March 2020 Share Package
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Natural Light Saves Electricity, Improves Vision

Question: Are rectangular or tubular skylights better for more natural light and energy savings?

Answer: Although the amount of electricity used for lighting in a house is only a fraction of what is used for heating, cooling and water heating, it still constitutes a significant annual cost. Using more natural light instead of lightbulbs is not a difficult task.

If saving electricity is your primary concern, replacing all your lightbulbs with LEDs is a less expensive option than installing either a typical or tubular skylight. Although not as natural as true sunlight, higher temperature bulbs—rated at 4000+ degrees Kelvin—produce a more natural, whiter light. Bulbs with a high color rendition index make colors look more realistic.

Most people's vision is better under natural lighting—even at a somewhat lower brightness level—than under typical artificial lighting. I can read a magazine easier by a window even on a cloudy day. Some businesses now use special lights that closely simulate natural light. They can reduce bulb wattages by more than 15% for big savings, and the workers cannot tell the light is dimmer.

For more information or to ask a question about energy savings, go to www.dulley.com. (c) 2020 James Dulley

A tubular skylight is generally a more efficient and less expensive choice than a traditional rectangular skylight. A traditional skylight provides more lighting and a view of the sky, but it creates a large hole in the insulation envelope of your roof and loses energy.

I installed a tubular skylight in my garage. It provides adequate light for most activities during the daytime. When there is a full moon, it produces enough light for me to walk to my car in the garage without switching on the light.

Tubular skylights are available in several diameters, depending on how much light you need and the space available. As a reference, a 10-inch-diameter model produces as much light as three 100-watt incandescent lightbulbs. A 14-inch model is equivalent to using five 100-watt bulbs.

If you are still using incandescent bulbs, the annual electricity savings from installing a large tubular skylight is about $90. If you typically use compact fluorescent bulbs or LEDs, the annual savings is about $20. This might not sound like a lot, but the tubular skylight should last for many years.

A tubular skylight is installed on a shingle roof. Notice how the shingles fit over the flashing to eliminate leaks.

PHOTO BY SOLATUBE

A tubular skylight requires no maintenance other than wiping off the glass or globe in the home. The dome on the roof should stay clean from the rain. It is not difficult to install one yourself, especially if you have an asphalt shingle roof.

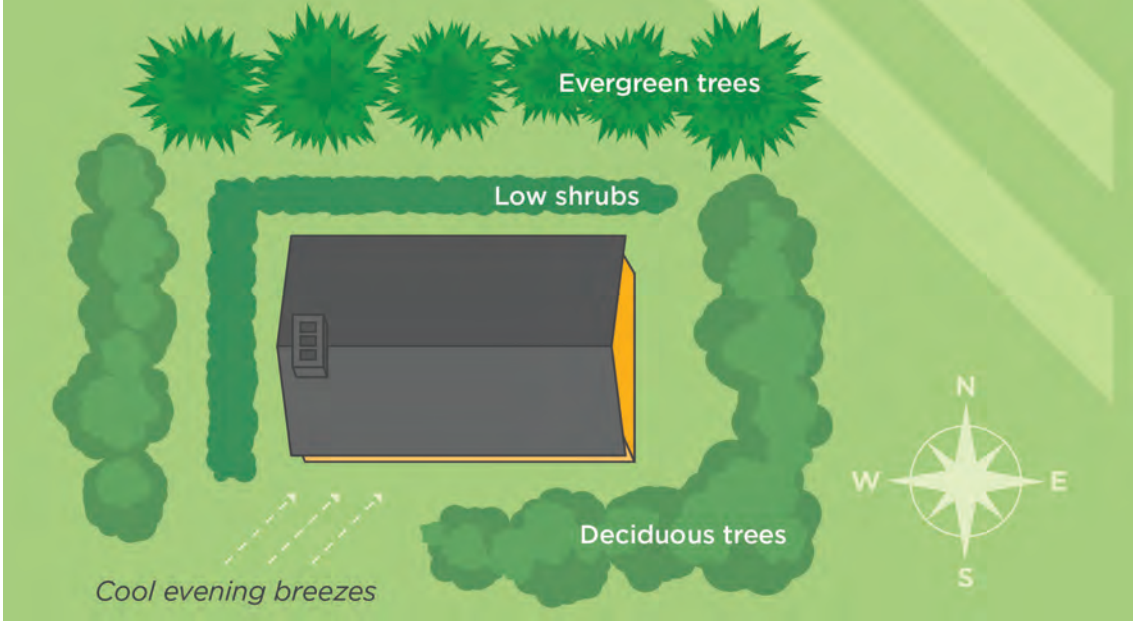
Tubular skylights use a sheet metal tube that extends from above the roof to the ceiling below. The interior of the sheet metal has a reflective coating, so little brightness is lost as the sunlight bounces back and forth on its way down. A clear dome seals the top of the tube above the roof and a flat diffuser snaps over the bottom in the ceiling.

To control the brightness, optional dimmer flappers are available to reduce light intensity. These can be operated by an electric motor or a solar panel with a remote control.

Another nice feature for bathrooms is a model that also works as an exhaust fan.

Most natural light comes in through windows. If you have relatively efficient windows, open the curtains or use just sheers during the daytime to allow light in. If you have old single-pane windows, use insulating shades. Opening them loses more energy than you save on lighting. Prune back shrubs that have grown up and block the window.

Placing decorative mirrors opposite windows can be effective. One method uses mirrors on opposite walls. This reflects light, and the repeating images in the mirrors add a sense of depth to the room. For a window near a corner, place the mirror on the adjacent wall close to the window. It will reflect the light out at 90 degrees from the window to brighten the entire room. ■



Plant for Efficiency

Q. What landscaping choices can we make to lower our home's monthly energy use?

A. The decisions you make about your home's landscaping can help you stay cooler in the summer and warmer in the winter. With summer just around the corner, let's start by looking at how strategic planting can help cool your home.

Direct sunlight hitting windows is a major contributor to overheating your home during summer months. By planting trees that block sunlight, you can improve comfort and reduce your air conditioning energy use. If the trees eventually grow tall enough to shield your roof, that's even better.

The most important windows to shade are those facing west, followed by windows that face east. Morning and evening sunlight hits more directly than midday sunlight. An eave on the south side of your home can help shade your windows during midday sun.

If you live in a colder climate, planting deciduous trees that lose their leaves in fall will shield your windows in summer and allow sunlight in during winter to help warm your home. A simple approach that can deliver some shade the first year is to plant a "living wall" of vines grown on a trellis next to your home.

One cooling strategy is to make sure your air conditioning compressor has some plants near it. Just make sure the plants aren't too close. The compressor should have a 5-foot space above it and a 2- to 3-foot gap around so it gets enough air movement to do its job.

There are two other factors to consider that are important in some areas of the country:

Water is becoming more precious and more expensive. When you pay your water bill, much of that cost is for the energy required to pump water to your home, or perhaps you have your own well. Either way, reducing water use saves you money and reduces energy use.

If you live in an area prone to wildfires, take that information into consideration as you develop a landscaping plan.

This column was co-written by Pat Keegan and Brad Thiessen of Collaborative Efficiency. For more energy tips, go to www.collaborativeefficiency.com/energytips.

Deciduous trees can help keep your home cool in summer by blocking the sun, and help warm it during winter by allowing sunlight in. PHOTO BY MARCELA GARA, ENERGY EFFICIENCY DATABASE

What and where you plant on your property can either increase or decrease the risk of fire reaching your home.

Now let's talk about how landscaping impacts your home's energy use and comfort in the winter.

If you live in a colder climate, a solid windbreak can cut harsh winter winds. The best solution for this is a solid row of trees—preferably evergreen—on the windward side of the home, with shrubs underneath the trees to keep the wind from sneaking through.

If you live in a warmer climate, you do not want a wind barrier because wind flow will help cool your home.

If you live in a cooler climate that isn't too humid, plant a row of shrubs a foot from your home for more efficiency. Stopping air movement can form a dead air space around the home that acts as bonus insulation.

While you're at it, you could add some foundation insulation if you have a home with a basement or if it's built on a slab. In a humid climate, however, leave several feet between landscaping and the home as air flow is necessary to avoid moisture-related home damage.

As with any landscaping projects that require digging, remember to dial 811 to ensure all underground utility lines are properly marked and flagged before you start the work. Happy planting! ■

Let Soil Temperature Guide Your Planting

Spring is here, and you're raring to get your garden in. Well, hold on just a minute. Sowing seeds or planting seedlings at the wrong time will bring nothing but heartache.

"One of the biggest mistakes people make is to plant too early," says Weston Miller, a horticulturist with Oregon State University's Extension Service. "They get excited when it's sunny for a few days, put plants in the ground and think they will grow. But the seeds either rot from damping off fungus or germinate very slowly. At the very least, they'll be stressed for the rest of the season and never catch up."

An inexpensive soil thermometer helps keep planting time in perspective.

"Fifty degrees is a good benchmark for cool-season crops," Weston says. "And the soil should be 60 degrees or more for warm-weather plants like tomatoes, peppers and basil. In fact, for tomatoes it should ideally be 65 to 70."

If you can't resist the urge to plant warm-season vegetables, Weston recommends using some sort of protection from the chill such as a floating row cover, individual glass or plastic cloches or even milk jugs or soda bottles with the top cut out and turned upside down over plants.

"Gardening depends on the weather, which is unpredictable," he says. "But it pays to wait."

Tips for a Successful Vegetable Garden

Prepare the soil. Before planting, add a moderate amount of compost (¼ to 1 inch) and a balanced fertilizer according to package directions. Incorporate the materials into the top 8 to 12 inches with a digging fork or spade. Rake the bed before planting seeds or transplants.

For new garden beds, remove sod or weeds to expose soil. Liberally add 4 to 6 inches of compost, agricultural lime and a balanced fertilizer. Incorporate them into the top 8 to 12 inches with a digging fork or spade. Prepare the seeds or transplant bed with a rake. Next fall, add 5 to 10 pounds of lime per 100 square feet to beds.

In addition to adding complete fertilizer to the soil, use a soluble fertilizer such as fish emulsion for transplants, especially early in the season or if the plants are not thriving.

Use transplants when possible. Crops that do best when seeded directly into the garden include carrots, parsnips, beets, radish, turnips, mustard and arugula. Most other crops can and should be transplanted to make the gardening process easier, particularly for weed control.

Grow your own transplants or look for high-quality starts—not root bound, stunted or off-color—at a garden center for best results.

Control weeds early in the growth cycle of your veggies. Weed your veggie beds at least once a week for the first four weeks of the plants' growth to get the edge on this ongoing challenge.

Monitor and control slugs and other pests. Keep an eye out for slugs. Find them under debris and in the folds of plants, and dispose of them by dropping into soapy water or cutting them in half with scissors. Look for aphids, imported cabbage butterfly larvae and other pesky critters on the underside of the leaves. Squash them!

For more information on vegetable gardening, check out https://catalog.extension.oregonstate.edu/em9027.

Kym Pokorny is a communications specialist for Oregon State University's Extension Service. Previously, Kym worked for The Oregonian, most notably covering gardening and horticulture.

The Evolving Electric Power Grid

By Jonathan Susser

When we turn on a light or plug in a phone charger, we receive electricity from a complex web-like network of equipment. Power plants, power lines, substations and transformers all communicate and work in tandem to deliver the right amount of energy when and where we need it. Together, these wires, switches and related equipment are known as the electric power grid, or just "the grid."

As the grid was being built in the late 19th and early 20th centuries, electric utilities operated in isolation. The power plants that popped up from coast to coast consisted of large, centrally located generators that delivered electricity in one direction to the communities that needed it.

In time, the grid became more interconnected and efficient. It has provided safe, reliable and affordable electric service for more than a century. Much of the time we don't even notice it is there.

But the grid's equipment and infrastructure are aging, and our needs are changing.

With a growing population, advancements in technology and many new electronic devices, we consume substantially more electricity than we used to. Electricity use today is more than 16 times greater than it was in the 1950s—and we expect more information and feedback about our energy consumption.

We also see new sustainability initiatives and a rise in renewable, more variable, energy sources located closer to their points of use. We also have to combat the threat of mounting physical and cyberattacks, and manage and respond to changing weather patterns.

These developments are pushing the grid to do more than it was designed for and have forced it to evolve and modernize.

Getting Smarter

Similar to phones, thermostats and watches, the grid is getting smarter. Advanced instrumentation and technologies such as relays, sensors and switches have become more affordable and are being added to our grid's existing network, enhancing communication, adaptability and efficiency. The result is a bidirectional system that supports energy consumers, communities and utilities, as well as environmental and economic efforts.

Benefits of a smart grid include:

- Increased reliability and resiliency.
- Faster restoration after disruptions.
- More information and energy management for consumers.
- Easier integration of renewable energy.
- Enhanced security and protection.
- New business opportunities supporting the smart grid supply chain.

The rise of the smart grid has coincided with and been supported by emerging technologies such as battery storage, renewable energy, smart meters and advanced metering infrastructure, self-optimizing networks and electric transportation. Although these technologies are not new—electric vehicles have been around for more than a century—their growth today is especially impactful because they are able to enhance a grid that is now capable of effectively harnessing them.

Microgrids

The arrival of these emerging technologies on the grid also has supported development of custom-designed microgrids: independent electric systems. The miniature grids use local energy resources such as solar arrays and battery storage to control equipment and help power a defined area, such as a building, campus or community.

These systems are becoming more popular, and for good reason: They can increase grid reliability and resiliency; ease periods of peak demand, when consumer demand for electricity is high; act as a testing ground for new technologies; and provide an alternative source of generation and storage to reduce power supply costs.

North Carolina launched a microgrid in electric cooperative territory in 2017 with a diesel generator, Tesla batteries, a rooftop solar array on the diesel plant, thermostats and water heaters that can be coordinated by the cooperative and a controller that pieces it all together.

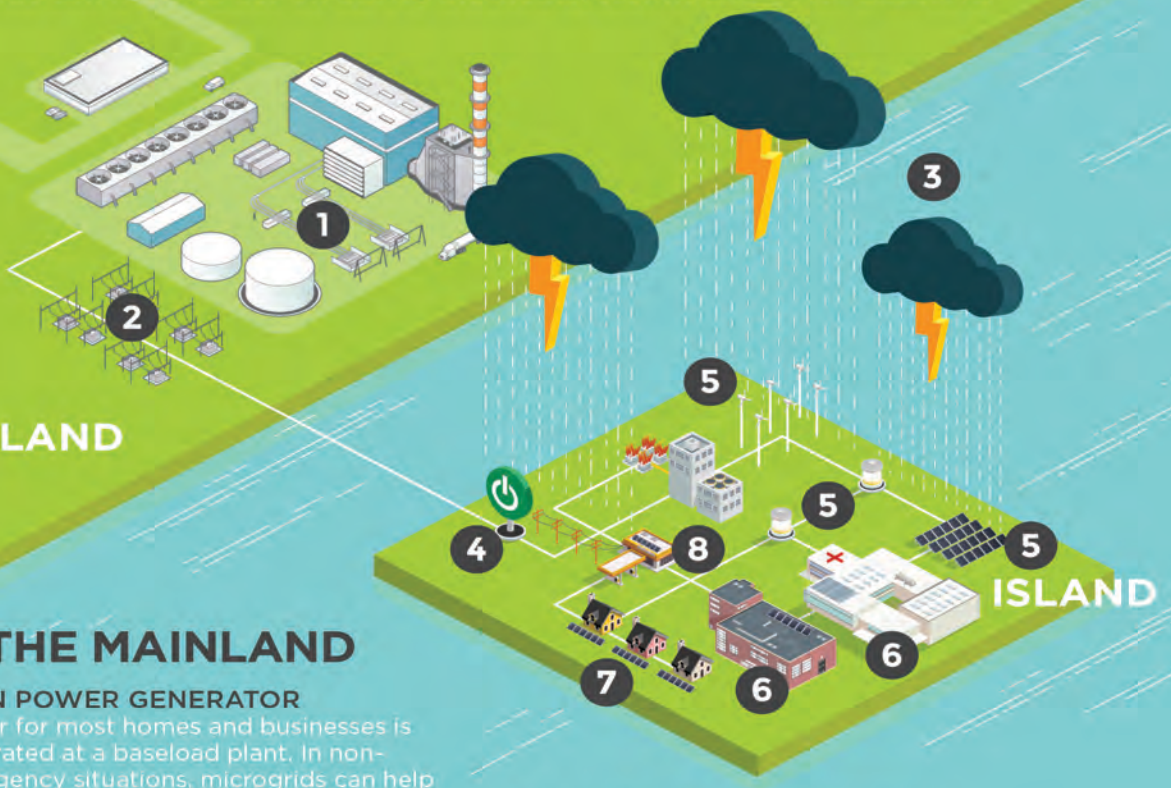
The combination of supply-side and demand-side components provides flexibility, and can improve performance and speed recovery during a loss of power.

Alaska's cooperatives have deployed dozens of microgrids—many featuring networks of wind turbines—to ensure remote communities have reliable power under the harshest weather conditions. Some communities are so rural a microgrid is the only way to serve them.

It can be easy to take for granted a ready supply of electricity, but the grid is truly a marvel of engineering. It has been able to evolve with the changing needs of society. The transition to a smarter grid with emerging technologies will allow for even more reliable, safe and affordable service. ■

How Microgrids Work

The electricity grid is like the mainland, where energy is generated at a central power plant and sent to where it's needed. A microgrid is like an island — it can function on its own, power a concentrated area, and connect to the mainland. Microgrids can keep power on during blackouts, storms and other disasters.



ON THE MAINLAND

1 MAIN POWER GENERATOR
Power for most homes and businesses is generated at a baseload plant. In non-emergency situations, microgrids can help reduce peak demand at the baseload plants.

2 SUBSTATION
A substation is the intermediary between the power plant and the consumer. If the substation fails or has problems, consumers lose power or experience brownouts.

ON THE ISLAND

3 STORMS
Storms and other disasters can cause large-scale outages on the main grid. Microgrids are being built today to increase resilience and keep the power on during emergencies.

4 MAIN COUPLING SWITCH
The microgrid and main grid connect. The coupling switch functions as the main switch point in case of grid outage. On an average day, the coupling switch ensures that voltage levels remain equal between the regular grid and the microgrid.

5 INDEPENDENT GENERATION
The microgrid system can generate electricity from a single solar or wind installation, or a combination of traditional and alternative power generation methods.

6 CRITICAL SERVICES
A microgrid is usually built to power critical community resources like hospitals, police and fire departments, and schools so that they can continue to function in emergency situations.

7 HOMES
Individual homes are usually low on the microgrid priority list, but can be linked to the microgrid if they have power generating capabilities, like rooftop solar panels.

8 BUSINESSES
A key commercial property may sometimes be included in the microgrid, depending on its generating power and the needs of the community.

SOURCE: American Public Power Association

Keeping Lines Clear

Tree trimming and vegetation removal improve safety and help your utility keep electricity flowing

By Pam Blair

A 2018 wildfire destroyed the electric distribution system serving Eagle Lake in Northern California, leaving about 1,000 people without power. PHOTO COURTESY OF LASSEN MUNICIPAL UTILITY DISTRICT

Despite your electric utility's best efforts to maintain a safe and reliable system, Mother Nature often has the last word.

Strong winds snap trees like toothpicks. Heavy rains saturate the ground, weakening tree root systems. Ice and heavy snowfall weigh down and break branches. Sparks ignite vegetation and spread fire.

Regardless of the cause, when any part of a tree contacts a power line, the result is the same: loss of electrical service and compromised public safety.

Even before alleged poor maintenance of transmission lines by Pacific Gas & Electric caused deadly wildfires in California, community-owned utilities invested millions on inspections and tree trimming.

At $1.76 million a year, vegetation management is the largest single line item in the budget of Lane Electric Cooperative, based in Eugene, Oregon, says Tony Toncray, operations manager.

"In 2001, we realized we needed to look deeper into our tree program," Toncray says. "We had not been clearing our rights-of-way, and it was causing problems. We added staff, and began a three-year rotational trimming schedule.

"We know some trees grow faster—cycle busters—so we drive our system every year looking for those. We now are gathering data about the species in each right-of-way and entering it into a database."

A minimum of three and up to four contract crews work year-round in Lane's territory.

Northern Lights Inc., based in Sagle, Idaho, annually spends about $2 million on trees, says Kristin Mettke, engineering and operations manager.

"We want to keep the lights on," Mettke says. "If trees don't get into the lines, we have less outages—and with less outages, we spend less on overtime for line crews. It's buying an insurance policy, essentially."

NLI has two year-round contract tree-trimming crews and a full-time tree foreman. From April through October, that balloons to five to six aerial crews and two to three ground crews that clean up debris or grind stumps.

Trees along the system's 1,570 miles of overhead line are trimmed an average of every five to six years, although faster-growing areas are visited more often, and crews are redirected as new hazards are discovered.

"During a storm, people are more willing to have their trees trimmed," Mettke says. "They want their power on."

Pat Holley, assistant general manager at Lassen Municipal Utility District in Susanville, California, says LMUD inspects every distribution and transmission line in its system every year. The 1,900-square-mile district ranges from desert valleys to high alpine, and includes private as well as federal forests.

"Now we are inspecting at ground level, but we are gearing up to begin drone inspections this year," Holley says. "We will be able to look down on structures to detect problems."

One contract crew works year-round trimming trees. LMUD personnel each spend about a month a year doing inspections and related work. A 20-foot area is brushed clear of vegetation around the base of all poles with equipment mounted overhead in high fire danger zones every year so sparks have nothing to ignite.

As part of its state-mandated wildfire mitigation plan, LMUD plans to extend easement width clearing from 50 feet to 200 feet where possible to provide better protection from windstorms and serve as a fire break.

Distribution line rights-of-way typically are 20 feet—not enough to prevent things

A contract crew with Asplundh Tree Experts trims trees away from power lines along a snowy roadway in Northern Idaho. PHOTO BY TRAVIS COTTIER/NORTHERN LIGHTS INC.

outside the right-of-way from causing problems, Toncray notes.

Wildfire is a serious concern. In 2018, the Whaleback Fire—suspected to have started from lightning—burned 18,703 acres, closed portions of Lassen National Park, forced evacuations and destroyed LMUD's 125-pole Eagle Lake distribution line. A portable generator provided power to the area for months while the 6.5 miles of overhead line was replaced with 10 miles of underground wire.

Although PG&E was ruled responsible for wildfires because it failed to correct maintenance issues it had tagged, "nine of 10 wildfires are manmade or naturally occurring," Holley notes.

As part of its mitigation plan, LMUD is expanding the capabilities of its computer monitoring and control system. Rather than automatically fixing a fault during fire season, a crew checks the line before it is re-energized.

Federated Insurance CEO Phil Irwin, who works with electric utilities on coverage, appreciates the investments.

The mutual insurance company buys reinsurance to mitigate its risk—and in the wake of PG&E's proposed $24.5 billion settlement of all wildfire claims, reinsurers have little appetite to write policies for utilities, Irwin says.

When talking to reinsurers, Irwin says he emphasizes the difference between PG&E and publicly owned utilities, where staff live in the communities they serve and problems are much more personal.

Drought, more dead trees and an extended fire season mean trimming is not only the law, but it is the right thing to do, Toncray says.

"It's important to keep public safety as our highest priority," he says. ■

If you see a tree problem, please contact your utility. Most have a program to replace removed trees.

Prevent Problems: Plant the Right Tree in the Right Place

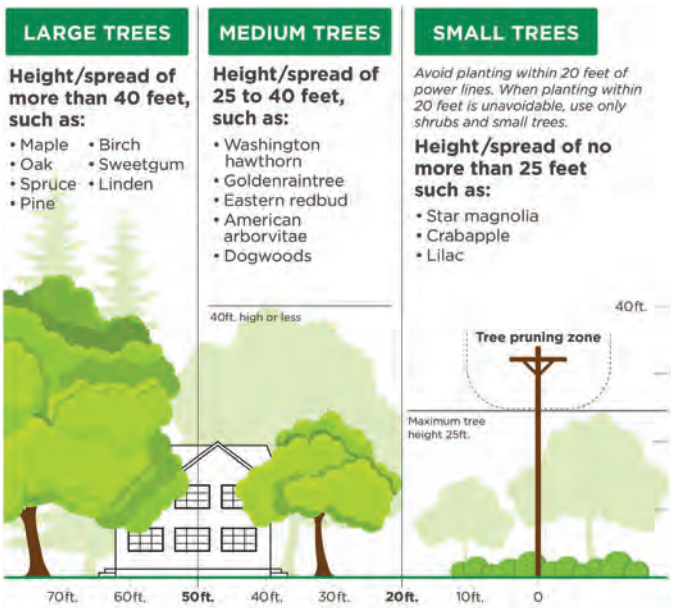
Be safe. Always call 811 before you dig to locate buried utility lines.

Trees beautify homes and property, and can lower utility bills if planted in the right spot. But care should be taken with trees near power lines. Outages are caused by trees or limbs falling on lines. Restoring power is expensive. So is trimming trees.

Before planting trees, bushes or shrubs, look up to see where overhead power lines may conflict with their growth. Remember: A 2-foot-tall fir seedling will grow more than 100 feet tall and 30 to 50 feet wide.

After you have looked up, look down. Planting over underground utilities can result in outages when tree or shrub roots grow into the lines, or in a potentially deadly shock if you dig into buried lines.

Your local nursery, garden center, electric utility or state forestry department can help you determine the appropriate tree for your situation. For information concerning tree selection and care, visit the National Arbor Day Foundation website at www.arborday.org.



Earth Day's Golden Anniversary

By Paul Wesslund

The estimated 20 million people who rallied for the first Earth Day 50 years ago might not have changed the world as much as they'd hoped, but they just might have changed it more than they thought possible.

Since that April 22 five decades ago, levels of many pollutants have fallen dramatically, while energy efficiency has greatly increased. Solar energy and wind power are making serious moves toward providing a significant share of our nation's electricity. Every major car company is expanding its electric vehicle options, and according to The Recycling Partnership, a nonprofit industry group, about half the homes in the United States have some version of curbside recycling.

In the 1970s, even I got caught up in an Earth Day episode that illustrates another way the nation has changed its approach to the environment.

I was a senior on the high school debate team. The topic proposed by the National Forensics League was if the federal government should establish programs to control air and water pollution. About half of us would contend that yes, the federal government should have pollution control programs, while the other half said no. We spent our evenings filling file boxes with index cards of research to prove our side to the small panel of judges who would gather in classrooms on Saturdays for the debate tournaments.

Then, the president of the United States turned our world upside down.

On July 9, 1970—less than three months after the first Earth Day—President Richard Nixon sent a reorganization plan to Congress creating the Environmental Protection Agency.

"... as a matter of effective and orderly administration, additional new independent agencies normally should not be created," Nixon said in his formal proposal, adding that the EPA was needed "... because arresting environmental deterioration is of great importance to the quality of life in our country and the world."

For some of the high school debaters, that meant suddenly switching sides. The teams defending the "status quo" of no government program on the environment now had to defend a status quo that included the EPA.

While high school debaters scrambled to rewrite their speeches, policymakers moved boldly to create sweeping federal laws: expansion of the Clean Air Act in 1970 and enactment

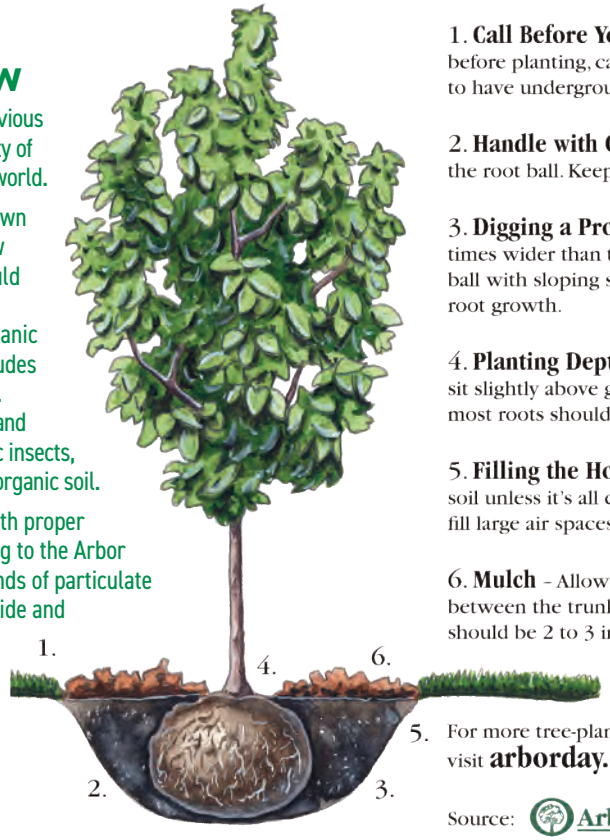
Be Green and Plant a Tree: Six Things You Should Know

Planting trees is an investment in the future. Beyond the obvious benefits of providing shade and enhancing the natural beauty of our surroundings, trees improve our communities and our world.

Root zones often two to four times the diameter of the crown help hold and aerate the soil, filter groundwater and allow the trees to draw in chemical nutrients that otherwise could leach into the environment. Decaying leaves, needles and other tree debris help enrich the soil. This mélange of organic matter described by scientists as the "soil food web" includes a huge chunk of the world's biodiversity. According to U.S. Department of Agriculture researchers, millions of species and billions of organisms—including bacteria, algae, microscopic insects, earthworms, beetles, ants, mites and fungi—can flourish in organic soil.

Trees take time to grow, but make a lasting difference. With proper care, a mature tree becomes a living air purifier. According to the Arbor Day Foundation, a mature tree can absorb 120 to 240 pounds of particulate pollution every year, and reduces atmospheric sulfur dioxide and hydrocarbon emissions and absorb heavy metals.

The Arbor Day Foundation has set a goal of planting 100 million trees worldwide by 2022—the 150th anniversary of the establishment of Arbor Day. A local nursery or your county agricultural extension service can recommend the best trees for your landscaping based on growing conditions, space and design goals.



1. **Call Before You Dig** - Several days before planting, call the national 811 hotline to have underground utilities located.

2. **Handle with Care** - Always lift tree by the root ball. Keep roots moist until planting.

3. **Digging a Proper Hole** - Dig 2 to 5 times wider than the diameter of the root ball with sloping sides to allow for proper root growth.

4. **Planting Depth** - The trunk flare should sit slightly above ground level and the topmost roots should be buried 1 to 2 inches.

5. **Filling the Hole** - Backfill with native soil unless it's all clay. Tamp in soil gently to fill large air spaces.

6. **Mulch** - Allow 1 to 2 inch clearance between the trunk and the mulch. Mulch should be 2 to 3 inches deep.

For more tree-planting tips and information, visit **arborday.org**.

Source: Arbor Day Foundation

of the Clean Water Act in 1972. The pesticide DDT was banned.

Setting the stage for Earth Day was Rachel Carson's 1962 book "Silent Spring" about the effects of chemicals in the environment, especially linking DDT with a decline in the number of bald eagles.

Two events in 1969 built on Carson's work and directly led to that first Earth Day. In January, a 3 million gallon oil spill coated beaches along Southern California. In June, pollution in Cleveland's Cuyahoga River caught fire.

This happened on the heels of protests for civil rights and against the Vietnam War. With college student schedules in mind, the time chosen for Earth Day fell after spring break and before final exams.

The heightened awareness from a day devoted to environmental consciousness brought attention to other environmental issues. The lead additive in gasoline damaged health in many ways. Refrigerants and solvents were among chemicals that depleted the ozone layer of the atmosphere, which protects the Earth from the harshest rays from the sun. Sulfur dioxide from coal-fired power plants caused "acid rain" that damaged forests.

A ban on ozone-depleting chemicals took effect in 1989, beginning the path to reversing damage to the ozone layer. Legislation to remove lead from gasoline and curbing acid rain was enabled by the innovative idea of pollution credits.

The notion behind the credits—also known as emissions trading—had the government setting an overall industry limit on pollution rather than requiring reductions by each power plant or refinery. That way, a power plant could emit more than the limit if it could buy or trade emissions credits with another plant that was under the allowed limit.

Lead was phased out of gasoline from 1971 to 1988. Sulfur dioxide emissions have been reduced 88% between 1990 and 2017, according to the EPA.

Huge gains in energy efficiency have also eased environmental impacts since 1970.

LED lightbulbs use as much as 80% less electricity and last as much as 25 time longer, the U.S. Department of Energy says.

Cars and trucks are more efficient and less polluting. The EPA reports that during the past 50 years, fuel economy has doubled and carbon dioxide emissions from vehicles have been cut in half.

The rise of renewable energy is another story of the past five decades. In 1970, nearly half of our electricity came from coal-fired power plants. Today, solar energy and wind power are on the rise, generating nearly 10% of electricity nationally.

Of all the electric generation planned for 2020, more than three-fourths will come from wind or solar, according to the Energy Information Administration.

For all of those achievements, environmental changes since the first Earth Day might be the perfect example of how a glass can be viewed as half-empty or half-full.

Regardless, focusing on ways we can improve our environment will certainly take center stage on April 22, 2020, when we celebrate the 50th anniversary of Earth Day. ■

Behind the Grid

The world continues to seek new methods to generate and store electricity. There is no perfect solution. Challenges include reliability, renewability and greenhouse gas emissions. This series seeks to explore those questions. This month, we look at wind power.

The output of a wind turbine depends on the turbine's size and the wind's speed through the rotor. An average onshore wind turbine has a capacity of 2–3 Megawatts

Modern wind turbines are nearly 300 feet tall - about the same height as the Statue of Liberty

Visit clearwaterpower.com to read previous 'behind the grid' articles including landfill gas and nuclear power.

Operation & Design:
As wind blows across propeller blades, it pushes them causing a turbine to spin. That spinning action generates electricity. Most wind turbines are built onto masts of 280-330 feet tall. This height puts the propeller blades in optimal position to take advantage of greater wind speeds. The blades themselves average 120 feet in length.

Renewable Resource:
Wind is a renewable resource. It is created as air naturally moves from areas of high pressure to areas of low pressure. Generally, this is caused by the uneven heating of the Earth's surface by the Sun.

Emissions and Environmental Impact:
Wind turbines do not produce any emissions. They have been known to endanger flying birds and bats. The whirring blades produce some noise as well that may affect people and wildlife. Although, these same criticisms could be said for highways, skyscrapers or industrial sites.

Operating and Maintenance Costs:
Wind turbines obviously don't require fuel so they cost very little to operate. As with anything, maintenance costs increase as they age. Modern wind turbines are still a relatively new technology. Some estimates suggest they can operate for over 30 years, though there are many deployed turbines that lasted less than 20 years. Turbines can be repaired and most of the metal structure can be recycled but the fiberglass blades deteriorate over time and must be placed in landfills. Efforts are being made to find ways to recycle the material used in the blades.

Location:
Most wind turbines are placed in flat, grassy, rural areas. Some locations are better than others. It is more economical to place wind turbines near existing electrical infrastructure. Wind turbines can also be located offshore, distributed throughout a grid or even built completely off-grid.

Reliability:
Wind is unpredictable and intermittent. In order to generate electricity, turbines require a minimum winds peed of about 6-9 miles per hour (this is known as the cut-in speed). The optimum range for wind speed is around 20 miles per hour and the maximum safe speed is about 45 mph (cut-out speed).

Demand:
Consumers want electricity to be available at any time. So, utilities seek 'firm' sources of generation that can be ramped up or down to meet demand. Wind is a non-firm resource (wind cannot be made on demand) so it only works when tied to another system to fill in when wind generation can't meet consumer demand.

Behind the Grid

The world continues to seek new methods to generate and store electricity. There is no perfect solution. Challenges include reliability, renewability and greenhouse gas emissions. This series seeks to explore those questions. This month, we look at nuclear power.

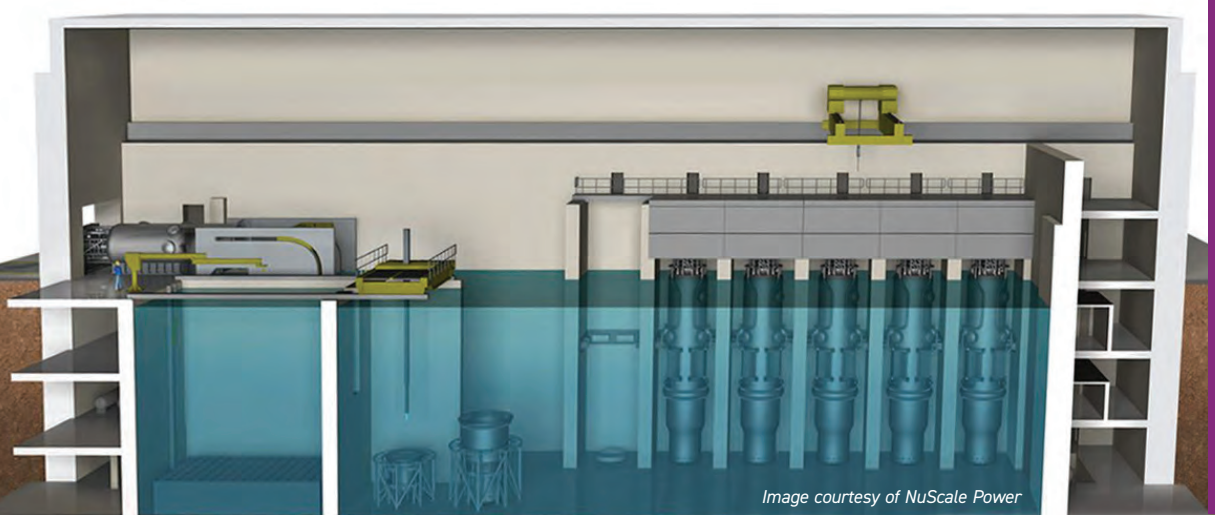


Image courtesy of NuScale Power

▶ The City of Idaho Falls along with other small utilities in Idaho and Utah support purchasing power from SMRs in the future.

▶ The first city in the U.S. to receive electricity from a nuclear power plant was Arco, Idaho in 1955.

▶ This rendering to the left is a Small Modular Nuclear Reactor (SMR) which incorporates all of the components for steam generation and heat exchange into a single integrated unit called the NuScale Power Module™ (NPM). Each NPM operates independently within a multi-module configuration. Up to 12 modules can be monitored and operated from a single control. Each module can output 60 Megawatts of electricity, which would power about 30,000 homes.

Most nuclear power plants use uranium fission to create heat. The heat turns water into steam and the steam then drives turbine generators to make electricity. About 20% of electrical generation in the United States comes from nuclear power. It is the largest contributor of non-greenhouse-gas-emitting electric generation.

Nuclear power is extremely reliable. Often running 24/7 at over 90% capacity for 18-24 months without refueling. It is also scalable, able to meet peak demands for power. Uranium is a fairly common element (about as plentiful as tin) and is found all over the world. However, it requires a great deal of refinement to be turned into a useful fuel.

A Northwest company called NuScale Power, which has an office in Corvallis, is currently working on a technology known as Small Modular Nuclear Reactors. These nuclear power plants are designed to be cleaner, safer and more cost competitive. Their compact design allows them to be built and assembled in a U.S. factory, then shipped to a prepared site for deployment. SMRs are about one-third the size of traditional reactors and their size and simplicity could reduce the time it takes to construct a new nuclear power plant. These factors make SMRs more flexible for different scales of production or as demand changes over short periods of time. The U.S. Department of Energy supports the design, certification, and commercialization of small modular reactors.

The greatest concern over nuclear power regards used fuel. Used fuel—often called spent fuel—remains radioactive for many thousands of years and must be contained or else it poses a serious environmental threat. Most nuclear waste in the U.S. is stored in large, water-cooled pools on-site at power plants. A safer but more expensive option for storage are large containers called dry casks. Great strides have been made in reusing old fuel but these methods are not currently considered economical. ■

For more information on nuclear power, visit www.energy.gov.

Dick McHaffie Will Be Missed

By Craig Reed

Dick McHaffie took full advantage of the many aspects of life.

He enjoyed being a husband, father, grandfather, worker, community volunteer, University of Oregon Duck fan and a continuing student of technology.

He loved to camp with his wife, Lynn, and family.

He specialized in smoking and barbecuing meat, his preference being pork, and he was obsessed with creating and cooking the perfect Chicago pizza—a food he enjoyed when living in Illinois as a young adult.

Dick's family and friends are now remembering the 63-year-old in all those aspects of life. He died January 25 of a pulmonary embolism.

"There's a gaping hole," Courtney Hallgrimson said of her father's death. "He's going to be greatly missed by his family."

Dick also leaves gaps in his hometown of Yoncalla. His community service included being a longtime member and the current president of the Yoncalla Chamber of Commerce, and he was a 23-year member of the Douglas Electric Cooperative Board of Directors.

As the DEC board member representing north Douglas County, Dick learned about changes in the electrical industry that included technological advances in hydro, wind, solar, wave and methane power sources.

"He loved techy stuff. He was into it," Courtney said. "He was a willing learner."

Courtney added that her father was passionate about supporting the Yoncalla area, and embraced being a member of the chamber and the DEC board.

"He wanted Yoncalla to be better," she said. "He wanted there to be reasons for people to come visit. Being a small town, he didn't want Yoncalla to just die out. He wanted to help it thrive. His goal was to do what he could to keep it alive."

Dick was a past Citizen of the Year for Yoncalla. Donna Dick, a longtime Yoncalla resident and friend of the McHaffies, described Dick as a fixer.

"Dick was one of those people you could depend on," Donna said. "He didn't put himself out there. He just was. Whenever something needed to be done, either Dick or Lynn were right there. He was such a presence, and we're going to miss him."

Dick was an advocate of Douglas Electric and Douglas Fast Net bringing high-speed fiber to rural areas to improve internet service to those residents.

"He enjoyed having a hand in making big decisions for the cooperative," Courtney said. "He liked collaborating with people on the board, being part of it, and coming up with new things like Douglas Fast Net and fiber. He was an advocate for progressive technology."

Keith Brooks, Douglas Electric's general manager, described Dick as level headed and compassionate.

"Sometimes boards have to make tough decisions," Keith said. "I have been in the room when he advocated for members and was the persuasive voice. He impacted members' lives in meaningful ways. I will miss Dick's presence in the room."

Dick leaves behind his wife, Lynn, of 43 years; their three daughters: Meridith (Todd) Grassman, Brittany McHaffie and Courtney (Isaac) Hallgrimson; and granddaughters Adelyn and Elsie Grassman; and grandsons Soren and Magnus Hallgrimson.

"He was very loving," Courtney said. "He showed you he loved you by always being there to help you. He was kind of a silent type, but he was there for you if you needed him. It was always, 'It's OK, everything will be alright.'" ■

Dick McHaffie died in January at the age of 63.

We Love Our Community

"To move forward, you have to give back."

This quote from Oprah Winfrey reflects the special bond and obligation that ties Coos-Curry Electric Cooperative to the community we serve. With Valentine's Day past and our celebrating the day of love, we felt the need to express how much we love this community and serving you, the members of the co-op.

When we helped bring electricity to the rural Southern Oregon Coast many years ago, the quality of life improved for all. Through the years, other issues needed to be tackled, and we have been at the forefront of helping address some of those issues.

We want to help meet the long-term needs of our community to ensure it continues to thrive, because just like you, we live here, too.

While our priority is to provide safe, reliable and affordable energy, equally important is our mission to enrich the lives of the consumer-members we serve. This focus to benefit the larger community is central to the way we operate as a cooperative. CCEC knows electricity is a critical need for modern-day life, but it takes more than poles and power lines to make a community.

Over time, our co-op has evolved to meet the changing needs of our community, thereby improving the quality of life for everyone. That can mean many different things. It can mean programs for Oregon's youth, such as education scholarships or the Electric Cooperative Youth Tour, where we take our community's brightest young people to Washington, D.C., for a weeklong immersion to experience democracy in action. It means organizing food and clothing drives, and contributing more than $3,300 annually to Operation Round-up—a program that helps local families in need pay their utility bills. It means partnering with organizations such as Curry County Search and Rescue and Gold Beach Fire for Safety Camp and other worthy programs.

Through the years, our community-focused programs and other giving projects have provided school supplies and coats to children, fed hungry families, enabled those in need to keep the lights on and so much more—and we couldn't do any of this without you, our members.

We all benefit from these programs because of you and your neighbors. You empower Coos-Curry Electric Cooperative through your membership and your participation in and support of these programs.

As a local business, we are proud to power your life and bring good things to our community. We hope you will continue to guide our efforts by sharing your perspective as we plan for the future.

The energy landscape is undergoing dramatic change, fueled by evolving technology and consumer desires for more options. While the larger environment in which we operate is constantly changing, one thing remains the same: By working together, we can continue to do good things for our community. ■

NLI linemen prepare to install a power pole. PHOTO BY KRISTIN METTKE

Maintenance is Key to Reliability

Northern Lights Inc. has been around for 85 years. The electric system serving our members is a spread out, complex conglomeration of different ages and types of infrastructure requiring constant attention to keep the system safe and reliable.

Maintenance and replacement work is carefully planned, budgeted and scheduled each year. This work requires balancing our crew's workdays with their regular duties, such as installing new services, responding to service issues and restoring power outages. NLI supplements our line crews, as needed, with additional contract line crews.

NLI has approximately 1,240 miles of underground power lines, 1,570 miles of overhead power lines and 12 substations that require regular maintenance and checks.

You may have seen NLI linemen working in a snowstorm or windstorm to restore your power. Linemen perform routine maintenance in all weather conditions year-round. The type of maintenance activities depends on the season, but there are no snow or rain days for linemen.

NLI has about 33,600 wood poles on our overhead power line system. The typical lifespan of a western red cedar wood pole is about 50 years in our region. A pole may have a shorter lifespan if it is in a particularly wet area prone to rot, is attacked by woodpeckers, or becomes damaged or compromised by trees or other outside forces.

NLI contracts with a company that specializes in pole testing and inspection to field review a portion of our wood poles. This helps catch many of the problems a wood pole may have ahead of it being replaced for age. We are working on such replacements in the Yaak, Montana, area of our system. About 250 to 300 poles are replaced through normal maintenance each year. Additional poles are replaced in larger upgrade projects.

For underground power lines, the typical lifespan for the cable in our region is 30 to 40 years. These replacements can typically only be done during the summer and fall. For this reason, NLI uses contract help during the busy summer with underground cable replacement projects. During the past 20 years, NLI has replaced more than a million feet of underground cable. Each year, we typically replace about 50,000 feet of underground cable.

Being a cooperative, NLI reinvests revenue into our service area through stable rates and infrastructure or returns it to members through patronage capital.

NLI maintenance programs aim to bring value and reliability to NLI members using a portion of our revenues. ■

Northern Lights Engineering & Operations Manager Kristin Mettke is an electrical engineer and has worked in the electric utility industry most of her career.

Noteworthy Accomplishments

- 2020 Pamela Klatt Award-Northwest Hydro Association award recognizing oustanding industry professionals
- 2019 Mason LaZelle Achievement Award-the highest honor conferred by the Alaska Power Association (APA)
- 2019 Honor Award-American Council of Engineering Companies recognizing engineering excellence for Allison Creek
- Leader in APA Environmental Regulations Committee, Board of Directors, and Managers Association, and Chair of Hydro Working Group

CEO Duhamel Retires

An Honor to Serve

By John Duhamel

In 1995, the Air Force assigned me to Eielson Air Force Base south of North Pole, Alaska. My family and I arrived on July 4 after a very long drive through Canada. It was not long for us to decide that Alaska was the place we had been looking for. When our Eielson assignment was completed, we made the decision to stay for good, and our search for the perfect retirement location led us to the Copper Basin and Valdez.

We knew very quickly that this somewhat rural area was where we wanted to plant our retirement roots. We bought land in Valdez and started a very slow construction plan to build our retirement home. Things were starting to come together but we were still a long way off, living in North Pole.

I starting looking for job opportunities in the area, and to our great pleasure, in 2010, I was hired by CVEA for a job in Glennallen. I would soon learn that it would be the best job I had ever had.

CVEA is made up of extremely professional and dedicated people. I was truly impressed that such a talented group was assembled in an area of the state so far from the large population centers. It was not an accident; the organization is run by a clear thinking Board of Directors and top notch managers.

My decision to join CVEA was one of my best work decisions. My job was to oversee the regulatory requirements of CVEA and to manage large scale projects that overlapped departments.

It is almost inconceivable the volumes of regulations that affect such a small organization, but they exist and I was hired to manage them. It was a challenge, but very rewarding when government regulators visited the Co-op and positively commented on CVEA's regulatory procedures.

I was also tasked with planning, managing, and construction of the Allison Creek Hydroelectric Project. I took over the project at the very beginning stages; an environmental impact statement was not completed and a license application to the Federal Energy Regulatory Commission (FERC) had not yet been written. This meant I was able to see it develop from an idea to a functioning hydroelectric power plant. Overseeing the construction in 2014, 2015 and 2016 was a proud time that I will never forget.

The project has significantly extended the summer generation season, saving members money on their power bill, eliminated millions of dollars of diesel fuel used for power production, and prevented emissions associated with that production each year. Ten years before the Allison Creek Hydroelectric Project was built, the average annual hydro production was 45 million kilowatt hours. In 2019, CVEA produced 72 million kilowatt hours of hydroelectricity; that is 74 percent of total annual production. The Allison Creek project has gone on to win multiple national awards for outstanding design and construction.

> "To use a phrase that we often stated in the military: It has been an honor to serve you."
>
> JOHN DUHAMEL, CVEA CEO

In 2015, I was privileged to become CVEA's CEO, supporting our fine organization with even more responsibility. It has been a pleasure and I have enjoyed coming to work every day. Your Co-op is filled with hard working employees, dedicated to serving the members. Words cannot begin to describe the real value of the people working hard for you.

I am retiring, but have handed the reins to someone smarter, stronger, faster, more ingenious, steadfast, and is a visionary. I can't think of a more qualified individual than the person selected by the Board, Travis Million. Travis is an extremely talented leader who has already dedicated himself to CVEA for the past nine years. I congratulate Travis on his accomplishments thus far and wish him continued success down the road. I am confident Travis will accomplish amazing things in his new role as CEO. Travis and CVEA will continue to do great things for their members and their communities.

To use a phrase that we often stated in the military: It has been an honor to serve you. ■

Travis Million Takes The Reins

Following a review of internal candidates and focused deliberation, CVEA's Board of Directors named Travis Million as the organization's next Chief Executive Officer (CEO).

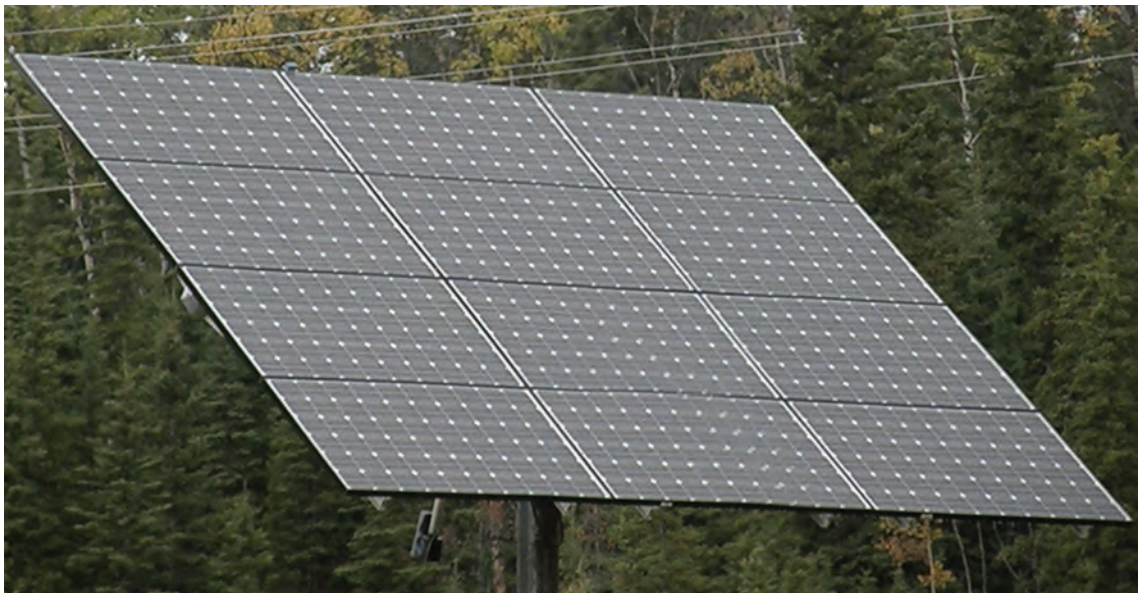
Travis came to CVEA in 2008 as a board director before joining staff as the Manager of Power Generation in 2011. He is currently Chief Operating Officer overseeing operations, production, engineering, environmental and regulatory compliance, and safety divisions.

During his time with the Co-op, Travis has completed many significant projects; two that stand out the most are the technical oversight of the Allison Creek Hydroelectric Project, and rebuilding the CVEA Safety Program and culture. He has gained the respect of every member of the Employee Team and Board of Directors, Industry Colleagues, Agency Personnel as well as Legislators and the Congressional Delegation.

Travis is a leader and engineer with over 20 years of experience in the power system and electric utility industry. Prior to working for CVEA, Travis worked for Schweitzer Engineering Laboratories and was the power engineer at the High Frequency Active Auroral Research Project, or HAARP. He has education in Electrical Engineering, Business Management, and Finance. He is the current Chairperson of the Alaska Power Association Safety Committee, serves on the ARECA Training Council Board, is the Vice Chairperson on the Copper River Local Emergency Planning Committee, Secretary of the Glennallen Community Chapel Board, and served one term on the Board for Copper Valley Telecom. Most notably, Travis is a past recipient of the Alaska Journal of Commerce "Top Forty Under 40" award.

Travis says he thinks CVEA's biggest challenge is "finding a solution for reliable, affordable winter energy. Many steps have been taken to reduce our dependence on fossil fuel, but continued work is needed to eliminate the volatility of costs associated with diesel generation. Overall system reliability also remains a high priority."

Travis and his wife Emily have two daughters, Sophia and Reese. Their family has called the Copper Basin home for 15 years. Travis enjoys spending time with his family, coaching youth basketball, camping, hunting and fishing, woodworking, and running. ■



Net Metering Program Reopened

CVEA implemented the Net Metering Program (Program) in 2012 when member interest in renewable energy alternatives, like wind and solar, had increased in popularity.

Net metering allows an eligible consumer to connect an approved renewable energy generation system to the CVEA grid in order to offset their normal usage and potentially sell back excess energy to the Cooperative. To be eligible to participate in the Program, a consumer's generation system must produce electric energy derived from one or more renewable resources to include the following: solar photovoltaic or thermal energy, wind energy, biomass energy, hydroelectric energy, geothermal energy, hydrokinetic energy, and ocean thermal energy.

The system must be operated, and either owned or leased, by a consumer that purchases retail electric utility service from CVEA. It must also be located on the consumer's premises, be used primarily to offset part or all of the consumer requirements for energy, be compatible with the Cooperative's system, and have a total nameplate capacity of no more than 25 kW.

There exist specific and overall system limitations that can limit the number of consumers that can participate in the Program. Specifically, the total nameplate capacity of all participants in the Program may not exceed 1.5 percent of CVEA's average retail demand. At inception this was 210 kw; once that limit was reached, applications were no longer accepted.

In 2020, due to an increase in peak loads, the maximum allowable kWs for this program, as dictated by CVEA's Tariff, has also increased. This provides for additional nameplate capacity, and an opportunity for members to once again apply for participation in the Program.

As of February 10, 2020, CVEA reopened the application period and new applications are being accepted. If you are interested in the Net Metering Program, have questions, or would like to get started on the application process, please visit the net metering page, under the member services section at cvea.org. For additional help, please contact Darin Sauls at sauls@cvea.org. ■

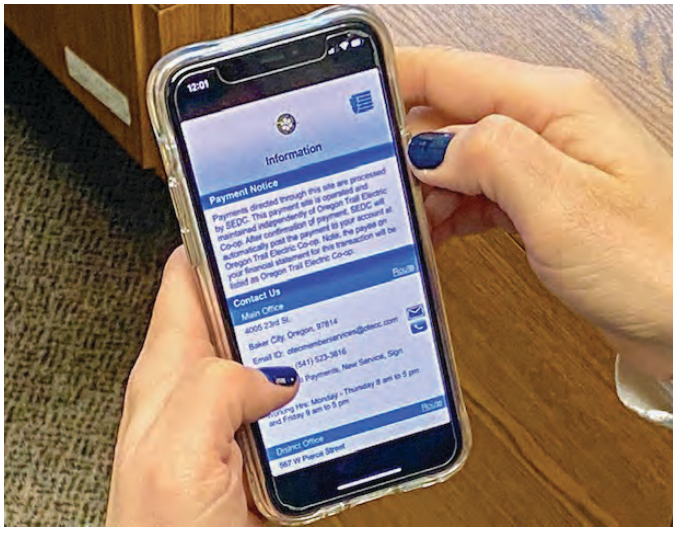
What Do OTEC Members Want?

There's an app for that

By Joseph Hathaway

Did you know there's an easy and free way to efficiently use and manage your energy consumption, and it's right at your fingertips?

Oregon Trail Electric Cooperative offers our member-owners a variety of billing and payment options that are safe, secure and convenient. One of those is the My OTEC mobile app you can download for free on your smartphone.



Take control of your OTEC account by using the My OTEC mobile app.

From the cozy confines of your home or office, you can regularly check your account or manage several accounts at once. You can make payments on any account through the app and report outages.

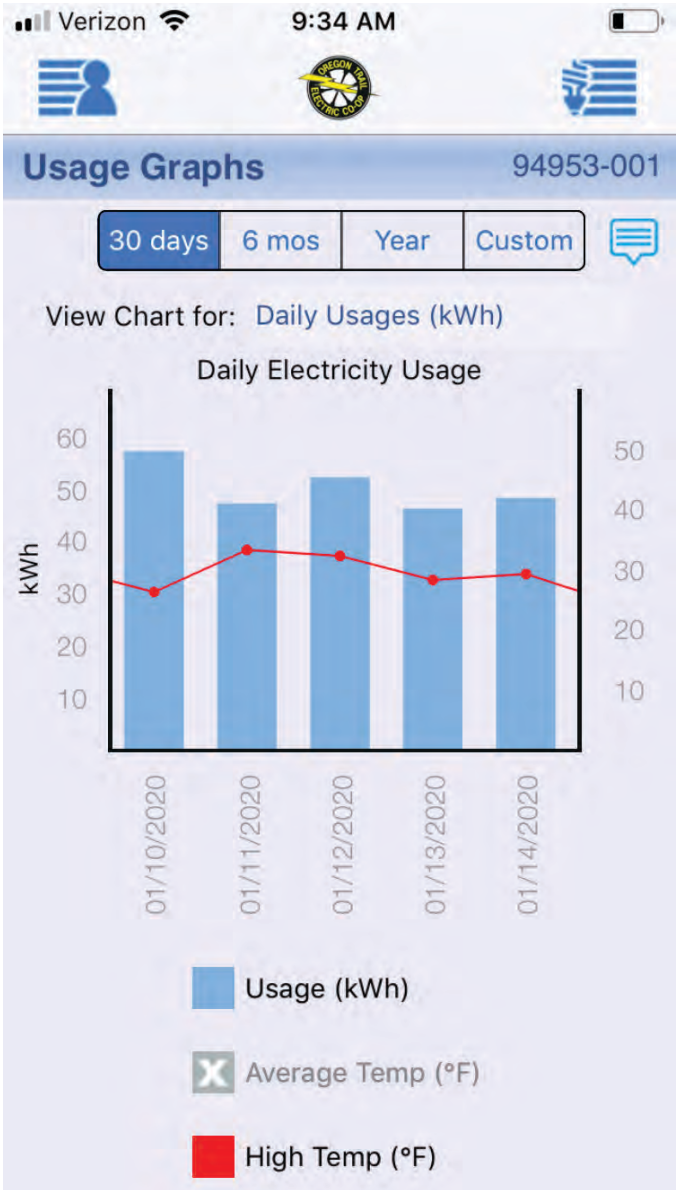
"Our mobile app is a great way for people to report outages," says Eric Wirfs, OTEC's director of member services. "Through the app, your smartphone can help us pinpoint the outage so our crews can start restoration efforts immediately."

The app is a great tool for ranchers and irrigators too.

"Through the app's feature of letting you manage separate accounts, they can report to us which exact pump is out so we can work quickly to bring it back on," Eric says.

The My OTEC app also gives you the opportunity to track how much energy you use. Energy usage charts show how much electricity you're using by month, week, day and hour.

Another benefit of using the app is signing up for a variety of notifications.



The app allows users to track electricity usage down to the hour.

"Through our push alert system, you can sign up to be notified via phone call, email or text if your payment is past due or if you have a low balance on your prepay account," says Tim Sheehy, OTEC's director of information technology. "We have modern technology built into the app, including encryption, that helps protect your personal information. Cybersecurity is a grave concern of ours, and we go to great lengths to make sure our member-owners are protected." ■

The app is free to download on the Google Play Store or Apple App Store. To start using the app, create a user ID on the homepage of OTEC's website, www.otec.coop.

OTEC Employees Train in Wilderness First Aid

By Joseph Hathaway

Oregon Trail Electric Cooperative member-owners know it is a gift to live in Eastern Oregon. Our way of life is intricately shaped by the beauty Mother Nature has provided in rural Oregon.

Living in our area comes with inherent risks as well, especially when you recreate or work outdoors. OTEC linemen already put their lives on the line as they work hard to provide you with reliable and safe electricity. The risks increase when they work in heavily forested and remote areas, with emergency services and help sometimes hours away.

To sustain and elevate your cooperative's strong safety culture, OTEC recently partnered with Baker Technical Institute to provide employee training in wilderness first aid. For two days at OTEC's headquarters in Baker City, employees learned general medical concepts and basic life support for emergencies they might encounter in remote settings.

BTI instructors Dr. Kaare Tingelstad and Robbie Langrell taught the class. Kaare is internationally recognized in this field. He has trained emergency medical service agencies, wilderness guides, military and fellow medical professionals how to care for patients who have sustained injuries or illness in remote areas.

BTI designed the course specifically for utility workers. It includes details such as items workers may keep in their service trucks to treat themselves or patients, environments they work in and emergencies they are most likely to encounter.

The training began with Dr. Tingelstad reviewing general concepts and principles of rescue medicine, such as assessing the severity of a patient's injuries. He discussed topics and terms related to the types of injuries OTEC employees could encounter on the job, including electrical and lightning injuries, fractures, hypothermia, wounds, burns and other backcountry medicine-related issues.

"We're very excited to be able to offer this training," says Tonia Springer, BTI program coordinator. "This may be some of the most valuable training they receive, and hopefully never have to use. However, often lives can be saved by having these specialized skills that are designed for where we live and work."

OTEC employees spent two days learning and practicing a variety of first-aid techniques they may encounter on the job.

Class participants underwent real-life training scenarios, including how to safely evacuate severely injured patients.

The course also immersed employees in real-time emergency situations. Hands-on training included CPR, making splints and wraps for wounds, and emergency simulations in different environments, such as the difference between treating someone in the dead of winter or the blazing heat of the summer.

"This training is important because this is a dangerous industry," says Larry Robb, OTEC dispatcher from Baker City. "There's lots of potential for injuries for guys who work in the field."

Jeremy Adair, serviceman out of John Day, agrees.

"This course helped identify medical issues that could easily come up in my day-to-day work and activities," he says. "We work in all kinds of weather conditions, terrains and areas that aren't easily accessed by EMS."

After successfully completing the course, OTEC employees received a three-year international certification in wilderness first aid and adult CPR.

The safety of OTEC member-owners, the general public and employees is at the forefront of everything OTEC does. Our participation in BTI's program helps employees of your cooperative be better prepared and empowered for the dangers they face as they work to ensure the people of our communities receive the best service possible. ■

Careers at AVEC

There are four major career areas in the electric utility industry: generation, transmission, distribution and administration. It would be impossible to produce and deliver safe, reliable electricity without the tremendous support, planning and supervision utility employees provide in each of these different areas.

Alaska Village Electric Cooperative is a generation and distribution cooperative. Distribution cooperatives are responsible for distributing electric power to the end users or consumers. Distribution cooperatives establish electric service to homes and businesses and ensure their consumers are supplied with safe, reliable electricity.

Generation cooperatives design the power plants that generate electric power and also design the installation of the various engines and wind turbines and their related components that help generate the power.

All electric utilities, including cooperatives, have people employed in areas other than generation and distribution. Accountants, data entry clerks, secretaries, purchasing agents, draftspersons, warehouse workers and customer service representatives are just a few of the administrative jobs available at AVEC. Typical jobs that may be available are listed below.

Administrative and Clerical Jobs

A variety of skills and abilities are required for these jobs involving office work.

- Member service representatives deal with consumers (members) directly, whether by phone, letter or office visits. They handle orders for establishing new electric service, answer member questions about their accounts and help solve problems. They also bill customers and collect and record members' payments.
- Secretaries/administrative assistants provide office support by word processing letters and reports, preparing charts, filing paperwork and operating various types of office equipment.
- Purchasing agents and warehouse personnel buy and distribute everything AVEC needs to carry out both its in-house and field operations. These items range from pencils and pens to power generation modules.

Technical Jobs

These specialized, practical, scientific and mechanical skills are necessary for the installation, operation and maintenance of electrical equipment.

AVEC has two categories of field employees: generation and distribution. Our field employees build new facility upgrades and/or maintain them after they are built. All of the field employee positions require extensive travel to remote locations.

- Autocad technicians help prepare/revise the blueprints used by engineers and field employees.
- Electricians follow prepared blueprints to install or repair electrical equipment, including circuits, control panels and engine-generator sets.
- Linemen build and maintain power poles and power lines that carry electricity from the power plant to the consumer.
- Power plant operators handle the daily power plant operations.
- Support personnel, including mechanics and welders, help keep equipment safe and in proper operating condition.

Scientific and Engineering Jobs

Specialized, complex responsibilities are handled by highly trained employees. For example:

- Mechanical and electrical engineers are involved in the planning, design, construction and management of our generation and distribution facilities.
- Computer programmers/technicians manage and produce information used to keep computer operations running as securely and efficiently as possible.

Other Professional Jobs

- Human resource personnel prepare payroll and handle employee-related benefits.
- Accountants keep financial records and analyze and advise on major business transactions. There are also work order clerks and accounting assistants.
- Lawyers are required to handle legal matters involving the cooperative and individuals, corporations, groups or governments.
- Public/community relations personnel help manage community and employee relations programs.
- Superintendents and corporate support are involved with aspects of operating an electric cooperative that require a business background.
- Upper-level managers require advanced degrees and/or years of on-the-job experience. ■

AVEC Scholarships

Are you interested in pursuing higher education after graduation to help prepare you to find employment with a steady income? Do you have a desire to go back to school to get vocational training to develop a new set of skills? Need money for school?

AVEC may be able to help you achieve your dreams. The AVEC Scholarship Committee annually awards $20,000 in vocational, technical and academic scholarships in two separate award periods.

The scholarships are worth $500 or $1,000, except for the Ted Stevens Memorial Scholarship, which is worth $5,000. This scholarship is granted to one student who, in addition to the standard AVEC scholarship criteria, demonstrates strong public and community service to their community and rural Alaska.

All applications for fall semester are due by April 15. Funds will be dispersed in August. All spring semester applications are due by August 15. Funds will be dispersed in December prior to the start of classes. Scholarship applicants must be an AVEC member or live in a household with an active AVEC membership. The scholarship is intended to go toward training or advancement of skills or trades that can be applicable to work in communities with an AVEC presence.

How To Apply

Applications are available online at www.avec.org or by contacting AVEC's Scholarship Coordinator at 800-478-1818, by email at scholarship@avec.org or write to:

Alaska Village Electric Cooperative
4831 Eagle St.
Anchorage, AK 99503

Applications are due by April 15, 2020, for schools that start in September 2020. ■

These scholarships are not limited to recent high school graduates.

Stay Back, Stay Safe

For the protection of you and everyone else, please give our crews room to do their jobs

WORKING WITH ELECTRICITY IS A dangerous job, especially for lineworkers.

USA Today lists line repairers and installers among the most dangerous jobs in the U.S. That's why, for Escambia River Electric Cooperative, safety is a priority. This is not empty talk. Over time, we have created a culture of putting our crews' safety and that of the community above all else.

Our mission is to provide safe, reliable and affordable electricity to you, our members. As we work towards that goal day in and day out, we want to be sure our employees return home safely to their loved ones. That requires ongoing focus, dedication, vigilance—and your help!

While we appreciate your kindness and interest in the work of our crews, we ask that you stay back and let them focus on their task at hand. Even routine work has the potential to be dangerous. It takes our crew's full attention and that of their colleagues, who are also responsible for the team's safety.

Distractions can be deadly. If a lineworker is on or near your property during a power outage, for vegetation management or for routine maintenance, please allow them ample room to work. These small accommodations help protect our crews and you.

If you have a dog, please try to keep it indoors while lineworkers are on or near your property. While most dogs are friendly, some are defensive of their territory and can't distinguish between a burglar and a utility worker.

We recognize that for your family's safety, you want to make sure only authorized workers are on your property. You will recognize EREC employees by their uniform with our logo and the service trucks with our name and logo on them. You may also recognize our lineworkers because they live here in the community.

In addition to giving crews space while they are near your property, we ask that you move over or slow down when approaching a utility vehicle on the side of the road. Moving over not only helps keep your friends and neighbors safe, it is the law. ■

Move Over. It's the Law.

The move-over law helps protect law enforcement officers and other emergency responders by requiring motorists to move over when approaching stopped emergency vehicles with flashing lights.

In July 2014, the Florida Move Over Act was amended. Utility service vehicles and sanitation vehicles were added to the list of public safety vehicles motorists must slow down or move over for to protect personnel who work on roads and highways.

Florida law states:

- On a two-lane roadway, you are required to slow to a speed that is 20 mph less than the posted speed limit.
- If the speed limit is 20 mph or less, you must slow down to 5 mph.
- If you are driving on an interstate or roadway with multiple lanes of travel in the same direction, and you approach an emergency or law enforcement vehicle parked along the roadway, you must vacate the lane closest to that vehicle as soon as it is safe to do so. If you are not able to safely move over, you must slow down to a speed of 20 mph below the posted speed limit unless directed otherwise by a law enforcement officer.

LEFT: Please use caution when driving through work areas. Always maintain a safe distance between you and utility workers.

OPPOSITE PAGE: The job duties of line crews may be interesting to watch, but please give our employees ample room to work—for their safety and for yours.

A Word About Water

Head Spinning With Laundry Options?

Washing machines perform a fairly simple function, which is cleaning dirty clothes. But prospective buyers can be overwhelmed with all of the different models and bells and whistles available: top-loading, front-loading, high-efficiency, water saver, steaming and wrinkle removing, to name a few.

Energy-efficient machines—identified by the Energy Star logo—should be a priority for cost-conscious consumers.

An estimated 93% of American households have a clothes washer, adding up to 102 million across America.

About 9 million washing machines are sold each year. Efficient models account for slightly more than one-third of sales.

Energy Star-rated washing machines cost slightly more than their less-efficient counterparts—anywhere from $400 to $1,500, depending on features selected.

To determine how much electricity a particular unit will use, read the yellow EnergyGuide before buying. An energy-efficient washing machine can save the typical homeowner about $50 a year, or $540 to $600 during the life of the appliance. Efficient machines also save more than 5,000 gallons of water a year.

The energy and water efficiencies of clothes washers are measured according to their modified energy factor and water factor. These criteria generally limit Energy Star qualifiers to front-loading and advanced top-loading models.

Front-loading clothes washers use a horizontal or tumble-axis basket to lift and drop clothing into the water, instead of rubbing clothes around a central agitator in a full tub. These units use less energy than conventional clothes washers by reducing the amount of hot water needed to clean clothes. Front-loaders also squeeze more water out of clothes by using spin speeds two to three times faster than conventional washers, reducing drying time and energy use.

Front-loading washing machines use less energy than top-loaders by reducing the amount of hot water needed to clean clothes. They can also be convenient space savers. PHOTO COURTESY OF WHIRLPOOL

Energy Star-qualified top-loaders typically use spray valves to rinse clothes, rather than a new tub of water. This not only reduces the energy required for heating water, but typically saves an average of 15 gallons of water per wash compared with conventional clothes washers. Qualified top-loaders also boast sensors that monitor and adjust incoming water temperature. This keeps water hot enough to dissolve the detergent and provide high-performance cleaning, but cool enough to save energy and minimize hot water damage to fabrics. One limitation of efficient top-loading washers is many models do not offer a high-temperature standard wash option.

Look for the Energy Star logo and shop at a store with knowledgeable staff to find a washing machine that will, over time, pay for itself. ■

Looking to Renovate Your Home?

By Robin Howard

It used to be that some renovations, such as replacing the roof or updating a kitchen or bathroom, returned almost 90% of cost of the investment at resale. Improvements such as these could also help sell a home faster, which made the decision to renovate an easy one. However, due to changing real estate market trends and new tax rules, home renovations may not have the same financial advantages as they did in the past.

The 2019 cost vs. value report for the South Atlantic region of the U.S. showed significant renovations don't return anywhere near what they used to.

On average, upscale kitchen renovations cost $126,307 and homeowners recoup about 65% of those costs, or $82,677. Midrange kitchen renovations cost an average of $63,387 and return about 63%, or $40,094. Upscale bathroom renovation projects average $61,063 and return about 61%, or $37,130. Midrange bathroom renovation costs about $18,981 and return around 67%, or $12,771.

What changed? For one thing, a peak in market prices means there isn't much margin for returns on renovations. Another factor may be that the cost of improvements has gone up about 20%, making gains even smaller for homeowners.

Other Remodeling Projects

Other remodeling projects may have higher payoffs than kitchens or baths. For example, replacing your garage door could return about 86% of your investment. Adding a deck returns about 75%, while replacing windows and siding returns about 73%.

Surprisingly, remodels that used to be ROI slam-dunks can turn out to be not-so-great investments today. For example, adding a master bedroom suite, a backyard patio and replacing the roof barely return half of the cost at resale.

Making the Decision

Whatever you're considering updating in your home, statistically, you'll forfeit 25% to 40% of what you put into the renovation at resale. However, that investment may come with an emotional boost that's worth it. If you shop for materials carefully, keep your updates streamlined and sensible, and cut labor costs by doing whatever you can do yourself, you could come closer to 100% ROI.

Planning to Sell?

If you plan to put your home on the market and your kitchen or bathroom could use an update, you probably won't see much more than a 60% return on your investment when you sell.

However, everyone knows kitchens and bathrooms sell houses fast—and fast sales can save you thousands of dollars. If you need to sell quickly, it might be worth it. Otherwise, you are probably better off with some simple improvements. If you don't want to put money into a renovation that you may not get back, try some of these inexpensive refreshes:

Bathrooms

- Paint the walls white.
- Raise the shower curtain rod and install a high-end, extra-long shower curtain.
- Paint a tired vanity cabinet.
- Add a sparkling new rain head or handheld showerhead.
- Reglaze bathtub or shower tile.

Kitchen

- Deep clean it.
- Declutter countertops.
- Reduce items in the cupboards and pantry to the bare minimum.
- Touch up paint.

Planning to Stay?

If you do not plan to sell soon, the decision to renovate becomes more emotional than financial. If you love your neighbors and your neighborhood, it makes more sense to renovate than to move. A remodeling project can have intangible returns that are worth the money, such as an improved sense of well-being and better functionality.

If you do decide to remodel and you want to eventually recoup your investment, make a realistic budget and stick to it. Don't over-improve your house so that the price outpaces the market in your neighborhood.

It's easy to get starry-eyed over expensive gas ranges, refrigerators that order groceries for you, sparkling granite and fancy auto-close drawers. That's OK as long as you understand you won't recoup much from those luxuries.

Unless you have money to burn, you'll be financially better off if you take the middle road with home renovations.

Remodeling With a Loan

If you decide to renovate and you aren't sitting on a pile of cash, two kinds of loans—a home equity line of credit and home equity loans—can help finance your vision. Which one you choose is mostly a matter of self discipline.

A home equity loan gives you a lump sum. If you plan a $150,000 renovation, you'll use your home for collateral and you'll get a check for $150,000. If your work comes in under budget, you still have to pay back $150,000. That means you have to be disciplined to pay back the excess right away instead of taking a vacation with the rest.

Getting a lump sum also makes it easier to spend more than you have to and harder to economize where you can.

A HELOC is a revolving line of credit you borrow against as needed. It allows you to pay for your renovation in stages and helps you only borrow what you need.

According to new tax laws, you can still deduct the interest paid on a HELOC up to $100,000 as long as you use it for substantial improvements to your home, and the combined amount of your first mortgage and your loan or home equity loan don't exceed the value of your home.

If you file taxes jointly, you can deduct interest on up to $750,000 of a home equity loan—or $350,000 if you file individually.

If a home renovation project is on your radar, the decision isn't as easy as it has been in the past. Since you are likely to recoup only 60% of your investment on average, the other 40% you spend should provide some other tangible return or an intangible return that justifies the price tag. ■

The Day the Sky Fell

Remembering the 1958 Mars Bluff accident

By Vanessa Wolf

In the 19th-century fable, Henny Penny—better known in the U.S. as Chicken Little—worried the sky was falling. Had her concerns occurred 125 years later in Florence County, a more apt fear would have been the sudden, unexpected descent of an unarmed atomic bomb. On March 11, 1958, that's exactly what happened.

After departing from Hunter Air Force Base in Savannah, Georgia, a B-47 Stratojet was passing over the small town of Mars Bluff en route to the United Kingdom. It was on its way to the U.K. to take part in "Operation Snow Flurry," a response to the Cold War.

The crew planned to conduct a mock bomb-drop exercise intended to measure accuracy. At the time, planes carried live bombs on board in case they were called upon to suddenly activate for a wartime situation. In most cases, however, their fissile nuclear cores had been removed and could not cause a nuclear detonation.

On the B-47, the crew was settling in for its transatlantic trip when a fault light began to flicker, indicating the pin holding the bomb in its harness was not properly engaged. Navigator Captain Bruce Kulka went to investigate. As he leaned over the launch trigger to check it, the plane hit an air pocket. Kulka accidentally hit the emergency release button and sent the 7,600-pound weapon down into the wooded Mars Bluff countryside.

At that moment, 15,000 below, Walter Gregg was at home, tinkering in the shop with his son. His two young daughters were playing with a cousin in the yard while his wife worked in the house. Had it been armed, the atomic warhead that came crashing into their lives would have been almost three times as powerful as Little Boy, the bomb that devastated Hiroshima 12 years earlier. Everyone in Florence, five miles away, would have died instantly. The other 30,000 residents of the county likely would have soon followed, the result of radiation poisoning.

The combined impact weight and the TNT trigger for the bomb blew a crater in the family's garden. Accounts of the hole's size differ, ranging from 24 feet deep and 50 feet wide, to 30 feet down and 75 feet across. A hundred yards away, the house and shop were destroyed, and several family members were injured with cuts and gashes. Miraculously, everyone survived, minus a few chickens.

In a March 31, 2018, story in The Post & Courier titled "The Atomic Bomb That Faded into South Carolina History," writer Bo Petersen reports that as far as the military's official comments on the incident, "Its spokespeople insisted early and often the bomb wasn't armed and there was no danger of nuclear detonation. But one of the pilots made a distress call saying they had jettisoned 'hot cargo,' or an atomic bomb. The three pilots were reassigned overseas for seven years. And for the next 25 years, military craft flew overhead the farm checking for radiation."

According to an exhibit at the Florence County Museum, despite the total loss of the Gregg property, the U.S. Air Force did not offer any reparations to the family impacted by their mistake. Walter eventually sued and was awarded $36,000, which wasn't enough to rebuild the house, let alone replace their possessions.

The family moved away, and the property passed through several owners. No one filled in the hole, yet both the incident and the site itself remained relatively obscure until 2008—the accident's 50th anniversary.

After that time, an information kiosk and a lifesize, plywood cutout of the 10-foot-tall bomb were placed beside the crater. Later, a state historical marker was erected alongside U.S. 301, a few hundred yards from the hole.

These days, the site of the near-apocalypse is difficult to find, which is probably for the best because the crater is on private property.

While it's harrowing to think of military planes fumbling atomic weapons onto civilian heads, the Mars Bluff accident was one of dozens of "broken arrow" incidents through the years. Broken arrow is the military's name for accidental detonations, contaminations, jettisons or complete losses of nuclear weapons, warheads or components that do not create a risk of nuclear war.

One month earlier, a mid-air collision above the waters off Tybee Island, near Savannah, resulted in another broken

C. B. Gregg looks at the bomb-damaged home of his brother Walter Gregg, who was injured after an Air Force bomb hit about 100 yards away March 12, 1958, in Florence. The unarmed nuclear weapon accidentally fell from a B-47 and exploded.
AP PHOTO

arrow. The captain was forced to parachute from the bomber and the plane went down into the ocean below. On board was an allegedly fully functional nuclear weapon, which still is missing. Had it gone off, the explosion would have been 200 times more powerful than Fat Man, which destroyed Nagasaki during WWII.

Thankfully, the military later abandoned the practice of carrying nuclear warheads on training runs. What remains of the Mars Hill crater now serves as an obscure local memory and somber reminder of the many downsides of the Cold War. ■

The Gregg family donated fragments of the bomb to the local museum.
PHOTO COURTESY OF THE FLORENCE COUNTY MUSEUM

You Belong Here, and We Need You

A transformation is sweeping the nation as people rediscover the allure of small rural towns

A new energy is emerging in rural communities, alongside the affordability and down-to-earth values that have made small towns places people choose to build a better life for their families for generations.

These are the communities served by Louisiana's electric cooperatives—locally focused organizations that deliver affordable, reliable and sustainable energy to their members.

If you think of your co-op as the local electric company, you are partially right. But ***you*** are what makes your co-op unique.

Unlike energy companies that answer to outside investors driven to make a profit, electric co-ops are led by your friends and neighbors who understand and listen to you.

Built by local leaders who live here and have a long-term interest in seeing the community thrive, cooperatives have been shaped from day one to respond to the specific needs of you and your neighbors.

Co-ops work with economic development groups and city and parish leaders to improve the places we live and work.

"Electric cooperative employees work tirelessly not only to keep the lights on in their communities, they are also leaders in the places they serve," says Addie Armato, director of member services and public relations for the Association of Louisiana Electric Cooperatives. "Electric cooperatives have been a part of their communities for so long it is easy to forget how vital they are to the area."

Every cooperative is as unique as the community that shaped it, adapting to respond to growth and change.

Local and independent, each co-op is part of a national network that works together to restore power after major outages, learns from one another, and pools their resources to develop new technologies and infrastructure.

Collectively, electric co-ops bring electricity to one in eight Americans and more than 19 million homes, businesses, farms and schools in 48 states. Co-ops provide 71,000 great jobs, invest billions in local economies every year, and are a driving force in helping attract and grow business and industry in rural America.

But America's electric co-ops aren't just economic engines. They're innovators, developing new ways to take advantage of the technology that's changed the way we live, and looking for opportunities to help members save energy and money.

Louisiana's cooperatives donate to local charities such as the American Heart Association and American Cancer Society. They assist local churches and schools, and donate lights for local ballparks. Each year, they send high school students to Washington, D.C., to learn about government and leadership while touring our nation's capital. Students sit down and discuss issues that concern their generation or hometown with Louisiana's senators and representatives.

If you live on co-op lines, you play an important role.

Seven Guiding Principles of Cooperatives

- **Voluntary and Open Membership.** Anyone willing to accept the responsibilities of membership can join.
- **Democratic Member Control.** Each member has one vote, and selects those who represent him.
- **Member Economic Participation.** Revenues in excess of operating costs are returned to members in proportion to their financial contribution.
- **Autonomy and Independence.** At all times, co-ops ensure members continue to control operations.
- **Education, Training and Information.** Members, employees and the community are taught about co-ops.
- **Cooperation Among Cooperatives.** Co-ops work together locally, regionally, nationally and internationally.
- **Concern for Community.** Co-ops work for the sustainable development of their communities.

Your involvement includes voting for those who represent you on the co-op's board of directors and attending your co-op's annual meeting.

Rather than boring business meetings, annual meeings are designed to be fun, community events. Each is a little different.

When you attend, you exercise your right as a member to make choices about the future of your cooperative. You are the decision maker, and your participation is crucial.

"Despite how different annual meetings are across the state, there is one thing they all have in common," Addie says. "Here in Louisiana, we love people, and our cooperatives give us an opportunity to come together, visit with our neighbors and catch up. Everyone has a good time."

That sense of community is part of the cooperative spirit and what makes living in rural communities special: Neighbors looking out for neighbors, and people working for the common good.

Community fueled the co-op movement, and it is the source of the new energy.

The power of community is what being an electric cooperative is all about.

You belong here! ■

We Count on Your Participation

Louisiana electric cooperatives are planning their annual membership meetings now. Make plans to attend. Start taking part in community events provided by your cooperative. Ask about money-saving ideas to make your home or business more energy efficient. If you want to be more involved in your electric cooperative, reach out. The possibilities are endless.