream of a renewable energy project, and project sponsors should carefully consider ownership scenarios that take advantage of the PTC. Note that the PTC amount is reduced for open-loop biomass, small irrigation hydroelectric, landfill gas, municipal solid waste resources, and hydropower. As of 2006, solar energy systems are NOT eligible for the PTC.

The duration of the credit is 10 years. However, open-loop biomass, geothermal, small irrigation hydro, landfill gas, and municipal solid waste combustion facilities placed into service after October 22, 2004, and before enactment of EPAct 2005, on August 8, 2005, are eligible for the credit for a five-year period. Refined-coal facilities will receive $4.375 per ton (indexed for inflation) for a 10-year term. Indian coal production facilities will receive an increase in tax credit during the seven-year period beginning January 1, 2006, in the amount of $1.50/ton through 2009, and $2.00/ton after 2009.

Note, however, that owners of geothermal projects who claim the federal business energy tax credit may not also claim the PTC.

To qualify for the PTC, electricity must be produced by the person taking the credit, and sold to an unrelated party. In a project with multiple owners, allocation of credits must be in direct proportion to ownership interests. The entity using the credit must either take an active role in project management or else use of the credit is restricted to tax liability incurred through other "passive" investments. Various strategies exist for capturing the value of the PTC, and analysis of the requirements for claiming the credit and evaluating interactions with other subsidies is complex. We recommend expert assistance be sought on the latest information in this ever-changing area, including the current status on the PTC expiration.

▷Reference

http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=US13F&State=Federal%C2%A4tpageid=1

Tax Form: http://www.irs.gov/pub/irs-pdf/f8835.pdf

Renewable Energy Production Incentive (REPI)

The federal REPI provides financial incentive payments for electricity produced and sold by new qualifying renewable energy generation facilities. Qualifying systems are eligible for annual incentive payments of 1.5¢ per kilowatt-hour (in 1993 dollars and indexed for inflation) for the first 10-year period of their operation, subject to the availability of annual appropriations in each federal fiscal year of operation. Section 202 of the Energy Policy Act of 2005 (H.R. 6) reauthorized appropriations for fiscal years 2006 through 2026 and expanded the list of eligible technologies and facilities owners.

Eligible electric production facilities include not-for-profit electrical cooperatives, public utilities, state governments, Commonwealths, territories, possessions of the United States, the District of Columbia, Indian tribal governments, or a political subdivision thereof and Native Corporations. The production payment applies only to the electricity sold to another entity.

Qualifying systems must generate electricity using solar, wind, geothermal (with certain restrictions), biomass, landfill gas (except for systems that generate electricity by the combustion of municipal solid waste), livestock methane, or ocean (including tidal, wave, current, and thermal) generation technologies. Fuel cells using hydrogen derived from eligible biomass facilities are also eligible.

While this incentive offers an alternative for entities not eligible for the PTC, the uncertainty of annual appropriations substantially reduces its value to many projects. If there are insufficient appropriations to make full payments for electricity production from all qualified systems for a federal fiscal year, 60% of appropriated funds will be assigned to facilities that use solar, wind, ocean (including tidal, wave, current and thermal), geothermal or closed-loop biomass technologies; and 40% of appropriated funds for the fiscal year will be assigned to other projects.

▷Reference

http://www.eere.energy.gov/repi/

Accelerated Depreciation

The Modified Accelerated Cost Recovery System (MACRS) establishes a set of class lives for various types of property, ranging from three to 50 years, over which the property may be depreciated. For solar, wind and geothermal property placed in service after 1986, the current MACRS property class is five years. For certain biomass property, the MACRS property class life is seven years. The federal Energy Policy Act of 2005 (EPAct 2005) classified fuel cells, microturbines and solar hybrid lighting technologies as five-year property as well.

The depreciation benefits, however, will only apply to that part of the project that has been financed with equity. The portion of the project financed by non-recourse debt—i.e. financing that is tied solely to the project and not the assets of the borrower—is not eligible for the depreciation benefits. If taking the PTC, individuals and closely held corporations can only use this depreciation tax benefit if they are

actively involved in the project or have offsetting passive income.

The federal Economic Stimulus Act of 2008, enacted in February 2008, included a 50% bonus depreciation provision for eligible renewable-energy systems acquired and placed in service in 2008. To qualify for bonus depreciation, a project must satisfy these criteria:

- the property must have a recovery period of 20 years or less under normal federal tax depreciation rules;
- the original use of the property must commence with the taxpayer claiming the deduction;
- the property generally must be acquired during 2008; and
- the property must be placed in service during 2008 (or, in certain limited cases, in 2009).

If property meets these requirements, the owner is entitled to deduct 50% of the adjusted basis of the property in 2008. The remaining 50% of the adjusted basis of the property is depreciated over the ordinary depreciation schedule. The bonus depreciation rules do not override the depreciation limit applicable to projects qualifying for the federal business energy tax credit. Before calculating depreciation for such a project, including any bonus depreciation, the adjusted basis of the project must be reduced by one-half of the amount of the energy credit for which the project qualifies.

▷Reference

For more information on the federal MACRS, see IRS Publication 946, IRS Form 4562: Depreciation and Amortization, and Instructions for Form 4562. http://www.irs.gov/

Clean Renewable Energy Bonds (CREBs)

Created by the 2005 Federal Energy Policy Act, CREBs can be issued to finance the development of renewable energy projects. CREBs are similar to a "tax credit bond" that currently exists in the tax code for school construction under the Qualified Zone Academy Bond (QZAB) program. Qualified issuers of the bonds include political subdivisions of the state such as local governmental bodies (including municipal utilities), tribal governments, and mutual or cooperative electric companies. In essence, a clean energy bond would provide these issuers with interest-free loans for financing qualified energy projects. CREBs do not require any corporate contribution and do not limit which parties can invest in the securities. The bonds must be issued in 2006 and 2007, but their proceeds can be spent at a later date. The anticipated term of such bonds is approximately fifteen years and is periodically adjusted by the U.S. Treasury along with the amount of the credit that can be claimed against bondholders' federal taxes.

With a conventional bond, the issuer must pay interest to the bondholder. But with a CREB, the federal government pays a tax credit to the bondholder in lieu of the issuer paying interest to the bondholder. The U.S. Treasury Department sets the rate of the credit on a daily basis, in an amount that permits the issuance of the tax credit bond without discount and without interest cost to the issuer. A bondholder can deduct the amount of the tax credit from the total income tax liability. The bonds are taxable, so if the credit is worth

$1,000 and the bondholder is in the 35% tax bracket, the bondholder's tax liability would be reduced $650.

▷Reference

http://www.irs.gov/taxexemptbond/index.html

Enterprise Community Investment Low-Income Housing Tax Credit (LIHTC)

Enterprise Community Investment offers competitively priced Low-Income Housing Tax Credit (LIHTC) equity to nonprofit and for-profit developers for new construction and/or rehabilitation of affordable rental housing that generally adheres to the Green Communities Criteria. Enterprise is committed to creating communities of greater sustainability by working with partners who are willing to incorporate green standards into their projects.

Target projects include:

- Projects that involve new construction of residential units or rehabilitation at an estimated cost of more than $3,000 per unit.
- Projects subject to firm site control.
- Rental housing projects that have at least 25 units reserved for renters with incomes below 60% of area median income.
- Homeownership projects that have at least 15 homes that will be sold to buyers with incomes below 80% of area median income.
- Projects in the working drawing or construction stages may be considered, but it is assumed that compliance with Green Communities Criteria may be difficult because the Criteria were not included in the design parameters; potential applicants in this situation may still send a funding application if they believe that the Criteria can be met.
- Priority is given to the following projects:
- Projects that are scheduled to close and begin construction within 6-9 months. This is a priority to help ensure the timely investment of project financing that has been committed to the program.
- Rental housing projects that have allocations under the Low-Income Housing Tax Credit program.
- Rental housing assisted by the Initiative must be permanent housing, not transitional or emergency shelter.

The sponsor must commit to meeting the Initiative's Green Communities Criteria and providing Enterprise with certification that the Criteria have been met; certifications will be made primarily by the project architect.

▷Source

http://www.greencommunitiesonline.org/tools/funding/housing.asp

State Incentives

For an up to date and comprehensive list of state incentives available for renewable energy and energy efficiency projects, refer to the on-line resource - Database of State Incentives for Renewables and Efficiency: http://www.dsireusa.org/

Washington

Renewable Energy Production Incentives

In 2005, Washington Senate Bill 5101, established production incentives of 15 cents per kilowatt-hour (capped at $2,000 per year, favoring small-scale systems) for grid-connected

individuals, businesses, or local governments that generate electricity from solar power, wind power or anaerobic digesters.

This statewide incentive program is first in the nation to financially reward owners for their system's energy production. The annual cash flow improves the lifetime economics particularly for small-scale renewable energy systems, though larger systems are not excluded.

The incentives vary depending on technology and if the system components were manufactured in Washington. The incentive amount paid to the producer is multiplied by 2.4 for electricity produced using solar modules manufactured in Washington state, 1.2 for electricity produced using an inverter manufactured in Washington state, 1.0 for anaerobic digesters and wind turbines with blades manufactured in Washington State, and .8 for all other wind generators. The production incentives do not impact the customer's eligibility for net-metering, and the green tags associated with the power produced remain with the customer/generator as well (unless otherwise contracted for sale).

The state's utilities will pay the incentives and earn a tax credit equal to the cost of those payments. However, the credit may not exceed the greater of $25,000 or 0.25% of a utility's taxable power sales. The incentive amount may be uniformly reduced if requests for the incentive exceed the available funds. More info can be found at http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=WA27F&state=WA&CurrentPageID=1&RE=1&EE=1

Oregon

The Energy Trust of Oregon

The Energy Trust of Oregon, an independent nonprofit organization, administers programs for renewable energy and energy efficiency improvements, with funding collected through a public-purpose charge on Pacific Power and Portland General Electric ratepayers.

Of the funds collected, at least $10 million per year are allocated to renewable energy projects. The Energy Trust uses these funds to support projects through a loan program, assistance for grant applications, potential co-funding of feasibility analyses, and direct financial support for project development.

For solar installations, the Energy Trust currently offers both a Solar Electric Buy-Down Program and a Solar Hot Water Buy-Down Program, available to residential and commercial projects. For Pacific Power and Portland General Electric customers, the Energy Trust provides cash incentives and resources to install wind turbines up to 50 kW. Homeowners are eligible for incentives up to $35,000 while businesses can be awarded up to $60,000. In addition the Energy Trust can provide technical assistance to finance and coordinate installation, however, the organization does not develop, sell or install equipment. In addition, Energy Trust does provide assistance with energy efficiency assessments, and energy users in eligible areas can receive cash incentives and/or rebates for participating in energy audits and weatherization activities.

To be eligible for funding from the Energy Trust, a project must either be developed within the service territory of Pacific Power or PGE, or

have a Power Purchase Agreement for the sale of energy to one of these utilities. The Energy Trust will provide referrals to contractors from their Trade Ally Network. PV systems must be grid-tied and net-metered, and pre-approval is required. Oregon's current net metering size limit is 25 kW. However, larger systems may be eligible for rebates if approved for interconnection by the utility. Learn more about the Energy Trust programs on their website www.energytrust.org.

Business Energy Tax Credit (BETC)

Oregon businesses investing in, among other things, renewable energy projects in Oregon can claim a Business Energy Tax Credit (BETC) equal to 50% of eligible project costs (with eligible costs capped at $20 million). The 50% credit is taken over five years (10% each year). Any unused credit can be carried forward up to eight years. Alternatively the credit can be taken as a discounted, lump-sum, up-front cash payment from a "pass-through" partner in exchange for the five-year credit. The pass-through option was designed to allow tax exempt entities (e.g. schools) to benefit from the BETC by exchanging the tax credit with taxable businesses able to use the credit, and that is primarily how it has been used to date. Even taxable entities, however, may choose to seek pass-through partners and take the BETC as a lump-sum cash payment. The pass-through cash payment is currently equal to 33.5% of eligible project costs (as opposed to 50% of eligible costs for the five-year tax credit), a discount that is set by the Oregon Department of Energy (which administers the BETC) and is revisited annually. Further information is available online at http://egov.oregon.gov/ENERGY/CONS/BUS/BETC.shtml.

Oregon Small-Scale Energy Loan Program

The Oregon Small-Scale Energy Loan Program (SELP) is a state loan program administered by the Oregon Department of Energy for renewable and energy efficiency technologies. The program makes available low-interest loans to individuals, businesses, schools, cities, counties, state and federal agencies, tribes, public corporations, cooperatives, and non-profit organizations and may be taxable or tax-exempt. Tax-exempt financing is available to private parties through the use of Private Activity Bonds. This may be an advantage to borrowers who cannot take advantage of federal tax benefits. Typical loans vary from $20,000 to $20 million with varying terms, but terms may not exceed the life of the project. Businesses which qualify for SELP often qualify for BETC as well. http://egov.oregon.gov/ENERGY/LOANS/index.shtml

Oregon Renewable Energy Feasibility Fund (REFF)

Oregon's REFF is administered by the Oregon Economic and Community Development Department, and supports feasibility studies for projects that would qualify as "renewable resource projects" under the Oregon BETC program. Cities, counties, county service districts, and tribes are eligible to apply. Funds can be used to evaluate topics such as available renewable resources, siting and permitting requirements, transmission/ interconnection issues, ownership structure, funding mechanisms, economic viability, community acceptance, and/ or to conduct a fatal flaw analysis. A Call for Applications is issued twice annually in the Fall and Spring. The applicant must provide a minimum of 25% of the study costs, with maximum grants of $50,000. Further information is available at Oregon's Department of Economic

and Community Development website: http://econ.oregon.gov/

Idaho

Low Interest Energy Loan Programs

The Idaho Department of Water Resources administers low-interest loan programs for energy efficiency projects, and for active solar, wind, geothermal, hydropower and biomass energy projects. The interest rate is 4% with a 5-year repayment term. Loans are available for retrofit only, with the exception of some renewable resources.

Residential customers may choose one of two loan options: the standard Residential Loan Program or the Home Performance with Energy Star program. Eligible energy efficiency improvements for residential customers under both programs include insulation, electric and gas heating upgrades and water heating system improvements. The Home Performance with Energy Star loan program also provides funds for improvements to windows and air conditioning.

Non-residential customers may undertake projects to improve insulation, windows and doors, heating systems, building commissioning, or custom-designed projects. Specific energy-efficient agricultural equipment may also be eligible. Note that the commercial and industrial loan has a minimum lending amount of $1,000, but loans for the agricultural and public sectors do not have a minimum loan amount.

Certain restrictions apply to this program. For existing homes or businesses, the savings from reduced usage of conventional fuel must be sufficient to pay for the project's installation cost (e.g. simple payback of 15 years or less). For new projects, use of a renewable energy resource must be the least cost alternative. Renewable energy projects that are intended to sell the energy generated or the commodity produced are not eligible. While the program's financing requires repayment within five years, this further stipulation for existing homes and businesses states that the project's cumulative energy savings over a fifteen year period must be great enough to offset the cost of the project.

Montana

Alternative Energy Investment Tax Credit

Commercial and net metering alternative energy investments of $5,000 or more are eligible for a tax credit of up to 35% against individual or corporate tax on income generated by the investment. The credit is applied only against taxes due as a consequence of taxable or net income produced by one of the following:

- A manufacturing plant that is located in Montana and that produces alternative energy generating equipment;
- A new business facility or the expanded portion of an existing business facility for which the alternative energy generating equipment supplies, on a direct contract sales basis, the basic energy needed; or
- The alternative energy generating equipment in which the investment was made, for the credit being claimed.

This credit is available to taxpayers purchasing an existing facility as well as to those building a new facility.

The tax credit must be taken the year the equipment is placed in service; however, any portion of the tax credit that exceeds the amount of tax to be paid may be carried over

and applied against state tax liability for the following 7 years. A credit may be extended through the 15th tax year succeeding the tax year of installation for projects on a Montana Indian reservation that meet other specified criteria. This credit cannot be taken in conjunction with any other state energy or state investment tax benefits, or with the property tax exemption for non-fossil energy property 15-6-201(4).

Alternative Energy Revolving Loan Program

The Alternative Energy Revolving Loan Program (AERLP) provides loans to individuals, small businesses, local government agencies, units of the university system, and nonprofit organizations to install alternative energy systems that generate energy for their own use. The program is funded by air quality penalties collected by the Department of Environmental Quality (DEQ). The program is administered by the Department of Environmental Quality, which is responsible for developing the rules.

Alternative energy systems are defined in MCA 15-32-102 as "the generation system or equipment used to convert energy sources into usable sources." The code goes on to list "fuel cells that do not require hydrocarbon fuel, geothermal systems, low emission wood or biomass, wind, photovoltaic and small hydropower plants (under 1 megawatt) and other recognized non-fossil forms of energy generation." DEQ will provide technical review and approval of systems proposed for the loan program.

In 2005, SB 50 amended the loan program, increasing maximum loan amount to $40,000 (subject to available funds) and extending the repayment period to ten years. Additionally, SB 50 added local government agencies, units of the university system, and nonprofit organizations to the list of eligible sectors, and allowed energy conservation measures to be financed when installed with an eligible renewable energy project. Interest rates are set annually and are fixed for the term of the loan. The rate for 2007 is 5.0%.

DEQ will accept and process loan applications throughout the year. Approved projects will be ranked according to the criteria published in the Administration Rules of Montana (ARM) Title 17, Chapter 85, which includes items such as system reliability, return on investment and avoided fossil fuel consumption. Once a loan is approved, the applicant will be informed as to whether funds are currently available, and if not, when new funds are anticipated.

Utility Programs

Throughout the Northwest, many utility companies are offering incentives (often rebates) for renewable energy installations. Programs range across technologies and sectors. Some utilities pass through funds from conservation and weatherization programs as rebates to customers for measures including renewable energy installations. Others may fund demonstration projects on community buildings with funds from voluntary green power purchases. For larger scale projects, some utilities may be a willing partner in terms of both financing and ownership of a renewable energy system.

The Database of State Incentives for Renewables and Efficiency gives information on loan, grant and rebate programs offered by utilities for each

state. http://www.dsireusa.org/

In addition, energy planners should contact the local utility directly to see what type of incentive or rebate programs they offer for renewables and efficiency.

Environmental Attributes: Green Tags for Project Funding

Renewable energy projects create electricity without pollution. This, and other incremental values of renewable energy generation, compared to generation from conventional sources such as fossil fuel and nuclear, are often recognized and quantified as the environmental attributes, "Green Tags", "Renewable Energy Credits" (RECs), or "Tradable Renewable Certificates" (TRCs). These are defined and sold separately from energy. A voluntary national standard exists to ensure consistency in these products. Visit Green-E's web page (www.green-e.org) for more information. One Green Tag is produced with every 1,000 kWh of clean energy, and currently sells for between $2 and $5 per tag in the Northwest. Green Tag buyers, such as the Bonneville Environmental Foundation, Green Mountain Energy, or Native Energy, resell to utilities and others interested in supporting renewable energy. Green Tags typically belong to the buyer of the power, depending on the structure of the Power Purchase Agreement. While environmental attributes can often be sold for a substantial amount, the market is quite volatile and sale contracts are often only available for three to five years.

Note that certain incentive programs define the ownership of green tags. Contracts for grants, rebates, or other types of project financing may include details on Green Tags going to the funding source for part or all of the system's lifetime. Only when the system owner retains ownership of the Green Tags may the entity choose to claim the green values of their energy or to sell the Green Tags and their claims for additional revenue. For larger-scale installations, for which a Power Purchase Agreement is necessary, the Green Tags usually are contracted to belong to the buyer of the power.

8 - GENERAL RESOURCES

This section is intended to provide direction to the reader who would like to explore a topic further. Many of these works were also useful to the authors of this Guidebook.

Publications and Web Tools

Database of State Incentives for Renewable Energy

This database provides information on tax incentives, rebate programs, portfolio standards, interconnection standards, green power programs, and other state-level policies that encourage renewable energy development. It also provides information on selected federal incentive programs. Available at http://www.dsireusa.org.

Energy Savers and Consumer Guide to Energy Efficiency and Renewable Energy

The U.S. Department of Energy: Energy Efficiency and Renewable Energy (EERE) office offers a comprehensive guide to energy efficiency and conservation. Their website site offers useful energy saving tips for everything from heating and cooling homes to car maintenance. For Energy Savers, visit http://www1.eere.energy.gov/consumer/tips/index.htm

For the Consumer Guide, visit http://www.eere.energy.gov/consumer/your_home/

Energy Star

The US Environmental Protection Agency and the US Department of Energy set standards for energy efficient appliances through the Energy Star program. The site has searchable lists of efficient appliances and vendors that sell them. The site also offers tools to evaluate the cost effectiveness of energy efficiency projects, and also offers other useful information about energy efficiency for residential buildings and hospitality.

available at http://www.energystar.gov/ or regionally at http://www.northwestenergystar.com/

Makah Public Transit Program

For information on their transportation program, visit their site at http://www.makah.com/transit.htm

National Renewable Energy Laboratory's Geothermal Technologies Program

The laboratory is working to determine the performance and value of small-scale geothermal power production through five projects in the Western United States. Their research and development is available online. Available at http://www.nrel.gov/geothermal/georandd.html#field.

Native Power: A Handbook on Renewable Energy and Energy Efficiency for Native American Communities

This comprehensive resource is available for download on the DOE Energy Efficiency and Renewable Energy. The handbook provides information about a variety of sustainable energy projects that may be useful to native communities. Available at www1.eere.energy.gov/tribalenergy/guide/pdfs/nativepower.pdf.

Northwest Community Energy

This site provides in-depth "how-to" information on renewable energy project development. Available at http://www.nwcommunityenergy.org.

Northwest Tribal Technical Assistance Program

Eastern Washington University administers a

program to provide training and research for Tribes on transportation issues. Their site provides program information and online resources. Available at http://www.ewu.edu/x24920.xml.

Renewable Energy Atlas of the West

A project of the Hewlett Foundation and The Energy Foundation. Produced 2002. Atlas contains full-color maps of the renewable energy resources of eleven western states, including high-resolution wind maps that are searchable in the online version. The atlas profiles wind, solar, geothermal, and biomass potential. Available at http://www.energyatlas.org.

Rural Housing and Economic Development Gateway (RHED)

The Gateway is an information clearinghouse supported by HUD's Rural Housing and Economic Development program to provide information and technical assistance to non-profits, local agencies and other community organizers interested in rural economic and community development. View their site at http://www.hud.gov/offices/cpd/economicdevelopment/programs/rhed/gateway/index.cfm.

Or contact staff directly:

451 7th Street, S.W.
Room 7137
Washington, DC 20410
Phone: 1-877-RURAL-26 (1-877-787-2526)
Email: rhed@hud.gov

Transportation Guide for Indian Tribal Governments

This guide is a project of the Washington Department of Transportation. The guide provides detailed information on the specifics of transportation planning and financing these projects in the Northwest. Available at http://www.wsdot.wa.gov/NR/rdonlyres/4FCC0C73-6C1D-4844-BF10-60D7D515A77A/0/TransportationGuideforIndianTribalGovernments.pdf.

Federal Agencies

Bonneville Power Administration

The BPA is a federal agency which markets and delivers electricity to several communities across the Northwest. BPA's Tribal Affairs Office seeks to ensure an "understanding and respect for tribal values and resources." Part of this program is a tribal set aside for low-income weatherization discussed in Section 7 of this guide.

Mailing address:

Bonneville Power Administration
Tribal Affairs Office
P.O. Box 3621
Portland, OR 97208-3621

Street address:

905 NE 11th Ave.
Portland, OR 97232

Phone and fax number:

503-230-7685, phone
503-230-4019, fax

Website:

http://www.bpa.gov/corporate/

Email address:

tribalaffairs@bpa.gov

National Renewable Energy Laboratory

The National Renewable Energy Laboratory

(NREL) is the nation's primary laboratory for renewable energy and energy efficiency. It is the principal laboratory for the DOE Office of Energy Efficiency and Renewable Energy, and is managed for DOE by Midwest Research Institute and Battelle.

Contact:

National Renewable Energy Laboratory
1617 Cole Blvd.
Golden, CO 80401
Phone: 303-275-3000
http://www.nrel.gov

U.S. Department of Agriculture: Renewable Energy and Energy Efficiency Program

The USDA Renewable Energy and Energy Efficiency Program provides information including details on USDA funding opportunities, links to technical and feasibility resources, environmental guidance, and more.

National Office Contact::

1400 Independence Avenue, SW
Washington, DC 20250
Phone: 202-720-1497
Website: http://www.rurdev.usda.gov/rbs/farmbill/index.html

State Contact:

Phone: 1-800-670-6553
Website: http://www.rurdev.usda.gov/recd_map.html

U.S. Department of Energy: Energy Efficiency and Renewable Energy (EERE)

The EERE website offers quick and easy access to a growing number of publications, videos, software, and other information products across EERE. The site provides resources such as national program-level publications, photographs, industry links, and homeowner links related to hydropower and wind energy.

For specific information visit http://www.eere.energy.gov/

Green Power Network

The U.S. Department of Energy's Green Power Network provides news and information on green power markets and related activities. The site provides information on Green Power Marketing in Competitive Electricity Markets and Utility Green Pricing Programs. The network includes marketers of Renewable Energy Certificates.

Visit http://www.eere.energy.gov/greenpower/

Tribal Energy Program

This program promotes tribal energy sufficiency, economic growth and job development through financial and technical assistance and education and training. Their web site provides some useful information that may help in evaluating projects for an energy plan, such as case studies, information on business opportunities and financing.

Visit http://www.eere.energy.gov/tribalenergy/

U.S. Department of Health and Human Services-LIHEAP

HHS is responsible for "protecting the health of all Americans and providing essential human services, especially for those who are least able to help themselves." Through the LIHEAP program HHS provides financial assistance to those whose energy costs constitute a high proportion of their household income.

National Office

Low Income Home Energy Assistance Program
HHS, Administration For Children and Families
Office of Community Services, Division of Energy Assistance (DEA)
Aerospace Building, 5th Floor West
370 L'Enfant Promenade, S.W.
Washington, D.C. 20447

Phone: (202) 401-9351
Fax: (202) 401-5661

Regional Contacts

Region X: Includes WA, OR, ID
Contact: is Zack Poimboeuf
Phone: 202-401-5544

Region VIII: Includes MT
Contact is Robert Laue
Phone: 202-401-5040

Direct contact information for LIHEAP Tribal Grantees can be found at http://www.acf.hhs.gov/programs/ocs/liheap/grantees/tribes.html#ID.

U.S. Department of Housing and Urban Development (HUD)

HUD's mission is to "increase homeownership, support community development and increase access to affordable housing free from discrimination." HUD's Rural Housing and Economic Development (RHED) program can be a helpful resource for rural agencies and organizations seeking funding and support for community development projects including green building projects (see RHED Gateway in Web Tools section).

Idaho

Boise Field Office
Plaza IV, Suite 220
800 Park Boulevard
Boise, Idaho 83712-7743
Phone: (208) 334-1990

Montana

Helena Field Office
7 W 6th Ave
Helena, MT 59601
Phone: (406) 449-5050

Oregon

Portland Field Office
400 SW 6th Avenue
Suite700
Portland, OR 97204-1632
Phone: (971) 222-2600

Washington

Seattle Regional Office
Seattle Federal Office Building
909 First Avenue, Suite 200
Seattle, WA 98104-1000
Phone: (206) 220-5101
Toll-free: (877) 741-3281

Spokane Field Office
Thomas Foley U.S. Courthouse Building
920 West Riverside, Suite 588
Spokane, WA. 99201
Phone: (509) 368-3200

U.S. Department of Interior—Division of Capital Investment

The Department of the Interior is responsible to manage U.S. domestic affairs including land management and Native America and Alaska Native relations. Through the DOI's Division of Capital Investment the Indian Loan Guarantee and Interest Subsidy Program serves to stimulate and increase American Indian entrepreneurship and employment through establishment, acquisition or expansion of Indian-owned or

Native Alaskan owned economic enterprises.

National Office

1849 C Street, N.W.
Washington DC 20240
Phone: 202-208-3100

Division of Capital Investment

1951 Constitution Ave, NW
RM 20-SIB
Washington, DC 20240
Phone: 202-513-7681

Northwest Regional Office

911 NE 11th Ave
Portland, OR 97232
Phone: (503) 231-6754

U.S. Department of Interior—Office of Indian Energy and Economic Development (IEED)

IEED runs an Energy and Mineral Development Program. The program funds projects promoting the development of tribal oil, gas and coal resources; construction aggregate markets; and renewable energy projects such as using biomass, geothermal, and solar and wind energy production.

Website

http://www.peoplelandandwater.gov/bia/bia_assistant-secretary-indian-affairs.cfm

Contact

Stephen Manydeeds
Chief, Division of Energy and Minerals Resources Management, Office of IEED
Lakewood, Colo.
Phone: (303) 969-5270

U.S. Environmental Protection Agency and EPA Tribal Portal

The U.S. EPA is responsible for coordinating pollution prevention activities in the interest of the environment and public health. Working with governments at all levels, the EPA is a source of funding for projects in several areas of energy planning. The Tribal Portal was developed to connect tribes with information within EPA and other government agencies.

Pacific Northwest Regional Office

U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101
Toll-free: 1-800-424-4EPA

Tribal Portal website: http://www.epa.gov/tribalportal/

For a list of tribal contacts in Region 10 visit http://yosemite.epa.gov/R10/tribal.NSF/webpage/tribal+coordinators.

Private Companies and Foundations

EcoFab

EcoFab is a company that provides technical assistance and consultation for buildings designed to be "durable, customizable, and energy efficient."

Contact:

1011 Western Ave., Suite 1006
Seattle, WA 98104
Phone: (206) 450-2062
Fax: (206) 682-5008
E-mail: info@ecofab.net
http://www.ecofab.net/

Bonneville Environmental Foundation (BEF)

BEF was founded in 1998 to support watershed restoration programs and develop new sources of renewable energy. BEF is a nonprofit organization, markets green power products to public utilities, businesses, government agencies, and individuals. Through the brokering of Green Tags, BEF funds can often help finance renewable energy projects.

Contact:

133 SW 2nd Avenue, Suite 410
Portland, OR 97204
Phone: (503) 248-1905
Toll-free: 1-866-BEF-TAGS
http://www.b-e-f.org

Kresge Foundation

Focusing in six fields of interest—health, the environment, arts and culture, education, human services, and community development—the Kresge Foundation seeks to improve the quality of life for future generations "by creating access and opportunity in underserved communities and by advancing methods for mitigating and adapting to global climate change." The foundation is a private organization which supports non-profits.

Contact:

3215 West Big Beaver Road
Troy, Michigan 48084
Phone: (248) 643-9630
Fax: (248) 643-0588

The Enterprise Foundation

Founded over two decades ago, the Enterprise Foundation is a non-profit driven to ensure every American lives in a decent, affordable home. Their programs provide capital and professional expertise for community development and affordable housing projects. Funding for green building projects is provided through the Green Communities Initiative.

Contact:

Enterprise Headquarters
10227 Wincopin Circle, Suite 500
Columbia, MD 21044
Phone: (410) 715-7433
Toll Free: 1-800-624-4298

Green Communities Initiative
Northwest Contact (OR, WA, ID, MT)
Melissa Peterson
Phone: (503) 553-5646

Nonprofit Organizations

The Alliance to Save Energy

Their website provides general information on energy efficiency and conservation, and has a particularly useful section on hotel energy conservation.

Contact:

1850 M Street, NW
Suite 600
Washington, DC 20036
Phone: (202) 857-0666
http://www.ase.org/
email: info@ase.org

American Wind Energy Association

AWEA advocates the development of wind energy as a reliable, environmentally superior energy alternative in the United States and around the world. The AWEA Web site provides a host of useful information and allows

guest access to their membership directory, which includes wind energy specialists and professionals of all types.

Contact:

1101 14th Street, NW, 12th Floor
Washington, DC 20005
Phone: (202) 383-2500
http://www.awea.org
e-mail: windmail@awea.org

Center for Resource Solutions

The Center for Resource Solutions manages Green-e, the nation's leading independent consumer protection program for the sale of renewable energy and greenhouse gas reductions in the retail market. Green-e offers certification and verification of renewable energy and greenhouse gas mitigation products.

Contact:

P.O. Box 29512
Presidio Building 97
Arguello Boulevard
San Francisco, CA 94129
Phone: (415) 561-2100
http://www.green-e.org/

Center for Rural Affairs

The Center for Rural Affairs, a private, nonprofit organization, is working to strengthen small businesses, family farms and ranches, and rural communities.

Contact:

145 Main St. – PO Box 136
Lyons, NE 68038-0136
Phone: (402) 687-2100
Fax: (402) 687-2200
http://www.cfra.org
e-mail: info@cfra.org

Northwest Energy Coalition

The NW Energy Coalition is an alliance of more than 100 environmental, civic, and human service organizations, progressive utilities, and businesses in Oregon, Washington, Idaho, Montana, Alaska, and British Columbia. They promote development of renewable energy and energy conservation, among other things.

Contact:

219 First Avenue South, Suite 100
Seattle, WA, 98104
Phone: (206) 621-0094
Fax: (206) 621-0097
http://www.nwenergy.org
e-mail: nwec@nwenergy.org

Northwest Sustainable Energy for Economic Development (NWSEED)

NWSEED supports and develops creative programs, policies, and financing approaches to build rural economies and meet the region's power needs through affordable, renewable energy generation.

Contact:

1402 3rd Avenue, Suite 901
Seattle, WA 98101
Phone: (206) 328-2441
http://www.nwseed.org
e-mail: info@nwseed.org

Renewable Northwest Project

RNP promotes development of the region's untapped renewable resources, and has proven to be a forceful advocate for expanding utility use of solar, wind, and geothermal energy in the Northwest.

Contact:

917 SW Oak, Suite 303

Portland, OR 97205
Phone: (503) 223-4544
http://www.rnp.org
e-mail: renewables@RNP.org

U.S. Green Building Council

This organization administers LEED project certification and professional accreditation. Their site provides LEED and other green building resources and national chapter information.

Contact:

1800 Massachusetts Avenue NW
Suite 300
Washington, DC 20036
http://www.usgbc.org/
email: info@ usgbc.org

9 - GLOSSARY

Biodiesel - Made from oily seeds, algae, or waste oil. Biodiesel can be mixed with or used to replace diesel.

Bioethanol - This fuel is made from sugary or starchy crops, grasses, and woody/cellulosic biomass. Bioethanol can be mixed with gasoline.

Compact Fluorescent Lamps (CFLs) - A type of fluorescent light designed to replace an incandescent light. Compared to general service incandescent lamps giving the same amount of visible light, CFLs use up to 75% less energy and have a longer rated life.

Distributed generation - Small, decentralized, generating systems located in or near the place where energy is used.(Also known as DG, Distributed Energy Resource, or DER.)

Distribution system - Distribution lines carry power from substations to electricity end-users. These lines are generally between 4 and 13 kV.

Energy audit - An inspection of a building to determine where and how the building may be wasting energy and what improvements (through conservation and efficiency) can be made.

Energy conservation - The process of reducing energy use through changes in everyday behaviors. Turning off lights when leaving a room and lowering thermostats are some easy and effective examples that conserve energy—and changing behavior generally doesn't cost anything yet saves money.

Energy efficiency - The process of ensuring that mechanical systems—such as homes, businesses, and appliances—use energy as effectively as possible. Replacing leaky windows, using more energy efficient light bulbs, and buying ENERGY STAR appliances are some examples of easy systems modifications that save energy and money.

Energy plan - A statement of long-range actions and policies to help guide the future of a tribe's energy use.

Interconnection - The connection between a generating system and the utility grid, enabling power to be moved in either direction.

Methane-based biogas - This fuel can be made through anaerobic digestion of animal droppings, landfill waste, or food or paper processing waste. Biogas can be mixed with or used to replace gaseous fuels like natural gas and propane.

Net metering - Under a net metering agreement, electricity that is fed back into the grid is credited at the full retail rate (the same retail price the customer pays for power they consume from the grid).

Photovoltaics or PV - A cell or panel of cells that convert sunlight directly into electricity using semiconductor materials.

Syngas - This gas mixture can be made from gasification of a variety of feedstocks and is used for industrial synthesis of fuels and other chemicals.

Transmission system - The high-voltage lines and associated equipment used to transmit electric power over long distances, generally from generators to subtransmission and distribution grids. Transmission lines have voltages ranging from 115 kV to more than 500 kV.

Wind power class - A simplified and standardized measurement to compare wind

resource. Classes ranging from 1 (power density less than 200 watts/m2) to 7 (power density greater than 800 watts/m2).

Wind turbulence - Uneven, chaotic wind conditions. Often caused by obstacles such as trees, buildings, or large land features, turbulence causes the forces on turbine blades to vary, affecting potential energy production.

10 - APPENDICES

Appendix A: Energy Plan Goals and Motivations Questionnaire

This questionnaire will help identify and focus your tribe's goals and motivations for completing an energy plan. It is intended for tribal council members and other people involved in high-level tribal planning.

Motivations:
What do you want to accomplish through the energy plan, and **why** is energy planning important for your tribe?

Goals:
How will your tribe meet the demands of your energy plan? What concrete steps will you take?

The following are some questions to help you brainstorm motivations and goals for creating your plan.

1. Describe the strengths and weaknesses of your tribe's current energy situation.

2. Select the 3–5 factors that are most important for your community and which you most feel should inform the energy planning process:

   __ Economic

   __ Scientific

   __ Environmental

   __ Sovereignty

   __ Historical

   __ Organizational

   __ Cultural

   __ Local/global obligations

   __ Other: _____

3. For each factor chosen above, answer the following questions:

   - What does this factor mean in the context of your tribe and energy planning?
   - What about your tribe's experiences and history make this factor important?
   - How do you envision this factor being incorporated into your tribe's energy plans?
   - What are 1–3 concrete energy goals that your tribe can accomplish relating to this factor?
   - How will your tribe benefit from accomplishing these goals?

Appendix B: Do-it-yourself Residential Energy Audit

A simple residential energy audit is an analysis of the energy used for space heating, the largest residential energy cost. Additionally, every other area of energy use—appliances, lights, hot water—can be audited separately, or combined for a full house audit.

An audit of space heating energy involves identifying cracks and holes that let heat escape, identifying insulation levels, determining the desired level of insulation, and identifying ways to increase the efficiency of the heating equipment. To find cracks and holes, carefully examine every wall, window, door, chimney, and joint between building materials in the house, both from the interior and the exterior. Look for places where daylight shows through a crack, places that feel drafty, and places where wires or pipes go through walls. Use the sample checklist to guide your search.

A building pressurization, or blower door, test is an excellent way to identify leaks. Conduct such a test by following these steps:

- Close all exterior doors, windows, and fireplace flues.
- Turn off all combustion appliances, such as gas furnaces and water heaters.
- Turn on all exhaust fans (generally located in the kitchen and bathrooms) or use a large window fan to suck the air out of the rooms.
- Patrol the house with a burning stick of incense, looking for wavering smoke, or with a damp hand, feeling for drafts.

Home Energy Audit Checklist

Air leaks
__Electrical outlets
__Switch plates
__Window frames
__Baseboards
__Weather stripping around doors
__Fireplace dampers
__Attic hatches
__Wall- or window-mounted air conditioners
__Pipes
__Wires
__Foundation seals
__Mail slots
__Doors
__Windows
__Exterior corners
__Exterior chimney
__Exterior foundation

Attic
__Air leaks
__Low insulation on hatch
__Low insulation on floor
__Poor seal around hatch
__No vapor barrier
__Insulation covers vents

Basement
__Low insulation in floor above basement
__Low insulation above foundation
__Low insulation around hot water heater
__Low insulation around pipes
__Low insulation around ducts

Bills
Heat source:_____
Heat price: $ _____ per _____
Max heat bill: month _____ $_____
Day temp: _____ Night temp: _____
Elec price: ¢ _____ per 1st _____ kWh
¢ _____ per next _____ kWh
Max elec bill: month _____ $_____
Ave. elec bill: $_____

This test will make it easier to find cracks by creating a low pressure zone inside the house, which pulls outside air into the house through even the smallest cracks. Searching for cracks can be time-consuming, but every crack plugged will save money and energy.

The next step is to determine the locations and insulating abilities of insulation. Minimally, look in the attic and basement to see where insulation exists. Ideally, determine the type and R-value of insulation in every wall, floor, and ceiling, and the R-value of every door and window. It is recommended that to try to determine if insulation exists in some walls between heating living spaces and the outdoors. The most common way of doing this is to look through an electrical outlet Making sure the electricity is off, take off the outlet cover and poke into the wall with a long thin rod. If there is resistance, there is insulation. Shine a flashlight into the opening and try to see the type and R-value of the insulation. Use the form on the next page to record levels of insulation found.

Check to see if heating equipment labels display annual fuel utilization efficiency (AFUE). AFUEs below 75% are inefficient and below the current minimum standards, while AFUEs over 90% are highly efficient. If the AFUE is not displayed, there are several indirect ways of estimating if heating equipment is operating inefficiently. The lifetime of a furnace or boiler is generally around 15 or 20 years; if the furnace is 15 years old or older, it may be cost effective to replace it with an energy efficient model such as a condenser. Find out when the furnace or boiler last had a professional tune-up. These tune-ups are well worth the money, and should occur every year for oil heaters, every two years for gas furnaces and boilers, and every three years for heat pumps. Examine the heater for these characteristics of low efficiency: continuously operating pilot light, combustion gases regulated only by natural air flow, wide flue pipe, heavy heat exchangerProgram (http://www.ornl.gov/~roofs/Zip/ZipHome.html).

Insulation Evaluation for Home Energy Audit

Room	Wall/Floor/Window/ door/ceiling/pipe	R-#

Appendix C: Issues to consider when planning an Energy Conservation Event

Audience

- Office workers
- LIHEAP recipients
- Homeowners
- Home renters
- Business owners
- Tribal administrators
- Schoolchildren
- Employees of a tribal enterprise
- Seniors
- Parents
- General audience

Topics

- Weatherization
- Lighting and daylighting
- Heating and HVAC
- Home appliances and hot water
- Office appliances
- How to save money quickly
- How to save money over time
- How to shop for appliances
- How to audit energy use
- How to read energy bills
- How the utility can help
- Demo of efficiency products
- LIHEAP and how to receive it
- Rebates, incentives, and assistance programs
- Where to find more information
- Tribal energy plans

Presentation methods and materials

- Lecture or Powerpoint
- Games and activities
- Question & answer
- Discussion
- With a meal
- Information handouts
- Applications for assistance programs
- CFLs
- Weatherization materials
- Low-flow faucets
- Motivational/reminder posters or fridge magnets

Presenters

- Tribe member
- Utility representative
- NWSEED
- LIHEAP representative
- Building manager
- Consultant/contractor

Venues

- School
- Community center
- After-school program
- Tribal office
- Private home
- Place of employment
- Continuing education series
- Day, night, or weekend

Expenses

- Presenter fee
- Space rental
- Food
- Publicity expenses
- Information handouts
- Supplies

Publicity

- Mail flyers to audience
- Post flyers at location
- Ad in newsletter
- Ad in newspaper
- Ad on radio
- Phone calls
- Workplace emails
- Announcement at community events
- Publicity through speaker's organization
- Word of mouth

Evaluation of event

- Number of people contacted
- Number of ads
- Number of positive responses
- Number of attendees
- Amount of materials handed out
- Responses on evaluation forms
- Number of people on sign-up sheet
- Number of follow-ups contacts