From your cooperative electricity provider...

Member Considerations for Adding Solar PV/Distributed Generation

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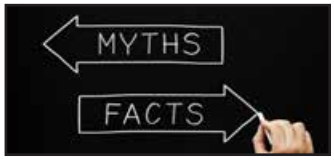

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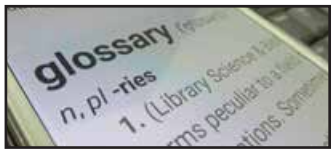

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Questions to Ask a Prospective Solar PV Vendor

If you're considering installing or investing in solar photo-voltaic (PV) technology to generate electricity, ask prospective vendors these questions before signing on the dotted line. If you have further questions or concerns, talk to the member services department at your not-for-profit electric cooperative for more information.

1. What is the total installed (turnkey) cost of the system?
2. How much money is due upfront, and what is the schedule of payments?
3. If my energy use changes, will I be able to add more panels later?
4. Do I need a new roof now in order to install solar? Is my roof suitable to carry the additional live and dead load forces that the solar array will exert?
5. When was your company established and how much solar has it installed to date? Can your company provide a list of the projects and references for them?
6. Is your company affiliated with other parties to deliver the installation and who are they?
7. Does your company have a standard insurance certificate with adequate general liability coverage of $1 million or more? (Ask to see it)
8. Does your company have professional liability Insurance? (Ask to see it)
9. Does your company carry Workers Compensation? (Ask to see it)
10. Do you have the ability to cover me as an "Additional Insured"?
11. Are your solar installers North American Board of Certified Energy Practitioners (NABCEP) Solar Photovoltaic (PV) Electric trained and certified?
12. Do you have a licensed professional engineer on staff to review and approve drawings for submission to city/county building code and fire department officials?
13. Are you accredited with the Better Business Bureau? If so, what is your rating?
14. In which country are the solar panels and inverters you are selling made?
15. Will the company honor your manufacturer's multi-year performance warranty?
16. Does the company have a master electrician on staff to obtain the required electrical permits and to supervise the electrical work for your project? (Ask to see the certificate)
17. Is your solar installer company a licensed electrical contractor, which is required to install solar electric systems? May I see your company's license?
18. Who will be working on my roof, and how much experience do they personally have installing solar?
19. How does your company handle it when you get busy? Do you work with sub-contractors?
20. How long will the installation take?
21. Will the age or type of my roof affect the cost of installation?
22. How will installation affect my roof? Will it create leaks? And if it does create leaks, are you then responsible for repairs?
23. If I'm planning on re-doing my roof, should I install panels before or after?
24. How much of my energy use would my solar system cover?
25. How much would my monthly energy bills be after installation? From you and from my cooperative?
26. How long would my payback period be on my solar system? What are the key assumptions associated with my payback that may impact that result?
27. How will solar affect my homeowner's insurance?
28. Will you complete all of the paperwork associated with getting the permits and financing?

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Top 10 Considerations Before Installing a Distributed Generation System

The following are 10 key things to consider before installing a solar or wind distributed generation (DG) system. As you work through the process, other items also may emerge as key items to consider. As always, make safety your top priority when considering any type of system that will be interconnected to the power grid.

1. Implement energy efficiency.

Completion of a thorough energy efficiency audit is an important precursor to considering distributed generation. Implementing energy efficiency measures in advance of installing a distributed generation system can save you money by reducing your overall energy or water consumption, which subsequently reduces the size of the distributed generation system you'll need to meet your energy needs.

2. Do your homework before you write the check.

First and foremost, if you are considering investing in a distributed generation system, talk to your electric cooperative at the outset of your process. Then, we recommend you also talk to credible, reputable sources of information who are skilled professionals and knowledgeable in distributed generation systems. Once you share some of your preliminary research with them, they can advise you of additional resources to help you understand the economics of a distributed generation system: what type of renewable energy technology would be best for your property; and financing, potential incentives, and other requirements, such as insurance.

3. Know your co-op's rate structure and interconnection and purchased power polices.

As distributed generation is becoming more common, many electric cooperatives (and utilities in general), are examining their rate structure to ensure that its rates are non-discriminatory between distributed generation member-owners and non-distributed generation member-owners. Your local not-for-profit energy provider can help you to understand the rate structure under which you will take service and what type of charges are likely to be incurred, as well as how you may be compensated for the excess energy you don't use that is generated by your distributed generation system.

4. Analyze your electric load and understand the DG system's capabilities.

Understanding your electricity use and overall energy needs is one of the first steps in the process of investigating whether a distributed generation system is a good investment for you. A thorough examination of your electricity needs helps you determine the size and type of the system you will need, and how your energy use fluctuates throughout the day, seasonally and over the year. By researching when various distributed generation systems produce peak energy, you can correlate that information with your current and expected energy use. You'll most likely still need power from a centralized energy grid, so it's important to realize that distributed generation is intended for supplemental power to meet your own energy needs.

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5. Determine the costs upfront.

Most electric co-ops do not install or maintain member-owned distributed generation systems. As an individual owner of the distributed generation system, you will be responsible for the initial upfront costs to install the system as well as ongoing maintenance and repair costs. Doing your homework before investing in a system will help you to understand what costs will be involved, such as installation and interconnection costs, insurance, taxes, etc. Costs will vary if you buy a new or used system, and there are variables such as incentives and tax credits. Your research will help to determine if a distributed generation system is economical for your energy needs.

6. Research potential incentives and tax credits.

It's important to know what types of financial incentives are available to offset your investment costs. As a first step to researching incentives, we encourage you to visit with your co-op staff. Incentives often are driven by laws or policies, have expiration dates, and can vary by type and size of system, whether it's for residential or commercial/industrial use, and other factors. The Database of State Incentives for Renewables & Efficiency (www.dsireusa.org) is one source of information on incentives and policies that support renewables and energy efficiency in the U.S. The site features an interactive map, which allows users to click on a state to see a comprehensive listing of federal and state incentives, credits, exemptions, grants, loans and rebates for residential and commercial/industrial projects and programs.

7. Understand responsibilities.

Installing a distributed generation system requires that certain responsibilities are met by all parties involved with the process. For example, the owner of the distributed energy system is responsible for obtaining the proper equipment and ensuring that all requirements of the electric co-op's interconnection agreement are met, including paying any necessary costs. Local and/or state officials are responsible for conducting safety inspections, but the owner of the distributed generation system must notify the local and state officials in order to set this in motion. Once all interconnection requirements are met and the safety and integrity of the system meet all necessary criteria, then the cooperative is responsible for the final stages of interconnection. Ongoing maintenance and system repairs are the responsibility of the generation system owner.

8. Know safety requirements.

Member-owners who choose to install distributed generation systems also are connected to the grid. To have reliable electric service available at times when your system isn't producing sufficient energy to meet your needs, your electric cooperative provides backup electricity. Because of this connection, distributed generation owners must work with their co-op to meet their requirements to keep the grid reliable and safe. This also will help to protect your investment so that if the grid experiences an outage, your system does not burn up trying to fulfill the electricity needs of other member-owners on the grid. All interconnection and safety requirements must be met prior to operating a distributed generation system in parallel with your co-op's electric distribution system.

This is necessary to protect other member-owners, cooperative employees, public safety personnel, and the general public from risks that could result from the improper installation of distributed generation.

9. Choose a reputable vendor.

If you have decided to install a distributed generation system, it's important to find a reputable installer who will size the system properly after you have implemented energy efficiency measures and who will give you realistic expectations. Ask for references, check online consumer reviews, and ask for third-party input from credible resources. Refer to the North American Board of Certified Energy Practitioners (NABCEP) at NABCEP.org to locate certified installers and practitioners in your area.

10. Keep thorough records.

Establish a thorough record-keeping process. Retain all data and research that you gather as well as information that is provided by your electric cooperative, vendors and other credible third-party sources. If you proceed with a distributed generation system, you will want to track and compare actual system performance with expected performance based on vendor information.

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Distributed Generation: Frequently Asked Questions

1) What is distributed generation (DG)?

Generating technologies located close to where the electricity is being used that are connected to the electric power grid and serve as supplement to or an enhancement of the traditional electric power system. The technologies of interest today for member-owners primarily include solar and wind generation and energy storage solutions. Distributed generation allows member-owners to produce some or all of the electricity they need.

Renewable energy distributed generation systems only produce power when their energy source, such as wind or sunlight, is available; this is called intermittent power. Due to this intermittency of the power supply from distributed generation, there often are times when the member-owner still needs to receive electricity from the cooperative's grid. When the distributed generation system produces more power than the member-owner can consume at that time, the excess power is sent onto the cooperative's grid. This reduces the overall amount of electricity that the cooperative needs to supply at the time the distributed generation system is producing power.

2) What are the primary differences between central station generation and distributed generation?

Central station generation produces electricity at a power plant, which is transmitted through the interconnected grid infrastructure to a widely distributed group of users, which provides significant cost efficiencies. Central station generation often uses a diverse mix of fuel sources, including coal, oil, natural gas, nuclear, hydro, wind, solar and biomass. Central station generation provides diversity in system size, optimal operation times for maximum efficiency, and geographic location. Base load central station generation resources (e.g. typically coal, oil, nuclear and natural gas) are designed to and can operate 24/7 and can also be dispatched as needed to meet load, regardless of factors such as weather.

Distributed generation is generally smaller in size than central station generation and located on or near a consumer's source of energy needs. Although technology is changing, most renewable energy distributed generation sources are unable to meet the dispatchability requirements of the grid. Currently, not all distributed generation is able to completely serve the consumer loads without relying on utility based backup.

3) How does distributed generation affect the current energy model?

For decades, power from central station generation has been and continues to be the most reliable and affordable way to provide power to large numbers of consumers. When consumers only receive power from centralized sources, cooperative member-owners benefit from economies of scale and the cooperative can adequately plan for future energy demand and have adequate generation available to meet those needs.

Distributed generation, while supported by electric cooperatives, introduces many new variables that need to be continuously factored into energy planning and delivery. Some of those factors include, but are not limited to, supply and demand forecasts, the rate structure to ensure non-discriminatory rates and that all member-owners pay their fair share for the costs associated with delivering and receiving power from the grid and various distributed generation inspection protocols to ensure the continued safe operation of the grid.

4) What is my co-op's position with respect to distributed generation?

Your member-owned electric cooperative supports distributed generation as long as it is developed and installed in compliance with the cooperative's policies and local, state and federal laws and regulations.

5) Is distributed generation right for me?

It is solely the responsibility of the member-owner to determine if owning a distributed generation system is a good investment. Your electric cooperative does not provide financial assistance with the analysis; however, we will assist you with finding appropriate and credible resources to help you with the decision-making process. Before determining if distributed generation is right for you, you'll want to determine your goals (e.g. environmental stewardship, serving a percentage of your energy demand, etc.), evaluate the type and size of distributed generation desired, understand your economics and investigate and understand all applicable requirements and regulations.

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6) Should I invest in energy efficiency improvements first?

Yes! Completion of a thorough energy efficiency audit is an important precursor to considering and understanding the economics of distributed generation for you. Implementing energy efficiency measures in advance of installing a renewable energy system can save you money by reducing your overall energy or water consumption, which subsequently reduces the size of the distributed generation system you'll need to meet your energy needs.

7) What type (wind, solar, etc.) and size of generation system should I choose?

Choosing the size of a distributed generation system requires thorough research and analysis of your daily and annual energy use and a determination as to whether you've maximized energy efficiency options for your property. The energy use analysis will indicate what time of day you are using the most energy and the profile of your usage across all hours. Not only will this information allow you to size your system according to your energy consumption needs, it also will show what system will be most suitable. For example, if your peak energy usage is 6-8 p.m., a solar system may not be the best choice as solar energy generation typically peaks earlier in the day. Factors such as your geographic location, city and county codes and zoning requirements, and overall system economics will be important considerations in your decision-making process. You also should understand your cooperative's policies for purchasing the power you don't consume if you have excess generation.

8) What is the process of interconnecting distributed generation?

Planning for a home distributed generation system is a multistep process that begins with talking to your electric cooperative, and requires significant analysis and fact-finding, and then careful evaluation of the information that you learn in the process. If you are considering investing in and potentially installing a distributed generation system, it's important that you follow these key steps: 1) Identify and implement energy efficiency opportunities. 2) Schedule a meeting with your co-op. We can help you to understand interconnection requirements and point you in the right direction for credible resources that can further assist with the analysis process. 3) Analyze your electric loads. 4) Determine applicable codes. 5) Identify and discuss your options with credible resources and contractors. 6) Schedule a follow-up meeting with your co-op.

9) What is an interconnection agreement, and does my co-op require one?

An interconnection agreement is a legal contract for the connection of the distributed generation facility to the cooperative's grid, specifying the location, size, cost, manner of payment, terms of operation and respective responsibilities of the cooperative and the distributed generation facility owner.

To ensure your own safety and that of your fellow cooperative member-owners, you must notify your electric co-op if you intend to install a distributed generation system. With any type of distributed generation system, whether cogeneration or renewable, maintaining the safety, stability and reliability of the overall grid is of the utmost priority.

10) What are my responsibilities when owning a distributed generation system?

As the individual owner of the distributed generation system, you will be responsible for the initial upfront costs to install the system as well as ongoing maintenance and repair costs. The owner of the distributed energy system is responsible for obtaining the proper equipment and ensuring that all requirements are met of your cooperative's interconnection agreement as well as applicable state, local and federal codes. In addition, you will be responsible for paying necessary costs associated with interconnection and operation of the system.

11) What are the co-op's responsibilities?

Once all interconnection requirements are met and the safety and integrity of the system meet all necessary criteria, then your co-op is responsible for the final stages of interconnection. Ongoing maintenance and system repairs are the responsibility of the generation system owner.

12) What questions should I ask a vendor (using solar panels as the example)?

During your research, many questions will be identified that you should ask a vendor including:

- What is the total installed (turnkey) cost of the system?
- How much money is due upfront, and what is the schedule of payments?
- If my energy usage changes, will I be able to add more panels later?
- Do I need a new roof now in order to install? Is my roof suitable to carry the additional live and dead load forces that the solar array will exert?
- When was your company established and how much solar has it installed to date? Can your company provide a list of the projects and references for them?
- Is your company affiliated with other parties to deliver the installation and who are they?
- Does your company have a standard insurance certificate with adequate general liability coverage of $1 million or more? (Ask to see it)
- Does your company have professional liability insurance? (Ask to see it)
- Does your company carry workers compensation? (Ask to see it)
- Do you have the ability to cover me as an "additional insured"?

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- Are your solar installers North American Board of Certified Energy Practitioners (NABCEP) Solar Photovoltaic (PV) Electric trained and certified?
- Do you have a licensed professional engineer on staff to review and approve drawings for submission to city/county building code and fire department officials?
- Are you accredited with the Better Business Bureau? If so, what is your rating?
- In which country are the solar panels and inverters you are selling made?
- Will the company honor your manufacturer's multiyear performance warranty?
- Does the company have a master electrician on staff to obtain the required electrical permits and to supervise the electrical work for your project? (Ask to see the certificate)
- Is your solar installer company a licensed electrical contractor which is required to install solar electric systems? May I see your company's license?
- Who will be working on my roof, and how much experience do they personally have installing solar?
- How does your company handle it when you get busy? Do you work with sub-contractors?
- How long will the installation take?
- Will the age or type of my roof affect the cost of installation?
- How will installation affect my roof? Will it create leaks? What if it does create leaks, are you then responsible for repairs?
- If I'm planning on re-doing my roof, should I install panels before or after?
- How much of my energy usage would my solar system cover?
- How much would my monthly energy bills be after installation? From you and from my cooperative?
- How long would my payback period be on my solar system? What are the key assumptions associated with my payback that may impact that result?
- How will solar affect my homeowner's insurance?
- Will you complete all of the paperwork association with getting the permits and financing?

13) What type of records should I keep?

You should keep records of all of your research and document the answers you receive to all of your questions. It's also important to maintain information about expected system performance and promises made by the vendor. Electric usage records should be kept for at least a year prior to installation and each month following installation for comparison purposes so you can monitor your savings.

14) What if the vendor that I choose goes out of business?

This is an important question to ask your vendor and other resources such as the Better Business Bureau.

15) What are the distributed generation installation and operating costs?

Many factors will impact the cost to install distributed generation and includes things such as type and size of system, construction, maintenance and installation fees, interconnection fees, such as line upgrades, isolating devices and system protection equipment, interest rates for loans, retail electric rate, cooperative's avoided cost of generation, and insurance. The engineering study that your co-op conducts as part of the interconnection process will determine what equipment is necessary for interconnection.

16) What tests will be needed to ensure the system is operating properly?

Your electric co-op will conduct a commissioning test to ensure the system is operating properly. This is a highly specialized activity where a power installation is tested by a trained engineer to exacting industry standards. The test will verify that the system has all of the needed protective and interconnection equipment and can operate properly and safely.

17) Who conducts the necessary inspections?

Local and/or state officials conduct safety inspections.

18) Should I buy or lease?

As is the case with other major purchases, buying and leasing options have different benefits and those benefits vary depending on your financial situation and purchasing goals. By doing your homework, understanding the economics of the system and assessing the pros and cons of both options, you can arrive at an informed decision that is best for your individual situation.

19) The vendor has described a lease arrangement in which they own the system and I simply pay them a monthly fee for system output. Is that allowed in my area?

Under federal law, our obligation is to buy from the owner of the distributed generation system as long as it meets the requirements of a qualifying facility as defined by the Public Utility Regulatory Policies Act of 1978 (PURPA).

20) If I lease, who is responsible for maintenance?

Information about responsibility for system maintenance should be covered early on in your discussions with the vendor and be documented within the lease agreement entered into with the company providing the equipment.

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21) What kind of maintenance costs should I anticipate?

Maintenance costs will vary depending on many things, such as the size and type of system; whether the generation unit is new, used or leased; and weather impacts. A reputable vendor should outline and document these cost assumptions when you are considering investing in a distributed generation system.

22) Are there state or federal incentives or tax credits?

The Database of State Incentives for Renewables & Efficiency (www.dsireusa.org) is one source of information on state and federal incentives, tax credits and policies that support renewables and energy efficiency in the U.S. The site features an interactive map, which allows users to click on a state to see a comprehensive listing of federal and state incentives, credits, exemptions, grants, loans and rebates for residential and commercial/ industrial projects and programs.

23) What is net metering service?

"Net metering service" means service to an electric consumer under which electric energy generated by that electric consumer from an eligible on-site generating facility and delivered to the local distribution facilities may be used to offset electric energy provided by the electric utility to the electric consumer during the applicable billing period.

24) How does net metering impact the entire utility system?

Due to current utility and cooperative rate structures that were designed with the concept of consumers always using the utility's central station services, net metering, as structured today, is essentially a cost shifting mechanism that provides a subsidy to the owner of the distributed generation system. This subsidy is a direct result of rate structure issues that force the non-distributed generation owning member-owners of the cooperative to cover the cost of the subsidy rather than using a federal- or state-funded incentive program to offer such subsidies. Policymakers across the U.S. are examining the concept of net metering to determine if it's sustainable concept. A primary challenge with net metering and an increasing number of distributed generation systems is the gap that it creates in receiving the necessary funds to maintain a safe and reliable power grid. Under the current design, member-owners who receive the benefit of net metering may not be paying their fair share of the costs necessary to construct, operate and maintain the grid so that they can rely on the grid when their distributed generation is not producing electricity.

25) What are my insurance needs?

All distributed generation owners should be prepared to provide proof of general liability insurance as part of the interconnection agreement. Specific requirements may be discussed with staff at the electric cooperative when you discuss your interconnection agreement.

26) What happens when my DG system fails or there is a power outage?

Typically if there is a power outage, the distributed generation system will automatically disconnect from the grid and may shut down if grid power is necessary for it to function. If the distributed generation system was allowed to remain in-service, it could backfeed and energize your cooperative's lines. This would present a serious danger to line crews who would expect the power lines to be de-energized so that repairs could be made to safely and efficiently restore service. If your DG system fails, your power will come from the co-op through the grid until you are able to restore the DG system to service.

27) If there is a catastrophic event, who pays for the loss?

As the owner of the DG system you are responsible for all costs or insurance claims associated with the system. Your electric cooperative does not have financial responsibility for your system.

28) If there are injuries to the public or crew during the installation process, who is responsible?

Your attorney can provide more information on liability. It is the responsibility of the property owner to obtain necessary insurance. This is an important question to pose to your installer to ensure they also have insurance.

29) What if I decide to remove the system, who is responsible?

If you are the owner of the distributed generation system then you will be responsible for removal of the system.

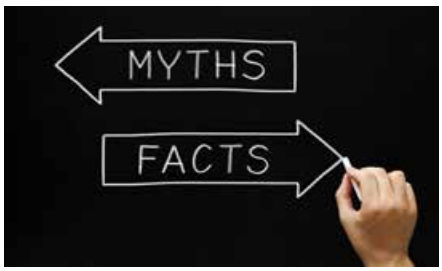
30) Are additional resources available to assist with the decision-making process?

At the outset of your process, it's important to talk to your electric co-op's member services personnel. You also should consult with experts in renewable energy and distributed generation who can advise you of additional resources; help you to understand the economics of a distributed generation system; help you to determine if a distributed generation system is right for you and what type of renewable energy technology would be best for your property; discuss financing, potential tax incentives and financial incentives; and discuss other requirements such as insurance.

Staying engaged with cooperative staff during all aspects of considering installation of distributed generation is critical to the success of the project. Our priority is to help you make informed decisions and to do everything possible to ensure the safety of all parties involved and that all interconnection requirements are met. Think of the co-op as your trusted energy advisor. We're member-owned and look out for our members' best interests.

Distributed Generation: Myths vs. Facts

If you're thinking about installing a solar photovoltaic (PV) generation system, make sure you have all the facts first. Read through our list and see if you've heard any of these myths.



Myth: I don't need to contact my electric cooperative before I install a distributed generation system on my property.

FACT: Owners of distributed generation, also referred to as alternative energy production facilities (such as solar photovoltaic and wind turbines) are required to notify their utility company, which includes electric cooperatives, of plans to construct, install and operate any system that will be connected to the utility's systems. The utility's system referenced includes electric transmission lines, distribution lines or attached equipment. The notification by the owner must be made in written form and received by the electric cooperative at least 30 days prior to the commencement of construction or installation.

Myth: My electric cooperative will help to cover the costs associated with determining if owning a distributed generation system is a good choice for me.

FACT: It is solely the responsibility of the member-owner to determine if owning a distributed generation system is a good investment. Your electric cooperative does not provide financial assistance with the analysis. However, electric co-ops have created this reference information to help members-owners to understand the complexity of owning a distributed generation system before a decision is made.

Myth: Because I already have a wind or solar generating facility on my premise, I don't need to contact my electric cooperative if I plan to expand my system.

FACT: Whenever a system expansion is planned, it's necessary to contact your co-op to ensure all electrical needs can be adequately met and that system reliability and safety are not compromised. In some instances, line upgrades may be necessary to serve the expansion. The system expansion also will need to undergo the same inspection process that is required of a new generation system.

Myth: I will be using all of the energy output that I generate with my distributed generation system; therefore, I don't need to contact my co-op.

FACT: No matter what size of the system and the intention to generate all of the power needed, consumers are required to notify their electric cooperative of plans to construct, install and operate any system that will be connected to the cooperative's systems (electric transmission lines, distribution lines or attached equipment). The notification must be made in written form and received by your electric cooperative at least 30 days prior to the commencement of construction or installation. An interconnection agreement also is required to be in place prior to operation of the system.

Myth: If I install a distributed generation system, I won't need the grid.

FACT: In order to ensure reliable and uninterrupted power, individual renewable systems typically must be balanced with a continuous source of dependable power from central station generation. It's very rare for individuals who want continuous and reliable electricity to be completely off the grid. Backup generation in the form of a gas-powered generator or battery bank or some other storage technology would be needed if the consumer was no longer on the grid and a continuous supply of power is desired. However, these backup systems can be more expensive and less reliable than currently available central station generation provided by an electricity provider using the grid and may require diligent monitoring and regular maintenance by the member-owner to maintain reliability.

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Myth: The grid acts as a battery for my excess kilowatt-hours.

FACT: Currently, the grid is not capable of storing electricity in a manner that is cost competitive with other technologies and storage technology itself has not advanced to a point that it can be seamlessly integrated with existing systems in an efficient and cost-competitive manner.

Myth: An interconnection agreement is not required between my electric cooperative and me.

FACT: To ensure your own safety and that of your fellow cooperative member-owners, you must notify your co-op if you intend to install a distributed generation system and an interconnection agreement must be in place. Whenever a generating resource is connected and providing power, your co-op must be aware that the system is in place so that our line personnel and other employees are not put in harm's way. There are a number of safety mechanisms that must be taken into account and put into place with member-owned generating facilities.

Myth: If I install a distributed generation system, and my co-op requires an interconnection agreement, then my co-op is responsible for the maintenance of my system.

FACT: Your electric co-op does not have responsibility for the maintenance of member-owned distributed generation systems. The member-owner who owns the generation resource is responsible for all necessary maintenance and repair investments and activities.

Myth: Once my system is installed, it does not need to be inspected before it is interconnected.

FACT: The state of Iowa requires that a series of inspections are completed to ensure the distributed generation facility is safely interconnected to the grid. Upon completing construction, the member-owner must have the system inspected by a local or state electrical inspection authority to ensure it meets code requirements. A certificate of a satisfactory inspection is required to be provided to the cooperative. The interconnection of the distributed generation facility must comply with the National Electric Safety Code and Institute of Electrical and Electronics Engineers (IEEE) Standard 1547. Finally, a required commissioning test will be conducted by the co-op to establish safe and reliable interconnection with the co-op's distribution and transmission system.

Myth: I am not responsible for fees associated with line upgrades that may be needed in order to provide power to my distributed generation resource.

FACT: Your electric cooperative reviews who benefits from the extensions or upgrades, and then the costs are generally assigned to those that benefit. Federal energy policy assigned the responsibility of any interconnection costs, such as line upgrades and any other costs of interconnection, to the member-owner interconnecting the distributed generation unit to the grid.

Myth: Owning and operating a distributed generation system on my property does not present any additional safety issues for my cooperative.

FACT: Each type of generating source often has specific requirements. For example, in the case of a rooftop solar system, the International Fire Code requires a construction permit, specific signage and markings, properly spaced access points, and smoke ventilation, just to name a few. All distributed generation systems within the state must have a safety inspection by either a local city inspector or the state. These measures are to ensure the safe and reliable operation of the system and to protect our member-owners and employees who interact with the power grid. If our linemen are not aware of an interconnected system, they could be at risk of a serious injury when working on the distribution system. These requirements also support the safety of local safety personnel, such as the fire department, by ensuring that there is appropriate system notification in the case of fire to prevent an injury from such a system.

Myth: I don't need to have any additional insurance for my distributed generation system.

FACT: In most states, distributed generation owners are required to provide proof of some type of general liability insurance as part of the interconnection agreement. Check with your electric cooperative for the specific insurance requirements needed for the system you are considering.

Myth: Solar generation production matches my cooperative's peak demand periods.

FACT: Peak production for solar generation is typically between 2-4 p.m. and consumer electric use generally peaks in the early evening, which means there is a mismatch between energy production and energy consumption. In order to maximize the potential benefits of distributed generation, it's important to size the system properly and to invest in the technology that coincides with providing the most output during your peak-use period. Unlike many other types of commodities, electricity cannot be stored in a manner that is cost-effective and available exactly when needed, which is why it's important DG output aligns with member-owner demand.

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Myth: On a cloudy day, my solar generation system will produce the same amount of energy as it does on a sunny day.

FACT: Solar energy production is at its highest on a sunny day; cloudy skies can significantly impact production. Research shows that production may drop 60-70 percent or more on a cloudy day versus a mostly sunny day. It's worthwhile to note that peak production for solar generation is typically between 2-4 p.m. and consumer electric use generally peaks in the early evening, which means there is a mismatch between energy production and energy consumption.

Myth: My electric cooperative isn't engaged in renewable energy.

FACT: Electric cooperatives support renewable energy and responsible environmental policies that balance the needs of the environment while providing for affordable, safe and reliable power. Electric cooperatives have integrated cooperative and member-owned renewable resources, such as wind, solar, biomass and methane into our portfolios. In addition, as part of our commitment to environmental responsibility, collectively we have invested millions of dollars in energy efficiency programs and services, and environmental upgrades to existing generating facilities.

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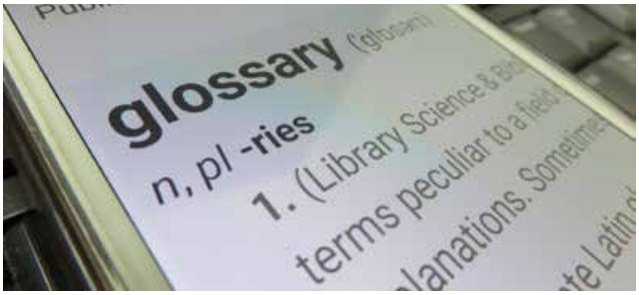
Distributed Generation: Glossary of Terms

Items with an asterisk (*) are terms as defined by the U.S. Energy Information Administration (EIA). The EIA collects, analyzes, and disseminates independent and impartial energy information to promote sound policymaking, efficient markets, and public understanding of energy and its interaction with the economy and the environment. Additional definitions are available online in EIA's glossary of terms.



Avoided Cost

The incremental cost for a utility to produce one more unit of power. For example, because a qualifying facility (QF) as defined under the Public Utilities Regulatory Policies Act or an Alternate Energy Production Facility and as defined in Iowa Code §476.42, reduces the utility's need to produce this additional power themselves, the price utilities pay for QF power has been set to the avoided or marginal cost.

Backfeed

When electric power is being induced into the local power grid, power flows in the opposite direction from its usual flow.

Backup Generator

A generator that is used only for test purposes, or in the event of an emergency, such as a shortage of power needed to meet customer load requirements.*

Backup Power

Electric energy supplied by a utility to replace power and energy lost during an unscheduled equipment outage.*

Baseload Generation (Baseload Plant)

Generation from a plant, usually housing high-efficiency steam-electric units, which is normally operated to take all or part of the minimum load of a system, and which consequently produces electricity at an essentially constant rate and runs continuously. These units are operated to maximize system mechanical and thermal efficiency and minimize system operating costs.*

Biomass

Organic nonfossil material of biological origin constituting a renewable energy source.*

Central Station Generation

Production of energy at a large power plant that is transmitted through infrastructure to a widely distributed group of users.

Coal

A readily combustible black or brownish-black rock whose composition, including inherent moisture, consists of more than 50 percent by weight and more than 70 percent by volume of carbonaceous material. It is formed from plant remains that have been compacted, hardened, chemically altered, and metamorphosed by heat and pressure over geologic time.*

Cogeneration

The production of electrical energy and another form of useful energy (such as heat or steam) through the sequential use of energy.*

Commissioning Test

A highly specialized activity where a power installation is tested to ensure it meets exacting standards through the integrated application of a set of engineering techniques and procedures to check, inspect and test every operational component of the project, from individual functions, such as instruments and equipment, up to complex amalgamations such as modules, subsystems and systems.

Consumption (also Energy Consumption)

The use of energy as a source of heat or power or as a raw material input to a manufacturing process.*

Cost of Service

A ratemaking concept used for the design and development of rate schedules to ensure that the filed rate schedules recover only the cost of providing the electric service at issue. This concept attempts to correlate the utility's costs and revenue with the service provided to each of the various customer classes.*

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Distributed Generator

A generator that is located close to the particular load that it is intended to serve. General, but non-exclusive, characteristics of these generators include: an operating strategy that supports the served load and interconnection to a distribution or sub-transmission system (138 kV or less).*

Distribution

The delivery of energy to retail customers.*

Electricity Generation

The process of producing electric energy or the amount of electric energy produced by transforming other forms of energy, commonly expressed in kilowatt hours (kWh) or megawatt hours (MWh).*

Electric Power Grid

A system of synchronized power providers and consumers connected by transmission and distribution lines and operated by one or more control centers. In the continental U.S, the electric power grid consists of three systems: the Eastern Interconnect, the Western Interconnect and the Texas Interconnect. In Alaska and Hawaii, several systems encompass areas smaller than the state (e.g., the interconnect serving Anchorage, Fairbanks, and the Kenai Peninsula; individual islands).*

Energy

The capacity for doing work as measured by the capability of doing work (potential energy) or the conversion of this capability to motion (kinetic energy). Energy has several forms, some of which are easily convertible and can be changed to another form useful for work. Most of the world's convertible energy comes from fossil fuels that are burned to produce heat that is then used as a transfer medium to mechanical or other means in order to accomplish tasks. Electrical energy is usually measured in kilowatt hours, while heat energy is usually measured in British thermal units (Btu).*

Energy Demand

The requirement for energy as an input to provide products and/or services.*

Energy Efficiency

A ratio of service provided to energy input (e.g., lumens to watts in the case of light bulbs). Services provided can include buildings-sector end uses such as lighting, refrigeration and heating: industrial processes; or vehicle transportation. Unlike conservation, which involves some reduction of service, energy efficiency provides energy reductions without sacrifice of service. May also refer to the use of technology to reduce the energy needed for a given purpose or service.*

Energy Efficiency, Electricity

Refers to programs that are aimed at reducing the energy used by specific end-use devices and systems, typically without affecting the services provided. These programs reduce overall electricity consumption (reported in megawatt hours), often without explicit consideration for the timing of program-induced savings. Such savings are generally achieved by substituting technologically more advanced equipment to produce the same level of end-use services (e.g. lighting, heating, motor drive) with less electricity. Examples include high-efficiency appliances, efficient lighting programs, high-efficiency heating, ventilating and air conditioning (HVAC) systems or control modifications, efficient building design, advanced electric motor drives and heat recovery systems.*

Engineering Study

A study conducted by the electric cooperative that will indicate the equipment needed for the interconnection of a distributed generation system; typically this study will address technical and safety requirements.

Grid

The layout of an electrical distribution system.*

IEEE

Institute of Electrical and Electronics Engineers

Interconnection

Two or more electric systems having a common transmission line that permits a flow of energy between them. The physical connection of the electric power transmission facilities allows for the sale or exchange of energy.*

Interconnection Agreement

A legal contract for the connection of the distributed generation facility to the cooperative's lines, specifying the location, size, cost, manner of payment, terms of operation and respective responsibilities of the cooperative and the distributed generation member-owner.

Interconnection Costs (DG)

The reasonable costs of connection, switching, metering, transmission, distribution, safety provisions and administrative costs incurred by the cooperative directly related to the installation and maintenance of a member-owner's distributed generation facility.

Intermittent Load

The range from base load to a point between base load and peak. This point may be the midpoint, a percent of the peak load, or the load over a specified time period.*

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Intermittent Resource

Intermittent electric generator or intermittent resource: An electric generating plant with output controlled by the natural variability of the energy resource rather than dispatched based on system requirements. Intermittent output usually results from the direct, non-stored conversion of naturally occurring energy fluxes such as solar energy, wind energy, or the energy of free-flowing rivers (that is, run-of-river hydroelectricity).*

Isolation Device

A readily accessible, lockable, visible-break switch located between the distributed generation facility and its interface to the cooperative's electric facilities.

Kilowatt Hour (kWh)

A measure of electricity defined as a unit of work or energy, measured as 1 kilowatt (1,000 watts) of power expended for 1 hour. One kWh is equivalent to 3,412 Btu.*

Load

An end-use device or customer that receives power from the electric system.*

Methane

A colorless, flammable, odorless hydrocarbon gas which is the major component of natural gas. It is also an important source of hydrogen in various industrial processes. Methane is a greenhouse gas.*

Natural Gas

A gaseous mixture of hydrocarbon compounds, the primary one being methane.*

Output

The amount of power or energy produced by a generating unit, station, or system.*

Peak Demand, Peak Load

The maximum load during a specified period of time.*

Photovoltaic (PV)

Energy radiated by the sun as electromagnetic waves (electromagnetic radiation) that is converted at electric utilities into electricity by means of solar (photovoltaic) cells or concentrating (focusing) collectors.*

PURPA

Public Utility Regulatory Policies Act (PURPA) of 1978. One part of the National Energy Act, PURPA contains measures designed to encourage the conservation of energy, more efficient use of resources, and equitable rates. Principal among these were suggested retail rate reforms and new incentives for production of electricity by cogenerators and users of renewable resources. The Commission has primary authority for implementing several key PURPA programs.*

Qualifying Facility (QF)

A cogeneration or small power production facility that meets certain ownership, operating, and efficiency criteria established by the Federal Energy Regulatory Commission (FERC) pursuant to the Public Utility Regulatory Policies Act (PURPA).*

Reliability

A measure of the ability of the system to continue operation while some lines or generators are out of service. Reliability deals with the performance of the system under stress.

Renewable Energy

Energy resources that are naturally replenishing but flow-limited. They are virtually inexhaustible in duration but limited in the amount of energy that is available per unit of time. Renewable energy resources include biomass, hydro, geothermal, solar, wind, ocean thermal, wave action and tidal action.*

Solar Energy

The radiant energy of the sun, which can be converted into other forms of energy, such as heat or electricity.*

Storage Capacity

The amount of energy an energy storage device or system can store.*

System Protection Equipment

Equipment that protects electrical power systems from faults through the isolation of faulted parts from the rest of the electrical network. The goal is to stabilize the power system by isolating only the components that are under fault, while leaving as much of the network as possible still in operation.

Transmission System

An interconnected group of lines and associated equipment for the movement or transfer of electric energy between points of supply and points at which it is transformed for delivery to customers or is delivered to otherelectric systems.*

Usage

The amount of energy or electricity used by a member-owner.

Wind Energy

Kinetic energy present in wind motion that can be converted to mechanical energy for driving pumps, mills and electric power generators.*

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