

# Success Stories

## DOE's Office of Power Technologies celebrates success in renewable energy research, development, and deployment

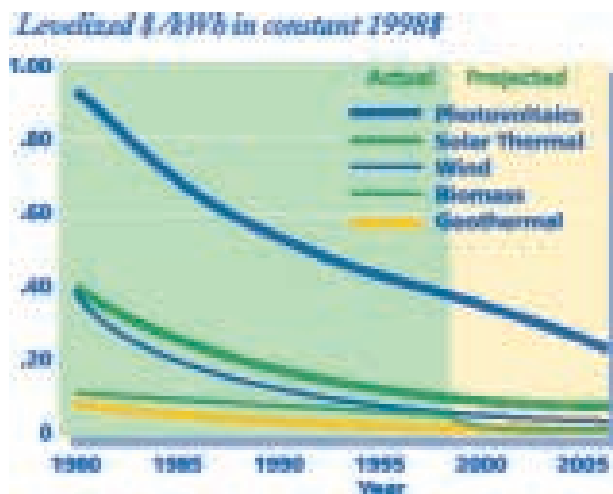
The Office of Power Technologies is part of the Office of Energy Efficiency and Renewable Energy

### Highlights

- *Starting from a few research and development firms supported by federal funding, the U.S. photovoltaics industry has developed into a thriving business with annual sales of \$500 million.*
- *Technology advances, such as more efficient blade designs and their associated cost reductions, have made wind power a serious contender for new power needs around the globe today.*
- *Three solar-thermal power technologies have been developed: dish/engines, a power tower using molten salt technology, and parabolic troughs. Dish/engines and the Solar Two power tower are being field tested now. Parabolic troughs are providing 354 megawatts of power to southern California.*
- *Advances in resource characterization, utilization, and system designs have enabled successful geothermal power plant construction and operation in four states. Installed geothermal power plant capacity now exceeds 2800 megawatts. And over 400,000 geothermal heat pump applications have a total thermal capacity of 3600 megawatts in the United States.*
- *New gasifier technologies that boost the efficiency and cleanliness of biomass power are now being tested.*
- *Through technology advances achieved by OPT research and development, the performance of renewable technologies has increased while the costs have dropped dramatically. Combined with a more detailed knowledge of renewable energy, these advances have accelerated the market for renewable technologies.*

The U.S. Department of Energy (DOE) was formed as a new cabinet-level department in the seventies. As part of its mission to enhance U.S. energy security, the newly formed department placed greater emphasis on programs to develop and deploy solar and wind technologies.

Today, DOE's Office of Power Technologies (OPT) continues on research and development (R&D) programs in wind power and photovoltaic (PV) systems. But the emphasis on renewable energy technologies has become more inclusive, and today's OPT also directs research programs in biomass power, geothermal energy, solar thermal power, hydropower, and solar



*The costs of renewable power technologies have dropped dramatically.*

**The success of these technologies is a success story for the nation. Renewables and related technologies create jobs and help local economies.**

buildings, as well as in supporting technologies such as high-temperature superconductivity, energy storage, electric and magnetic fields, and hydrogen.

These programs have achieved tremendous successes. Wind power, for instance, has dropped eight-fold in cost, to about \$0.05 cents per kilowatt-hour in areas with the best resources. In these locations, wind is competitive with many traditional generation technologies. Once located almost exclusively in California, wind turbines now supply electricity to customers in such diverse locations as Texas, Minnesota, Michigan, and Vermont.

Geothermal power plants, once restricted to The Geysers in northern California, are now operating throughout California and in Nevada, Utah, and Hawaii. Biomass power has grown to 350 U.S. power plants providing 7000 megawatts (MW) of power. And what was a fledgling PV industry in 1977 has grown to 850 U.S. companies, producing a total of 34 MW of PV capacity each year, 70% of which is exported.

Solar thermal electric technologies have moved from the research laboratory to

commercial reality, with 354 MW of capacity provided by parabolic-trough systems in California's Mojave Desert. And nearby, Solar Two is demonstrating the feasibility of new molten salt technology for power towers.

The success of these technologies is a success story for the nation. Renewables and related technologies create jobs and help local economies in the communities surrounding manufacturing plants and power facilities. Renewables and energy-efficient power technologies improve our nation's energy security while helping the environment. Renewables are also a strong export commodity, with growing markets in many developing countries.

These fact-sheets present DOE's best renewable energy R&D success stories to date. Several decades of steady advancements, together with many scientific breakthroughs, are now culminating in a strong and growing renewables industry that is prepared to meet the challenges of the future.

## For More Information:

Visit the OPT Web site at:  
<http://www.eren.doe.gov/power/>

An online database of renewable energy generation facilities is located at:  
<http://www.eren.doe.gov/repis/>

The following DOE publications highlight renewable energy installations and the economic benefits they have created for our country. Both are available on the Web:

*Profiles in Renewable Energy: Case Studies of Successful Utility-Sector Projects.* DOE/CH10093-206, October 1993.  
[www.nrel.gov/documents/profiles.html](http://www.nrel.gov/documents/profiles.html)

*Dollars from Sense: The Economic Benefits of Renewable Energy.* DOE/GO-10097-261, September 1997.  
[www.eren.doe.gov/power/dollarsfromsense.html](http://www.eren.doe.gov/power/dollarsfromsense.html)

Publications about a variety of OPT technologies are available from:

Energy Efficiency and Renewable Energy Clearinghouse (EREC)  
P.O. Box 3048  
Merrifield, VA 22116  
(800)-DOE-EREC  
[www.eren.doe.gov/consumerinfo/](http://www.eren.doe.gov/consumerinfo/)  
email: [doe.erec@nciinc.com](mailto:doe.erec@nciinc.com)



Produced for the  
U.S. Department of Energy  
1000 Independence Ave., SW  
Washington, DC 20585

by the  
National Renewable Energy Laboratory  
a DOE national laboratory

DOE/GO-10098-473  
September 1998, revised August 2000

Printed with renewable-source ink on paper containing at least 50% wastepaper, including 20% postconsumer waste

