

The energy behind public power

THE FUTURE OF ENERGY

Innovating & Integrating for Sustainability

TABLE OF CONTENTS

- Ask the Customer: Renewables
- **Rapid Rise**
- Plugging In: Electric Vehicles
- 8 New Landscape: The Future Energy Mix
 - Energy Meets Convenience
- 10 The Bright Side of Community Solar



4

6

ASK THE CUSTOMER: RENEWABLES

Over three quarters of residential and commercial customers say that renewable energy is important to them. (While many are not ready to pay for it, they look for utilities to deliver solutions at minimal costs.) Here are the numbers...

A strong majority of residential (78.0%) and commercial (77.1%) customers reported renewable energy was important to them, however much fewer customers reported being willing to pay more on their bill for their utility to purchase additional renewable energy. There was a larger segment of residents (64.6%) and businesses (58.2%) who indicated that they would not like their monthly bill to go up at all.



If you had to pay a premium for renewable energy, how much more would you be willing to pay on a monthly basis?



RAPID RISE



AFFORDABLE RENEWABLE ENERGY IS TAKING OFF

Innovation continues to drive down the cost of many renewable energy sources – one day, we may see a very different energy mix than we see today.

Of course, many in the U.S. energy industry have known for years that this was coming: coal is quickly declining as a source of electricity generation, while solar and wind power are rapidly growing.

The latest Annual Energy Outlook, released in January by the U.S. Energy Information Administration (EIA), confirmed that coal's share of electricity generation is expected to plummet to 24 percent in 2020 – down from nearly 50 percent in 2008. On the flip side, wind power is expected to account for 14 percent of electricity generation by 2020 and solar power for 17 percent. Factor in other renewable sources, plus the affordability of energy storage, there's no denying that renewable energy is well on its way to providing the majority of electricity in the U.S.



Historical Cost of Energy by Generation Source

The energy equilibrium has shifted. Today, technologies like largescale wind and solar have come so far down the cost curve that they're becoming cheaper than legacy sources of electric power generation.





Why has renewable energy grown so quickly over the last decade? There are a few key catalysts behind the rise.

- 1) Fundamental technologies have improved. Significantly.
- 2) Battery storage now reinforces naturally intermittent sources, like wind, and solar.
- 3) Local and state leaders are advocating for clean energy to address climate change.
- 4) The economic case for renewable energy is getting stronger.

All combined, the time is right for the rapid growth of clean energy. And we're only at the beginning of the utility shift to solar, batteries, and wind – which means this trend won't lose momentum.

DID YOU KNOW?

The State of North Carolina has committed to reduce greenhouse gas emissions by 40% of 2005 levels by 2025.

PLUGGING IN

Electric Vehicles Fast-Track Drivers to a Sustainable Future

WHAT ARE EVS?



Plug-in electric vehicles, also known as electric cars or EVs, boast a myriad of features to suit different drivers' needs. The common denominator is that they plug in to charge from an electric power source. It's tempting to confuse EVs with hybrids, which supplement a conventional engine with battery power but do not plug in or rely on electricity to charge.

THE BASICS

There are two main types of EVs: battery electric vehicles (BEVs) and plug-in hybrid electric vehicles (PHEVs).

BEVs – battery electric vehicles – run purely on electricity. On most current models, this will drive up to 190 miles, with a few models going up to 300 miles. When the car's battery is depleted, it can take from 30 minutes (from a DC fast charger) to a full day (from a typical wall outlet) to recharge.

PHEVs – plug-in hybrid electric vehicles – run on electricity for shorter ranges (10-50 miles) and then switch to a fuel-efficient internal combustion engine, which operates like a generator, once the battery is depleted. PHEVs, like BEVs, are always powered by the electric motor. PHEV's flexibility makes it a versatile option. Eighty percent of drivers travel 40 miles or less per day, and PHEVs can typically meet that need. PHEVs allow drivers to use electricity from the grid to meet the majority of their needs. While still somewhat dependent on gasoline, powering PHEVs with electricity from the grid reduces fuel costs and tailpipe emissions compared to conventional gas-powered cars.

IS AN EV RIGHT FOR ME?

If you're considering an EV purchase, there are payoffs beyond the environment. Since 2008, EV owners can earn a federal tax credit – most recently of up to \$7,500 per personal electric vehicle purchase. The credit varies based on the EV's battery size, and stops once 200,000 credits are claimed for any particular manufacturer model. Take note: Consumers receive EV tax credits upon filing federal income taxes and not at time of car purchase.



Hello savings!

Since EVs run on electrically powered motors, there is no need to lubricate the engines (a costly regular maintenance). The cars improve fuel economy, lower fuel costs, reduce emissions, and can help increase energy security.

FOR DRIVERS

• Cost effective: Lower fuel and maintenance costs

• Environmentally friendly: Better air quality for all

FOR UTILITIES

- Improve distribution system cost effectiveness: Off-peak sales distributes fixed costs across more kWhs
- Customer engagement opportunity: EV owners can use time-of-use rates or other programs to manage EV load

BY THE NUMBERS

A CLOSER LOOK AT ELECTRIC VEHICLES



TRAVEL DISTANCE

The average electric vehicle travel range is 192 miles. By just 2022, expect averages closer to 250 miles.



SALES SURGE

In 2018, annual EV sales increased by a whopping 86% in the U.S. The latest 2019 data already shows a 51% sales growth so far this year. Since 2010, more than one million plug-in cars have been sold in America – 1,262,014, to be exact.



PLUG-INS

Charging stations are organized by four levels: Level 1, Level 2, DC Fast Charging, and DC Ultrafast Charging.



NEARBY PIT STOPS

There are approximately 98 charging stations for electric vehicles in our member cities, with Tesla placing an additional 90 charging stations throughout the state of North Carolina.*

*Source: U.S. Department of Energy; https://afdc.energy.gov/fuels/electricity_locations.html

NEW LANDSCAPE The diversified energy forecast

What could emerge in the future energy mix?

NUCLEAR

Nuclear power accounts for 20 percent of the nation's total electricity generation. Ninety-eight reactors in 30 states account for 55 percent of domestic emissions-free electricity generation, making nuclear the largest source of emissions-free electricity in the U.S. (Source: APPA)

SOLAR

Solar energy can be harnessed anywhere that receives sunlight. In the U.S., solar energy resources are massive, widespread, and increasing. Globally, the amount of solar radiation (insolation) reaching the Earth's surface every hour is more than the total annual energy currently consumed by all human activities.

WIND

Wind turbines generate electric power without creating greenhouse gases. Wind energy requires significant land: a typical wind farm includes dozens of widely-spaced turbines across thousands of acres, such as the 200-megawatt Lone Star farm on approx. 36,000 acres in Texas.

HYDROPOWER

Hydropower generates electricity by harnessing the energy of flowing water in rivers, streams, and waves. As water runs downstream, it is channeled through an intake structure in a dam (usually a pipe). The flowing water turns the blades of a turbine, which generates electricity in the powerhouse (located at the base of the dam).



BIOMASS

Wood, waste, landfill gas, crops, and alcohol fuels are biomass energy sources that generate electricity and provide direct heating. Biomass energy can be used continuously or according to a schedule, setting it apart from other intermittent renewable energies. It can also be converted into biofuel, a direct substitute for fossil fuels in transportation.

TIDAL/WAVE

Using the differential between high and low tides to generate electricity, wave energy is predictable, carbon-free, and inexhaustible. The future is bright for this renewable: in 2018, a tidal stream turbine at the European Marine Energy Centre in Orkney, Scotland generated record levels of production in its first year of testing alone.

GEOTHERMAL

Geothermal energy taps into naturally occurring high temperatures to generate electric power. Geothermal areas can be located relatively close to the Earth's surface, generally near tectonic plate boundaries where there are occurrences like earthquakes and volcanoes. The energy also has direct uses, such as heating and cooking.



Thriving in the modern market

In addition to a possible shift in the energy mix, customers are living in a world of the "Amazon Experience" and demanding more convenience throughout their lives. They have growing needs and expect access to information, choices, and use technology in most aspects of their lives. Serve as your customers' trusted energy advisor – in all things energy.

HOW DOES YOUR UTILITY PREPARE FOR THE FUTURE OF ENERGY?



PARTNER WITH YOUR CUSTOMERS

- Participate in a retail customer survey. ElectriCities offers this service to members annually.
- Establish a customer advisory group for ongoing feedback as you build future programs.
- Listening to your customers can go a long way towards increasing trust and improving satisfaction.



ESTABLISH RATES THAT FIT YOUR UTILITY AND CUSTOMERS

- Have you established rates that can meet the needs of customers with solar panels or electric vehicles?
- Now is the time to investigate timeof-use and demand rates required to support your utility and customer of the future.



INVEST IN APPROPRIATE

 Advanced Metering Infrastructure (AMI) is an integrated system of smart meters, communications networks, and software systems that enables two-way communication between utilities and customers. AMI is a foundation for modern utility and customer benefits.

- Consider implementing other modern software systems that enable customer benefits such as:
 - Flexible payment options and a customer portal
 - Outage notifications (text, call, or outage map)
 - Systems that can support growth of new technologies such as EVs, solar, and more.



Questions? ElectriCities is here to help. Contact services@electricities.org for any questions or assistance related to this information.

THE BRIGHT SIDE OF COMMUNITY SOLAR

From rooftops to shared farms, solar energy shines

SHARING SOLAR

A community solar project is any solar power facility generating electricity that's shared by more than one household. These projects can be community-owned or third-party-owned, and their output is always shared by a community.

The big appeal of community solar is its widespread accessibility: Community members can tap into solar power when they cannot or prefer not to install solar panels on their property. What's more, community solar usually generates more efficiently than rooftop solar because of greater control over location and sun exposure. Community solar is also affordable and low-risk to the customer. By embarking on a collective effort, community members avoid purchasing permanently installed solar equipment and instead work together for common good.

If you want to go solar, you can. Community solar is the right option for users who are interested in solar energy but aren't in the market for rooftop technology. There's power in sharing.

NORTH CAROLINA IS A LEADER WHEN IT COMES TO NEW SOLAR DEVELOPMENT. WE ARE #2 IN THE NATION FOR SOLAR ELECTRIC CAPACITY. *SEIA, 2018 **POWER UP**

Solar energy is making big moves. Over the past few years, the U.S. solar industry has grown incredibly. Solar energy systems are more affordable than ever before, making them more accessible to American families and businesses. This solar boom is helping set the course for a cleaner, more sustainable energy future.

IS SOLAR MEASURED?

Sure enough, demand for solar in the U.S. is at an all-time high. Prices continue to fall, bolstering solar energy as a smart economic choice for homeowners and businesses.

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1,000 WATTS = 1 KILOWATT 1,000 KILOWATTS = 1 MEGAWATT 1,000 MEGAWATTS = 1 GIGAWATT

NC PUBLIC POWER SOLAR

As of October 2017, there is a total of approximately 149 MW of installed utility scale solar in NCEMPA & NCMPA1 (connected to distribution systems in our cities).

SUSTAINABILITY ENERGY EFFICIENCY SOLAR LOAD MANAGEMENT SOMMUNITY

About ElectriCities of North Carolina

ElectriCities is the energy behind public power. For more than 50 years, ElectriCities has helped North Carolina public power communities provide safe, reliable, and affordable power to their customers. ElectriCities serves more than 1.2 million people in North Carolina public power communities, including 32 members of the N.C. Eastern Municipal Power Agency (NCEMPA) and 19 members of N.C. Municipal Power Agency #1 (NCMPA1). Learn more about the benefits of public power at: https://www.electricities.com.



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