

FACT SHEET

# REVOLUTION NOW

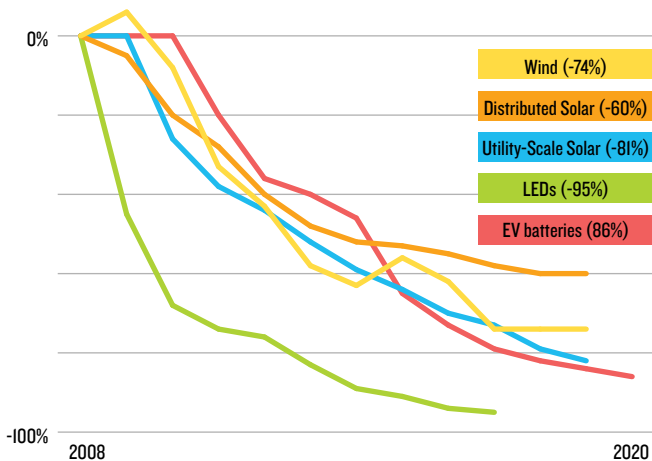
## THE FUTURE IS HERE FOR CLEAN ENERGY TECHNOLOGY

Clean, low-cost energy is transforming the U.S. economy. Over the past decade, we've seen the payoff from nearly 45 years of federally funded research and development on clean energy. From wind and solar power to electric vehicles and LED lighting, clean energy technologies are dramatically declining in cost and benefitting more homes and businesses—while reducing pollution and creating millions of new American jobs.<sup>1</sup>

Clean energy is delivering solutions to help us meet important federal health and environmental safeguards in an increasingly affordable way. The U.S. government must continue to invest in clean energy R&D because today's technology breakthroughs are building the energy system we need to fight climate change.

Revolution Now, formerly published by the Department of Energy and continued by NRDC, documents the remarkable success of four clean energy technologies: wind, solar, LED lighting, and electric vehicles. To continue the progress, we need massive federal investments in DOE R&D, demonstration, and deployment programs, as well as performance standards to drive adoption of innovative technologies.

### COST REDUCTION IN MAJOR CLEAN ENERGY TECHNOLOGIES



### WHY FEDERAL INVESTMENT IN CLEAN ENERGY INNOVATION MATTERS

GOVERNMENT RESEARCH HAS HELPED SLASH THE COSTS OF FOUR MAJOR CLEAN ENERGY TECHNOLOGIES BETWEEN **60 AND 95 PERCENT SINCE 2008**, LEADING TO MASSIVE GROWTH IN ADOPTION.

**2 MILLION** DISTRIBUTED SOLAR SYSTEMS INSTALLED NATIONWIDE AS OF 2019 > ALL THE HOUSEHOLDS IN AL<sup>a</sup>



**60,000** LARGE WIND TURBINES IN **40 STATES** PRODUCE ENOUGH ENERGY ANNUALLY TO POWER **32 MILLION** AVERAGE U.S. HOUSEHOLDS<sup>b</sup>



MORE THAN **1.4 million** EVs ON THE ROAD IN 2019—ENOUGH TO CUT GAS CONSUMPTION BY **750 MILLION GALLONS** ANNUALLY, SAVING \$1.2 BILLION<sup>c</sup>



ALMOST **1.1 BILLION** LEDs IN USE NATIONWIDE, CUTTING ELECTRICITY CONSUMPTION BY **18 MILLION** MEGAWATT-HOURS—SAVING **\$1,200 OVER 10 YEARS** FOR EACH HOUSEHOLD SWITCHING OUT OLD BULBS<sup>d,e</sup>



## WIND

Wind has become one of the cheapest energy sources in many regions of the country. Since 2008, the average price of wind energy has dropped by 74 percent, reaching a record low in 2018. Over the same time period, nationwide capacity grew from 25 gigawatts (GW) to more than 105 GW—enough to power more than 32 million U.S. homes.<sup>2</sup>

This progress would not have been possible without technology advancements that result from federal investment in R&D. For example, from the 1980s to 2018, the height of wind turbines in the U.S. increased fourfold and the blade length grew fivefold, allowing each turbine to capture more energy.



## SOLAR

In little more than a decade, solar technology has evolved from running our calculators to producing enough electricity to power more than 16.4 million U.S. homes—thanks in large part to federally funded R&D.<sup>3</sup>

The solar industry supports a vibrant clean energy economy, with 380,000 Americans employees across the industry. The solar workforce included 175,000 full-time workers in the distributed (on-site) solar sector and another 84,000 working at utility-scale solar facilities in 2019.<sup>4</sup>

The cost of installing giant solar farms to generate electricity delivered by utilities decreased by 82 percent from 2008 to 2019. A similar trend of plummeting costs has driven the expansion of distributed solar systems, which generate electricity for local homes and businesses either through rooftop solar panels or via community projects that provide power to entire neighborhoods.

## LED LIGHTING

LED (light-emitting diode) bulbs were barely on the radar in 2009, when only 400,000 were installed nationwide. By 2018, more than 1.4 billion bulbs were in light sockets across America—more than double the installations from a year earlier and a 3,000-fold increase from 2009. Not only has their price dropped by 95 percent since 2008, but LED bulbs' energy usage is also typically 75 to 80 percent below equivalent incandescent bulbs, with the best bulbs saving even more.<sup>5</sup> That means big electric bill savings thanks to breakthroughs from federal research.

## ELECTRIC VEHICLES

Electric vehicles (EVs) are charging into America's car market in a big way. In 2019, almost 320,000 EVs were sold in the United States, bringing the total number on U.S. roads to more than 1.4 million. Advancements in EV technology have come in many forms—such as better drive trains, lighter materials, and improved charging—but the limiting factor for growth has been battery costs. Federal research has helped bring down the price of lithium-ion batteries by 86 percent since 2010, which has enabled the EV industry to expand. Thanks to declining costs and improved performance, cumulative U.S. EV sales are expected to reach almost 1 million vehicles sold in a single year in 2022.<sup>6</sup>

### ENDNOTES

- 1 U.S. Department of Energy (hereinafter DOE), *U.S. Energy and Employment Report*, January 2017.
- 2 American Clean Power, "Wind Power Facts", <https://cleanpower.org/facts/wind-power> (accessed March 17, 2021).
- 3 Solar Energy Industries Association, "What's in a Megawatt?" 2017.
- 4 The National Association of State Energy Officials and Energy Futures Initiative report there are 284,034 full-time and 97,359 part-time workers in the solar industry and, of the full-time workers, 29.5 percent are in utility-scale solar and 70.5 percent are in distributed resources. *2020 U.S. Energy and Employment Report*, 2020.
- 5 DOE, "How Energy-Efficient Light Bulbs Compare with Traditional Incandescents" (accessed April 2, 2018).
- 6 This number is calculated from Energy Innovation's Energy Policy Solutions tool, using the Business As Usual scenario. Energy Innovation, *Policy Solutions*, <https://us.energypolicy.solutions/scenarios/home>.

### "WHY FEDERAL INVESTMENT IN CLEAN ENERGY INNOVATION MATTERS" INFOGRAPHIC SOURCES

- a United States surpasses 2 million solar installations. <https://www.seia.org/news/united-states-surpasses-2-million-solar-installations>.
- b Number of wind turbines from American Clean Power, "Wind Power Facts" <https://cleanpower.org/facts/wind-power>.
- c Assumes the average vehicle travels 11,500 miles per year at 22 MPG and average U.S. gasoline prices of \$2.84/gallon, compared with \$1.17/gallon-equivalent for electric vehicles, based on EPA (<https://www.epa.gov/greenvehicles/greenhouse-gas-emissions-typical-passenger-vehicle>) and DOE (<https://www.energy.gov/eere/electricvehicles/saving-fuel-and-vehicle-costs>) assumptions.
- d Department of Energy, Adoption of Light-Emitting Diodes in Common Lighting Applications, 2020, <https://www.energy.gov/sites/prod/files/2020/09/173/ssl-led-adoption-aug2020.pdf>.
- e Average costs for incandescent bulbs and LEDs from the Consumer Federation of America, 2017, <https://consumerfed.org/wp-content/uploads/2017/06/6-5-17-Light-Bulb-Appendix.pdf>.