

Our Perspective

Electric Cooperatives of the Southwest

Looking Out for You: *Climate Change and the Rush to Renewable Energy*

One of a Series of Reports Covering:

- *Growth Implications*
- *Rate Increases*
- *Climate Change and the Rush to Renewable Energy*



Prepared by:
Grand Canyon State Electric Cooperative Association
102 N 44th Street, Suite 100
Phoenix, Arizona 85034
(602) 286-6925
www.gcseca.coop

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Who We Are

Electric cooperatives in the Desert Southwest include: Anza Electric Cooperative, Anza, California; Duncan Valley Electric Cooperative, Duncan, Arizona; Graham County Electric Cooperative, Pima, Arizona; Mohave Electric Cooperative, Bullhead City, Arizona; Navopache Electric Cooperative, Lakeside-Pinetop, Arizona; Sulphur Springs Valley Electric Cooperative, Willcox, Arizona; and Trico Electric Cooperative, Marana, Arizona.

In addition, three cooperatives (Arizona Electric Power Cooperative, Sierra Southwest Cooperative Services and Southwest Transmission Cooperative, all headquartered in Benson) comprise the Arizona Generation and Transmission cooperatives.

We Are Responding to Consumer Concerns

The electric cooperatives are responding to issues the boards of directors and management are facing today and forecast for the future. As Glenn English, the chief executive officer of the National Rural Electric Cooperative Association, announced in early 2008, "With a shortage of electric capacity, huge increases in demand for power, and the cost of climate change, we have the making of a perfect storm."

Many of these concerns have been voiced by cooperative members. However, many cooperative members are unaware of the issues facing the electric cooperatives and their own personal budgets.

These issues include growth implications, rate increases, climate change and the rush to renewable energy. The cooperatives have developed three documents that examine these issues.

This document examines the climate change and the rush to renewable energy issue.

What is Climate Change?

A Definition:

According to the U.S. Environmental Protection Agency web site:

"The Earth's climate has changed many times during the planet's history, with events ranging from ice ages to long periods of warmth.

"Historically, natural factors such as volcanic eruptions, changes in the Earth's orbit, and the amount of energy released from the Sun have affected the Earth's climate. Beginning late in the 18th century, human activities associated with the Industrial Revolution have also changed the composition of the atmosphere and therefore very likely are influencing the Earth's climate."

Climate change may result from:

- natural factors, such as changes in the sun's intensity or slow changes in the Earth's orbit around the sun;
- natural processes within the climate system (e.g. changes in ocean circulation);
- human activities that change the atmosphere's composition (e.g. through burning fossil fuels) and the land surface (e.g. deforestation, reforestation, urbanization, desertification, etc.)

One of the alleged causes of man-caused climate change is an increase in greenhouse gases. Greenhouse gases (GHG) are necessary to life as we know it, because they keep the planet's surface warmer than it otherwise would be. Burning fossil fuels, such as coal and oil, results in "greenhouse gases" such as carbon dioxide (CO₂). It is estimated that human contributions to greenhouse gases are small in relationship to the total amount of GHG. Major sources include the oceans and decaying plant matter.

There is still scientific debate on the contribution that humans make to climate change. On one end of the debate are those that join former Vice President Al Gore and those that believe the evidence presented in his Academy award winning documentary "An Inconvenient Truth." He announced in early March 2008 a \$300 million national campaign to move the effort (see <http://www.wecansolveit.org/>) toward federal legislation which would limit greenhouse gases.

On the other end of the scientific debate are the more than 19,000 scientist who have joined the Petition Project (see <http://www.oism.org/pproject/>). The scientists' petition notes: "There is no convincing scientific evidence that human release of carbon dioxide, methane, or other greenhouse gasses is causing or will, in the foreseeable future, cause catastrophic heating of the Earth's atmosphere and disruption of the Earth's climate. Moreover, there is substantial scientific evidence that increases in atmospheric carbon dioxide produce many beneficial effects upon the natural plant and animal environments of the Earth."

The EPA web site notes:

"Scientists are certain that human activities are changing the composition of the atmosphere, and that increasing the concentration of greenhouse gases will change the planet's climate. But they are not sure by how much it will change, at what rate it will change, or what the exact effects will be."

Thus, the discussion continues and is likely to continue into the future. For utilities, the concern is not whether climate change is real or not, but rather centered on how to keep the lights on in the future. The need for additional generation is being confronted by legislative uncertainty.

What Are Co-ops Doing About Climate Change?

First, they are monitoring the legislative front. Why? Because whatever Congress approves as far as climate change legislation is likely to affect the operation of the cooperatives and ultimately their members. Specifically, the legislation will affect their members' pocketbooks.

One of the proposed solutions to slowing the affects of climate change is an increased reliance on renewable energy resources. Because most renewable energy projects take root in rural America, electric co-ops are at the forefront of this new and exciting wave of generation technology.

Currently, co-ops lead electric utilities in renewable power generation, with a full 11 percent of co-op power coming from hydro and other renewable resources, compared to 9 percent for the industry as a whole.

Nationally, co-ops own and operate about 1,000 MW of renewable projects utilizing biomass, wind, solar, and small-scale hydropower. And 750 rural electric systems offer green power to their members. Those are numbers the cooperatives are proud of.

Cooperatives are also doing research through their own organization – the Cooperative Research Network. They are looking for ways to deliver electric power in more efficient, economical and environmentally friendly ways.

Despite the efforts of the cooperatives' renewable efforts, there is much more that needs to be done to assure the lights remain on in the future. That is why the cooperatives are supporting the work of their industry's leading research group.

The Electric Power Research Institute (EPRI) conducts research and development on technology, operations and the environment for the global electric power sector. EPRI, a non-profit organization, brings together its members, the institute's scientists and engineers, along with experts from academia, industry and other research centers to meet challenges in electricity generation, delivery and use. EPRI supports multi-discipline research in emerging technologies, which drives long-range research and development planning. EPRI's members represent more than 90 percent of the electricity generated in the United States. International participation in its programs includes 40 countries.

EPRI released a study in 2007 outlining a seven-step plan for how U.S. electric utilities could reduce carbon dioxide emissions to 1990 levels by 2030, while still meeting a 40 percent boost in electricity consumption. You can find the study here - <http://my.epri.com/portal/server.pt?open=512&objID=210&PageID=0&cached=true&mode=2&userID=2>.

Their first study was the “Prism” analysis, so called because of its graphical representation.

The Prism analysis assumes successful achievement of performance and deployment targets associated with several advanced technologies as a basis for estimating CO₂ emissions reduction potential:

- End-use energy efficiency
- Renewable energy
- Advanced light water nuclear reactors
- Advanced coal power plants
- CO₂ capture and storage
- Plug-in hybrid electric vehicles
- Distributed energy resources

Cooperatives are doing everything they can to make renewable power a viable part of their energy mix, but there are very real hurdles to overcome before that 11 percent can become 15, 20, or 25 percent in coming years.

For one, construction costs for electricity generation are going up across the board, and renewable sources are no exception. Three years ago it was estimated that a wind farm would cost about \$1,000 per kW of capacity – today that price tag has doubled. Costs for installation and operation of solar panels can run five times higher than a traditional coal plant of comparable size.

How do we get those costs down? Research and development can help to some extent, and that is where the previously mentioned Cooperative Research Network comes in. CRN is working with the U.S. Department of Energy on various projects. Government programs, such as Clean Renewable Energy Bonds (CREBs), are another solution. The bonds offer electric co-ops interest-free loans for financing renewable power projects, and the U.S. Treasury Department has reserved \$450 million in CREBs for electric co-ops through the end of 2008.

SSVEC as part of the REST program used CREBs to build 41 solar shades for school in their service area. The interest free loans improved the economic returns that gained the approval of the ACC to proceed with the project to be repaid from the REST surcharge.

Another hurdle involves getting renewable power to where it can be used. True, most renewable resources are abundant in rural areas, but that also means they’re far from the concentrated power needs of big cities. New transmission lines will need to go in to address this problem, and related costs can add up in a hurry.

A third drawback can cause major headaches for control room operators, charged with matching available power to demand. Most renewable sources are intermittent: the sun doesn’t always shine, and the wind doesn’t always blow. A fossil fuel-fired power plant, on the other hand, will produce “baseload” power as long as fuel remains

available. In the case of a renewable resource like solar, though, an overcast afternoon can leave a gap in available power that needs to be filled. Texas has an abundance of wind power. One day this past spring, the wind stopped and utilities were left scrambling to supply power. They notified commercial customers to curtail their use in order to keep from going dark.

Improved technology offers one way around this problem, making it possible, for example, to store excess electricity produced on a sunny day. When a storm cloud rolls up, that stored power would be ready and waiting. Co-ops are constantly making advancements in storage technology, although real breakthroughs have yet to be realized.

Although some policymakers will try to speed up the process of getting renewable power on-line, an informed, thoughtful approach is what is needed. Cooperatives are urging their members, the public and Congress to be realistic about the value of renewable energy, and be realistic about its associated costs and benefits.

Support for renewable power must be consistent with providing safe, reliable, and affordable service to the members. Co-ops are developing the renewable resources that make the most sense, geographically and economically.

Renewable energy will remain a key part of rural development efforts, our nation's energy security, and a valuable asset to consider. But as not-for-profit, consumer-owned electric co-ops, cooperative officials encourage elected officials to make sure that public policy doesn't get ahead of available technology, and doesn't impose a hardship on consumers.

Since the 1970s, electric co-ops have been actively engaged in promoting renewable energy resources like wind, solar, hydropower, and, biomass (including landfill gas, livestock waste, timber byproducts, and crop residue). Today, nearly 90 percent of the nation's 900-plus electric co-ops provide electricity produced by renewable sources, all playing a key role in powering rural America while increasing our nation's energy independence.

Currently, 150 electric co-ops either own wind turbines or buy output from wind farms, most of which are located in America's "wind tunnels"—the Upper Midwest and Great Plains, as well as down the spine of the Alleghenies in the East.

However, wind and solar power face challenges: transmission; intermittency and the need for advancements in storage technology; and increased construction costs and delays. Overcoming these challenges is not impossible but will require strong leadership and investment from government.

Transmission – Renewable resources are abundant in rural areas, but that also means they are located far from the concentrated power

needs of cities and towns. To move electric generation from renewable sources (i.e., wind farms), new transmission lines will need to be built to enable greater availability of renewable power sources.

Intermittency – Most renewable sources are intermittent: the sun doesn't always shine, and the wind doesn't always blow. Improved storage system technology would make it possible to store electricity produced by a wind turbine or solar system. When a storm cloud rolls up, stored solar power could be ready and waiting. Electric co-ops are studying ways to boost storage technology, although major breakthroughs have yet to be made.

Increased Costs/Delays – We have already addressed the rising construction costs for power plants of all types. In addition to increased costs, the skyrocketing demand for wind turbines has led to a manufacturing backlog of two years or more. For solar panels, costs for installation and operation can run five times higher than a traditional coal plant of comparable size.

To help electric cooperatives further tap into renewable opportunities, a National Renewables Cooperative Organization (NRCO) was formed in February 2008. Operations are anticipated to begin this summer. "Electric co-ops remain committed to an overall goal of fostering domestic energy independence while benefiting the environment and assisting rural economic growth," concludes NRECA CEO Glenn English. "While no single approach or policy is appropriate for every co-op, we see renewable generation as an important part of our future. It will not be easy, but it is needed."

Electric cooperatives are also asking Congress to seek out balanced solutions to energy and climate change. NRECA has introduced a public campaign, "Our Energy, Our Future: A Dialogue With America," to ensure that the voice of cooperatives and their consumer-members is heard as debates over energy and climate change legislation rage in state legislatures and Congress. For more information about this campaign, visit www.ourenergy.coop.



Cooperative members need to join the discussion on our nation's energy future.

What Renewables Really Work: Now and in the Future?

Well, virtually all renewable resources work now. And, they should work into the future. As with anything, a reliable manufacturer and installer are keys.

However, they just may not be the most economical or reliable resource for energy—now or in the future when compared to fossil-fuel generation.

However, with rising costs for fuels used to generate power in conventional fossil fuel power plants, many renewable systems are beginning to become more economical especially when utility incentives and government tax credits are considered.

Renewable energy providers are even predicting price reductions in the components used in renewable equipment which should bring down costs to install the systems.

As more and more manufacturers and installers gain experience the reliability will improve.

Since energy outputs, installation and maintenance costs vary widely among the different renewable resources, consumers interested in them should carefully do their homework when considering such an installation.

What Can Consumers Do?

Consumers of electric cooperatives in Arizona are already doing something. They are investing in the future. In the fall of 2006, the Arizona Corporation Commission approved the rules requiring utilities to generate 15 percent of their total energy from renewable energy technologies by 2025. The rules, the Renewable Energy Standard and Tariff or REST for short, are designed to capitalize on Arizona's sunshine and other "green energy" opportunities.

Four commissioners voted in favor and Commissioner Mike Gleason voted against the rules citing concerns over the costs of meeting the sharply higher standard, grid reliability and specific changes he sought to make the rules more precise.

For 2006, utilities were required to generate 1.25 percent of retail energy sold from renewable resources.

REST allows utilities to use solar, wind, biomass, biogas, geothermal and other similar technologies. The rules package outlines what technologies qualify and allow for new and emerging technologies to be added as they become feasible.

The Commissioners also required a growing percentage of the total resource portfolio to come from distributed generation – residential or non-utility owned installations. The distributed energy requirement starts at 5 percent of the total portfolio in 2007 and grows to 30 percent of the total renewable mix after 2011.

In many cases, distributed generation installations – such as a large solar installation on the roof of a shopping mall, or solar panels at someone’s home – qualify for utility rebates or state and federal tax breaks that offset some of the upfront costs.

To help offset the increased cost of meeting the more aggressive standard, the current Environmental Portfolio Surcharge amount was changed with a cap on the monthly surcharge moving higher.

Currently, customers in the service territories of Duncan Valley Electric Cooperative, Graham County Electric Cooperative, Mohave Electric Cooperative, Navopache Electric Cooperative and Trico Electric Cooperative are paying the following fee. For residential customers the fee is \$0.04988 per kilowatt hour up to a monthly cap of \$1.05. For commercial customers, the cap is \$39. For customers whose demand is 3,000 kilowatts for three consecutive months, the cap is \$117.

Sulphur Springs Valley Electric Cooperative charges \$0.005 per kilowatt hour subject to the maximums per month.

Maximums:

- \$1.30 for residential consumers
- \$42.00 for commercial and industrial accounts
- \$150.00 for industrial (over 3 megawatts load)

In addition to the renewable mandate, the ACC has enacted rules relating to “net metering” for those renewable projects owned by customers.

Net metering will allow eligible cooperative members who have distributed generation (DG) systems, such as photovoltaic systems, to offset the energy (kWh) portion of their electric bill with the energy produced by their DG system. DG energy is either going to supply more than a member uses or less.



SunWatts is a program designed to help electric cooperative customers take part in renewable electric generation technologies throughout Arizona. The program is meant to get customers involved in “green”

power and to help foster the growth and the renewables industry.

There are three SunWatts programs:

Contribution Program: Contribute to a 'green fund' used to install photovoltaic systems throughout the state.

Incentive program: Gives customers a rebate of \$4 a watt (or up to half the total cost, whichever is less) to install qualifying photovoltaic (solar) systems on homes and small businesses.

Renewable Generation Program: Allows the Arizona cooperatives to participate in large-scale (greater than 100 kW) photovoltaic, landfill gas, biomass and wind energy projects.

Large-Scale Generation: This program encompasses large-scale projects (generally, greater than 25 kilowatts), which can include wind, biomass, landfill gas and, of course, solar installations.

Sulphur Springs Valley Electric Cooperative has modified the SunWatts program to include a renewable loan program which funds up to 25 percent of the system cost at 3 percent interest, installation of a photovoltaic system to one Habitat for Humanity home each year and a photovoltaic program for schools. The school program has two components; one is a grant a teacher may apply for use to promote renewable energy in the classroom. The other component involves the installation of 41 23 kilowatt solar canopies for each school campus in their service area.

Mohave Electric Cooperative participates in the plan, as does Duncan Valley Electric Cooperative, Graham County Electric Cooperative and Trico Electric Cooperative.

Navopache Electric Cooperative's REST program includes payment of \$3 per watt with a maximum of \$25,000 total for each project.

What About Tax Credits and Rebates?

Any consumer tax credits for 2008?

On the federal level, as of December 31, 2007, most of the residential tax credits (windows, doors, roofs, insulation, HVAC, and non-solar water heaters) expired.

The tax credit for solar water heaters and solar panels remains in effect through December 31, 2008. The tax credit is for 30 percent of the cost of the system, up to \$2,000. This credit is not limited to the \$500 home improvement cap. At least half of the energy generated by the "qualifying property" must come from the sun. Homeowners may only claim spending on the solar water heating system property, not the entire water heating system of the household. The credit is not available for expenses for swimming pools or hot tubs.

On February 27, 2008, the House passed \$18.1 billion in renewable energy tax incentives (H.R. 5351), including an extension of the tax

credit for energy-efficient home improvements. The bill is similar to the one passed last year, which was ultimately removed from the 2007 Energy Bill, signed into law in December 2007. This bill must still pass in the Senate.

Arizona has a Solar Energy Tax Credit. The solar energy credit is equal to 25 percent of the cost of the device. The maximum credit in a taxable year cannot exceed \$1,000, and the cumulative solar energy credits allowed for the same residence cannot exceed \$1,000. The maximum credit a taxpayer may take for all solar energy devices installed in the same residence cannot exceed \$1,000 in the aggregate.

A solar energy device is a system or series of mechanisms which collect and transfer solar generated energy and which is designed primarily to:

1. provide heating;
2. provide cooling;
3. produce electrical power;
4. produce mechanical power;
5. provide solar daylighting; or
6. provide any combination of the above by means of collecting and transferring solar generated energy into such uses either by active or passive means, including wind generator systems that produce electricity.

Solar energy systems may also have the capability of storing solar energy for future use. Passive systems must clearly be designed as a solar energy device, such as a trombe wall, and not merely as a part of a normal structure, such as a window.

For the purposes of the solar energy credit, the following devices, when used for residential purposes, qualify for the credit:

1. Solar domestic water heating systems - collectors, storage tanks, heat exchangers, and piping, valves, wiring, etc., directly related to the solar system.
2. Solar swimming pool and spa heating systems - collectors, heat exchangers, piping, valves, wiring, etc., directly related to the solar system.
3. Solar photovoltaic (PV) systems - collectors, batteries, inverters, solar system related wiring, including solar PV for RVs used as a residence.

Wind generators and wind-powered pumps are also covered by the Arizona credit. For more details about the credit, see <http://www.revenue.state.az.us/brochure/543.pdf>.

In addition to the tax credits, there are Arizona cooperative programs in place to encourage renewable energy. With the SunWatts rebate program, cooperative residential and small commercial members can receive a rebate of \$4 per installed watt for qualifying systems installed on their homes or small businesses, up to 50% the total cost of the device.

There is also a contribution program where members can voluntarily donate money to promote the development of renewable energy.

What Does the Future Hold?

Electric utility experts predict fossil fuel generation is going to become more expensive due to the rising cost of oil, natural gas and coal. Renewable energy proponents predict the amount of wind and solar generation is going to grow and their reliability will improve and their costs go lower.

Cooperatives are investing in renewable energy and encouraging consumers to investigate these alternatives and consider them when they make economic sense.

Congress is considering climate change legislation. At this point, the most aggressive bills would likely lead to 40 percent increases in electric rates by 2025.

Summary

Climate change is still being debated. Cooperatives have moved past the discussion on science and are focused on the legislation which will affect their ability to keep the lights on. Renewable energy use is growing and cooperatives are actively involved. Cooperatives believe reliability and economics of renewable resources will improve over time.