



Sample Version

Renewable Energy Landscape: Market & Technology Overview

A Graphical Representation of U.S. Markets in a Global Context

American Council On Renewable Energy (ACORE), October 2011

About the American Council On Renewable Energy

ACORE is a nonprofit organization dedicated to advancing renewable energy in the U.S. and global economies through education, convening, research, and communications.



ACORE's 600+ Organizational Members

All the players necessary to make renewable energy successful in the U.S.

About Sample Version

This sample version of **Renewable Energy Landscape: Market & Technology Overview** contains a selection of abridged slides from the full 40+ slide report. The complete version of the slide deck contains the sample slides seen here – Technologies, U.S. Market, Global Market, and Industry & Costs – for each renewable technology sector.

Purchase the report or become an ACORE member to access the complete version.

- To access the full report, visit:
<http://www.acore.org/renewable-energy-landscape>
- For more information about ACORE membership, visit:
<http://www.acore.org/membership>

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Full Version Outline



Overview

- U.S. Renewable Energy Resources
- Electric Markets Overview
- Renewable Energy Finance
- Cost of Renewable Energy
- Looking Forward

Solar Photovoltaic (PV)

- Technologies
- U.S. Market
- Global Market
- Industry & Costs

Solar Thermal Electric (STE)

- Technologies
- U.S. Market
- Global Market
- Industry & Costs

Solar Heating and Cooling

- Technologies
- U.S. Market
- Global Market

Wind Power

- Technologies
- U.S. Market
- Global Market
- Industry & Costs

Geothermal

- Technologies
- U.S. Market
- Global Market
- Industry & Costs

Biomass Power & Thermal

- Technologies
- U.S. Market
- Global Market
- Industry

Biofuels

- Alcohol Fuels Technologies
- U.S. Ethanol Market
- Oil Fuels Technologies
- U.S. Biodiesel Market
- Global Market
- Industry & Costs

Hydropower

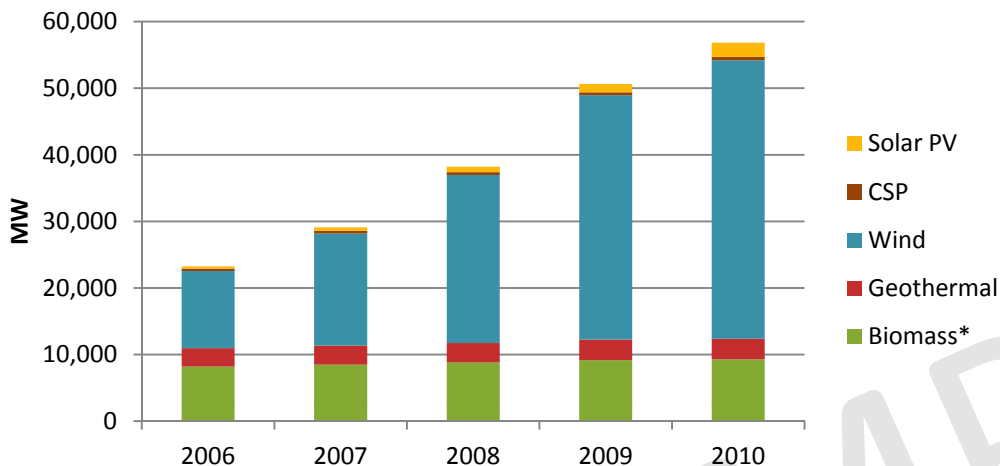
- Technologies
- U.S. Market
- Global Market

Marine Energy

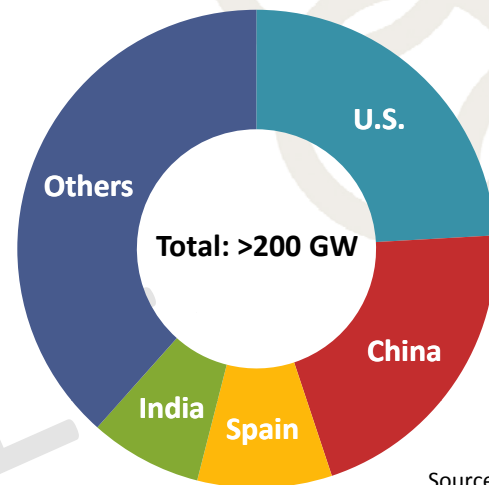
- Technologies
- U.S. Market
- Global Market

Electric Markets Overview

U.S. Renewable Electricity Capacity



Global Renewable Electricity Capacity, 2010

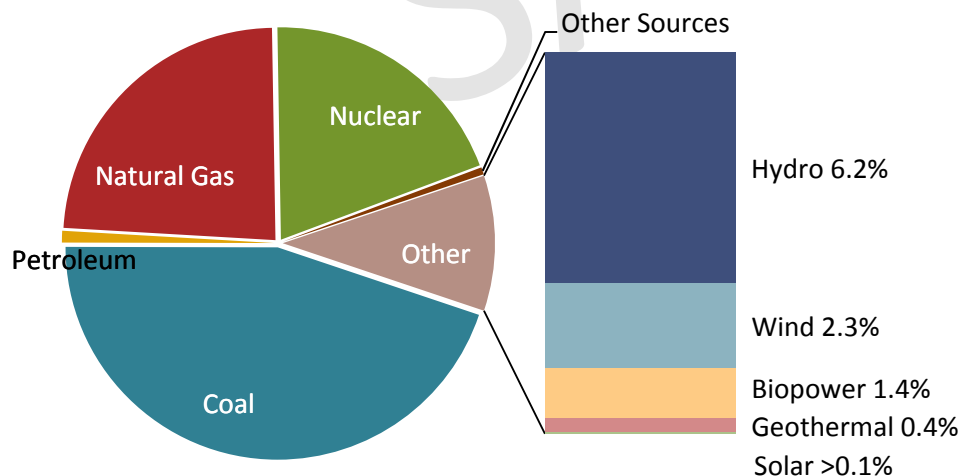


Source: Bloomberg New Energy Finance Desktop, Dec 2010
Excludes large hydro, distributed generation

Sources: Bloomberg New Energy Finance, Solar Energy Industries Association (SEIA), GTM Research, European Photovoltaic Industry Association (EPIA), American Wind Energy Association (AWEA), Geothermal Energy Association (GEA)

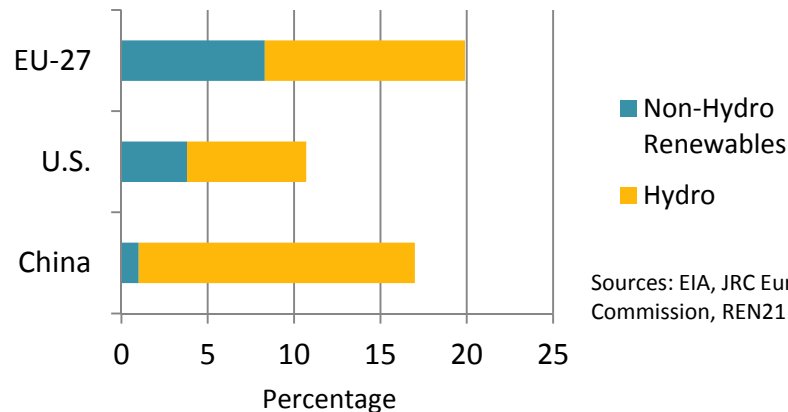
*Includes electricity generation from incineration, anaerobic digestion, gasification, co-firing and landfill gas

U.S. Electricity Generation, 2010



Source: Energy Information Administration (EIA)

Renewable Energy Generation as a Percentage of Total Electricity Generation in Select Regions, 2009



Sources: EIA, JRC European Commission, REN21

Sample Technologies Slide: Solar Photovoltaic

Crystalline Silicon



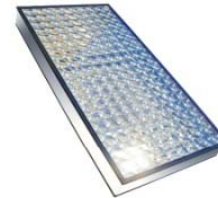
Monocrystalline (c-Si)
Image: SunPower



Multicrystalline (mc-Si)
Image: Kyocera

- Higher materials cost
- Area needed per kW= 7-8m²

Concentrator Photovoltaic (CPV)



Multijunction
Image: Concentrix Solar

- Lower materials cost
- Early-stage

Thin Film



Amorphous Silicon (a-Si)
Image: Sharp



Cadmium telluride (CdTe)
Image: First Solar

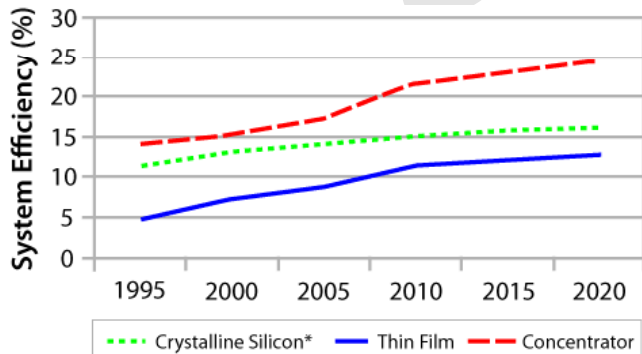


Copper indium (gallium) diselenide (CIS or CIGS)
Image: MiaSole

- Lower materials cost
- Area needed per kW = 10-15m²

Source: European Photovoltaic Industry Association

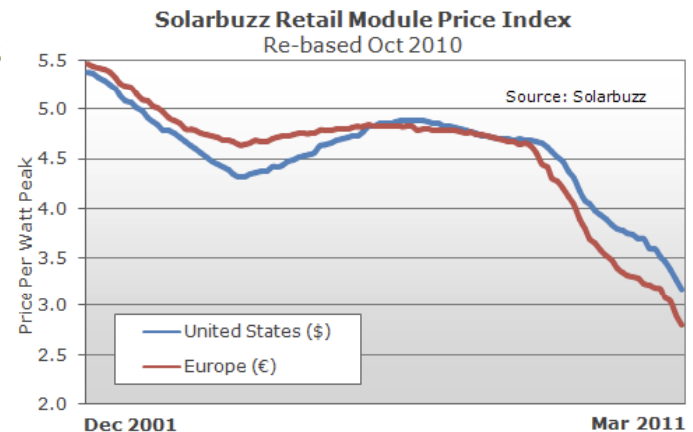
Efficiency Trends



Source: U.S. Department of Energy, Office of Energy Efficiency & Renewable Energy (EERE) Tribal Energy Program

Module Cost Trends

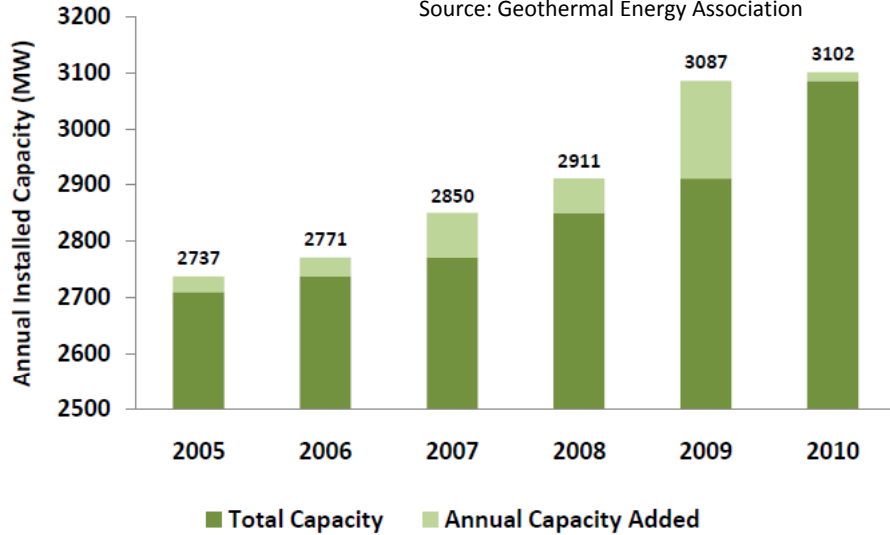
Source: Solarbuzz Retail Pricing Environment (used with permission)



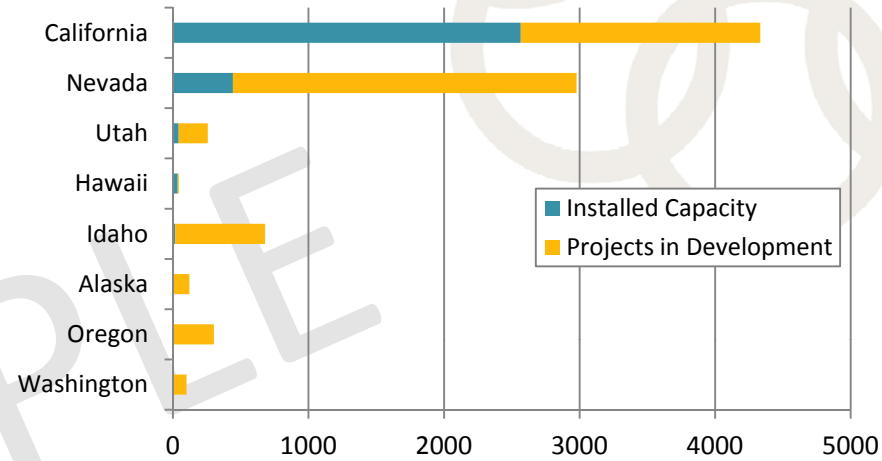
Sample U.S. Markets Slide: Geothermal

Total Installed Capacity 2005-2010

Source: Geothermal Energy Association

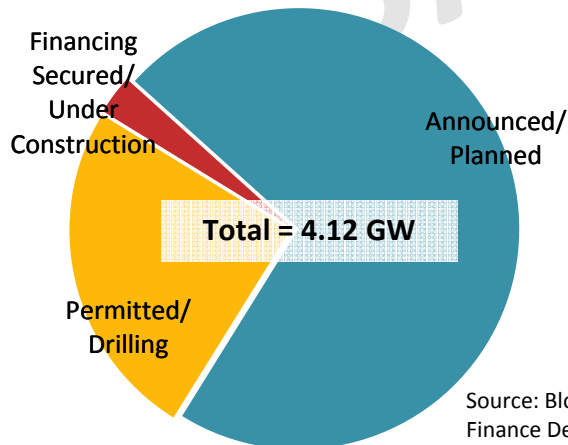


Installed Capacity and Projects in Development MW in the top eight states



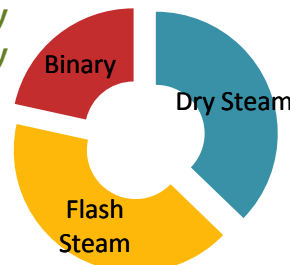
Source: Geothermal Energy Association

Status of U.S. Pipeline (MW)



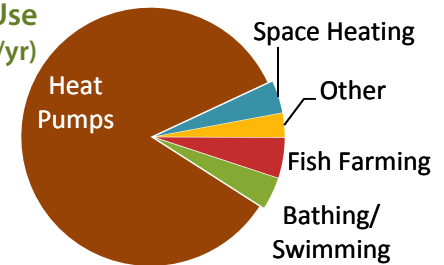
Source: Bloomberg New Energy Finance Desktop, Jan 2011

Capacity by Technology



Source: Geothermal Energy Association 2008, Bloomberg New Energy Finance Desktop March 2011

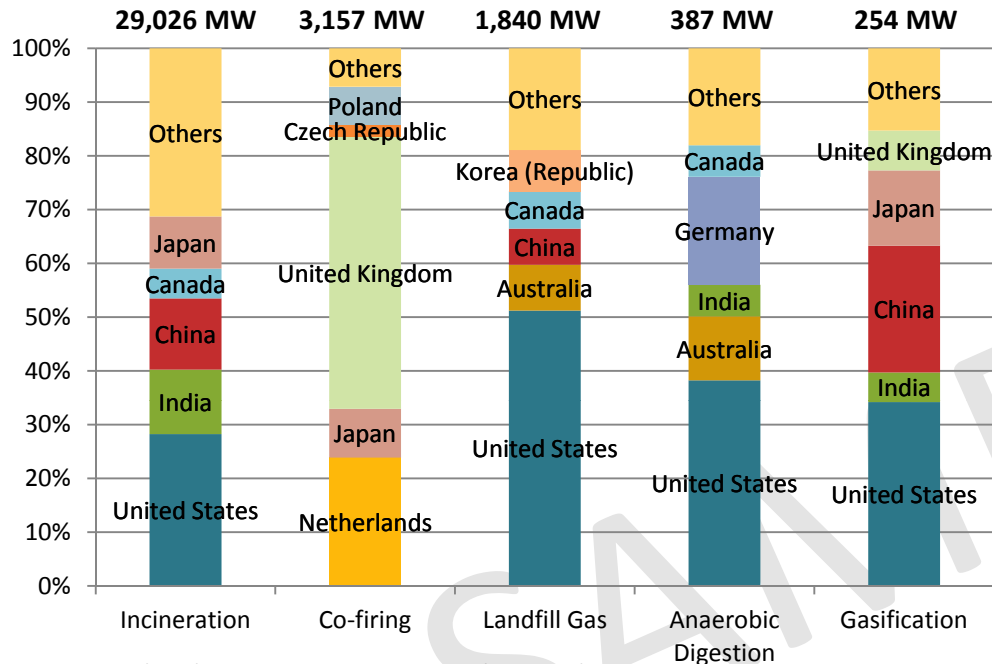
Direct Use (TJ/yr)



Source: Lund, J., Freeston, D., and Boyd, T. (2010). *Direct Utilization of Geothermal Energy 2010 Worldwide Review*. Geo-Heat Center, Oregon Institute of Technology, Klamath Falls, Oregon.

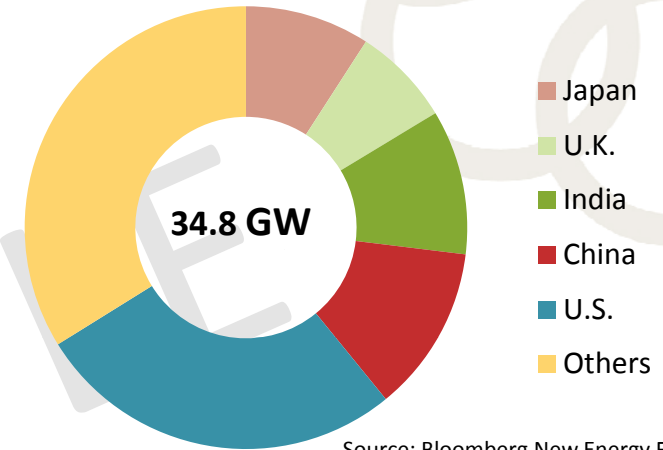
Sample Global Markets Slide: Biomass Power

Top Biopower Generators by Application (MW)



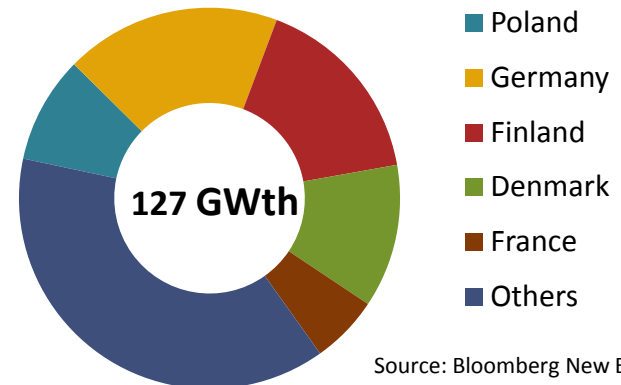
Source: Bloomberg New Energy Finance Desktop, April 2011

Installed Biopower Generation Capacity Percentage of overall installed capacity by country



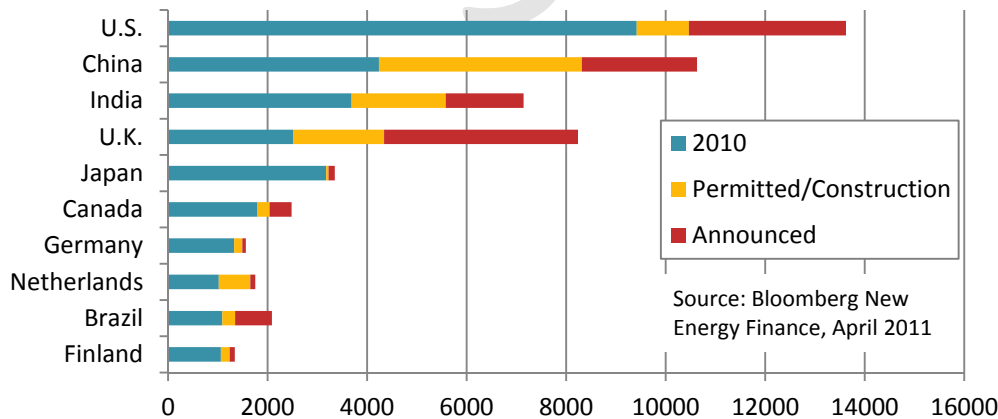
Source: Bloomberg New Energy Finance Desktop, April 2011

Installed Biomass Thermal Generation Capacity Percentage of overall installed capacity by country (Gigawatts Thermal)



Source: Bloomberg New Energy Finance Desktop, April 2011

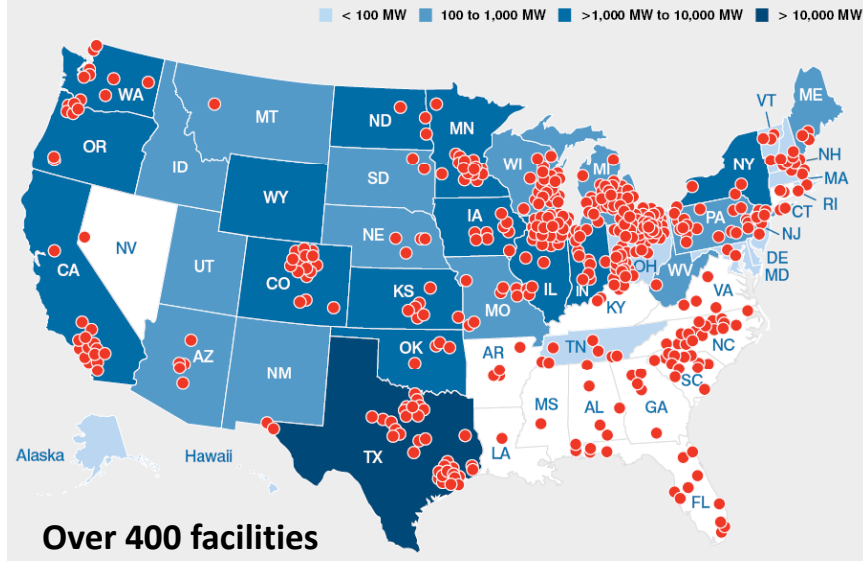
Top Biopower Generators, Existing and Planned Capacity (MW)



Source: Bloomberg New Energy Finance, April 2011

Sample Industry & Costs Slide: Wind

U.S. Wind Manufacturing Facility Locations



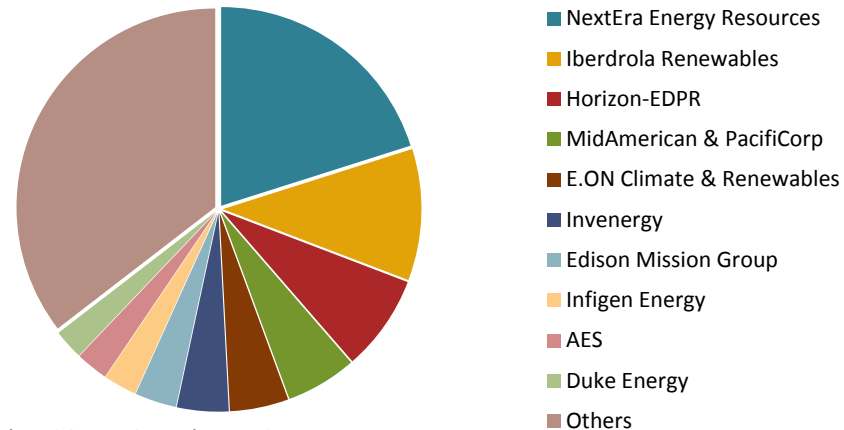
Top Global Wind Manufacturers

Rank Order by Production

Rank	2005	2010
1.	Vestas (DK)	Vestas (DK)
2.	Enercon (DE)	GE Wind (US)
3.	Gamesa (ES)	Sinovel (CH)
4.	GE Wind (US)	Gamesa (ES)
5.	Siemens (DK)	Goldwind (CH)
6.	Suzlon (Ind.)	Suzlon (Ind.)
7.	REpower (DE)	Enercon (DE)
8.	Goldwind (CH)	Dongfang (CH)
9.	Nordex (DE)	REpower (DE)
10.	Ecotecnia (ES)	Siemens (DK)

Source: Bloomberg New Energy Finance, June 2011 (Presentation by Michael Liebreich)

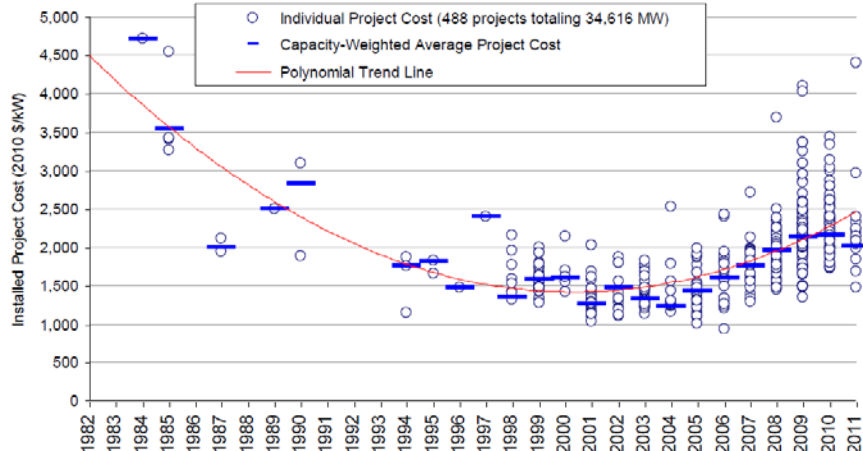
Owners of U.S. Wind Power Projects in MW of Capacity (2010)



Source: AWEA "U.S. Wind Industry Annual Market Report"

Source: American Wind Energy Association (AWEA) "U.S. Wind Industry Annual Market Report 2010"

Installed Project Costs



Source: Lawrence Berkeley National Laboratory "2010 Wind Technologies Market Report"

American Council On Renewable Energy, October 2011 – Sample Version

Other ACORE Publications



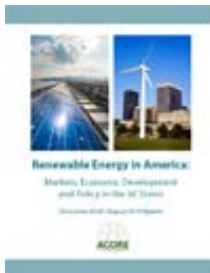
US-China Quarterly Market Review

Released Quarterly

The US-China Quarterly Market Review regularly examines the most significant developments in renewable energy markets, finance, and policy in the U.S. and China. The Review is a product of ACORE's US-China Program (USCP) and the Chinese Renewable Energy Industries Association (CREIA), with expert contributions from ACORE members.

[>Read More](#)

Free for ACORE Members



Renewable Energy in America: Markets, Economic Development and Policy in the 50 States

Released Twice Per Year

This interactive report is intended to provide an executive summary on the status of renewable energy implementation at the state-level. Compiling financial, renewable energy resource potentials, market and policy information in one easily-accessed, online format, the report is intended to be an executive summary for all who are interested in the highlights of the renewable energy sector in every state.

[>Read More](#)



Compendium of Best Practices: Sharing Local and State Successes in Energy Efficiency and Renewable Energy from the United States

This joint report from ACORE, REEEP and the Alliance to Save Energy gives concrete examples on how state and local governments in the United States are successfully promoting energy efficiency and renewable energy. It is designed to share successful program and policy models that can be easily replicated around the country, as well as adapted for implementation in emerging markets.

[>Read More](#)

About ACORE

ACORE, a 501(c)(3) membership non-profit organization headquartered in Washington, DC, is dedicated to bringing renewable energy into the mainstream of the U.S. economy and lifestyle through research and communications programs and membership committees. ACORE'S membership works in all sectors of the renewable energy industries including wind power, solar energy, geothermal energy, hydropower, ocean energy, biomass, biofuels, and waste energy. ACORE provides a common platform for the wide range of interests in the renewable energy community including end users, technology companies, manufacturers, utilities, professional service firms, financial institutions, colleges and universities, associations, non-profit organizations and government agencies. ACORE serves as a thought leadership forum through which these parties work together on common interests. ACORE co-organizes the REFF-Wall Street and REFF-West Finance Conferences, the RETECH All-Renewables Energy Conference and Exhibition, the Phase II National Policy Forum in Washington, DC, and hosts both domestic and global policy events furthering the mission of renewable energy. Additional information is available at www.acore.org.

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