



CULLEN COATES

US Green Energy Market Overview

September 2009

Executive Summary

- **We believe that entering the US market is one of the most exciting opportunities offering a long term value play**
 - United States is Second in renewable electricity production
 - Share of renewable-generated electricity in the United States is expected to grow
 - Government policies are aimed to increase the use of green technology
- **New market entry gives an additional advantage**
 - Build scale to gain competitive advantage
 - Build a de-risked business model with product, services and geographic diversification

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USA - Germany: Energy Problems and Solutions

Energy Dilemmas

- Growing dependence on energy imports of coal, oil and gas
- Rising costs for energy imports
- Rising energy demand and use
- Rising air-pollution and CO₂-emissions
- Low energy productivity in some economic sectors
- High and rising energy prices, burden for low-income groups

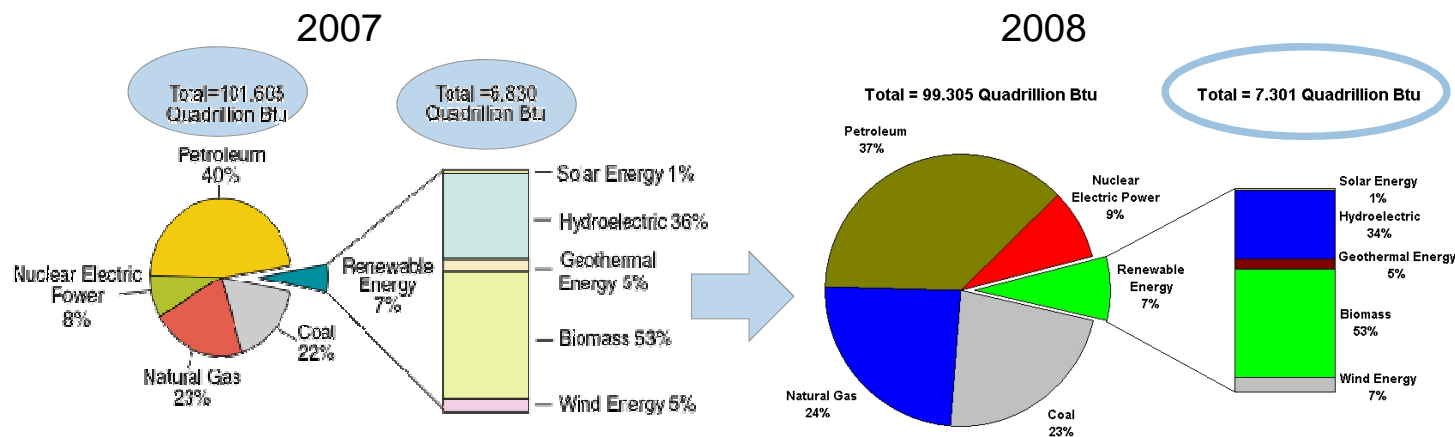
Energy Solutions

- Developing domestic, local RE potentials (wind, biofuels)
- Playing the renewable energy card
- Promoting energy efficiency
- Loans and grants for renewable energy and energy efficiency
- Financing energy efficiency in municipal government
- Citizens become responsible for their own energy consumption

US Industry Overview

- President Obama has outlined National renewable electricity standard (RES) with a target of generating at least 25% of the nation's electricity from renewable by 2025, and a near-term target of 10% by 2012
- Energy Information Administration (EIA) projects that renewable-generated electricity will increase from 8.5% (2007) to 15.8% of total U.S. electricity generation in 2030
 - However total worldwide electricity generation will decrease slightly: from 18% of generation in 2005 to 15% in 2030
- Renewable energy consumption grew by 7 percent between 2007 and 2008, despite a 2 percent decline in total U.S. energy consumption .

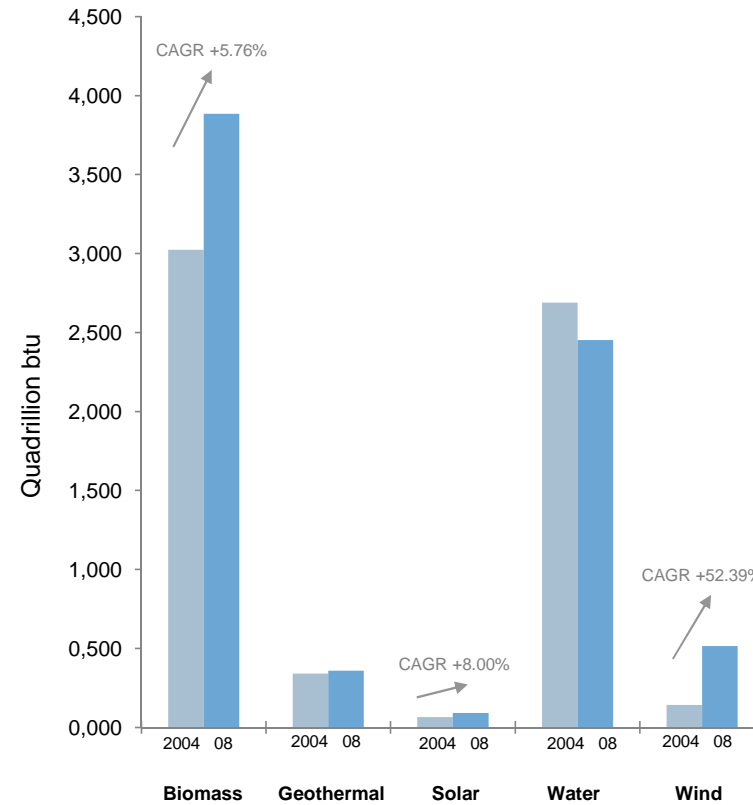
Renewable Energy Consumption in the Nation's Energy Supply



Note: Sum of components may not equal 100 percent due to independent rounding.
 Source: EIA, Renewable Energy Consumption and Electricity Preliminary 2007 Statistics, Table 1: U.S. Energy Consumption by Energy Source, 2003-2007 (May 2008).

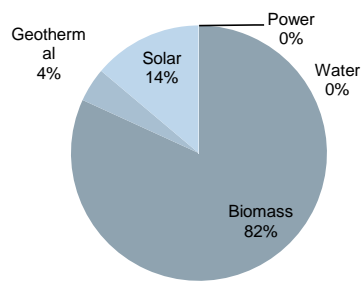
US Industry Overview

- Green technology serves 5 sectors- Residential, Commercial, Transportation, Industrial and Electric Power .
 - Electric power 51%
 - Industrial- 28%
 - Residential- 8%
 - Commercial- 2%
- Ethanol refineries doubled – 81 (Jan 2005) to 170 (Jan 2009)
- Wind and Solar enabled plants have shown fastest growth year on year

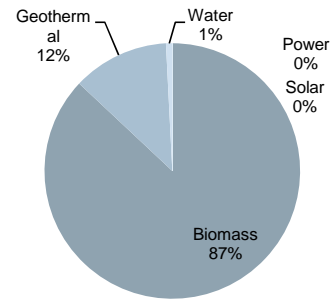


US Industry Overview

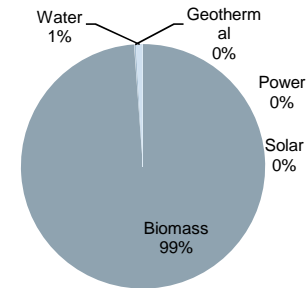
Renewable Energy consumption by sector, 2008



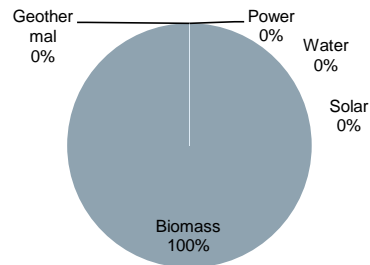
Residential
Total- 0.599 Qbtu



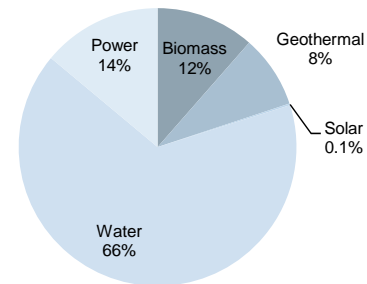
Commercial
Total- 0.123 Qbtu



Industrial
Total- 2.056 Qbtu



Transportation
Total- 0.833 Qbtu



Electric Power
Total- 3.690 Qbtu

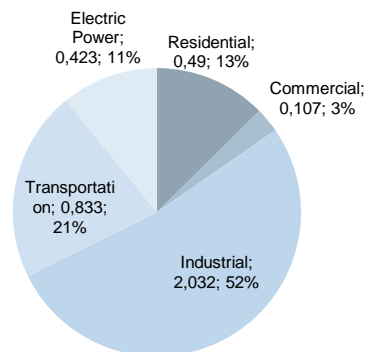
BioMass– Opportunity Snapshot

Industry Overview

- Corn ethanol has been solidly established as a foundation for the industry and will continue to grow and mature.
- Technology is being developed and applied across much of the value chain for both conventional and advanced biofuels.
- Feedstock supply is improving, as planting patterns shift, new technologies enhance existing agricultural practices and new biomass sources are developed
- New feedstock sources are more geographically disperse, providing better transport economics and balancing infrastructure loads
- There are long term legislative trend and programmatic support
 - Energy Independence and Security Act of 2007 provides an aggressive funding
 - DOE's Biomass Program is actively supporting industry development and technology commercialization
 - The United States Department of Agriculture has a wide range of supporting activities, including programs for feedstock development, small scale production and farm-based use.

Biomass Usage by sector, 2008

Quadrillion BTU, %age from each sector



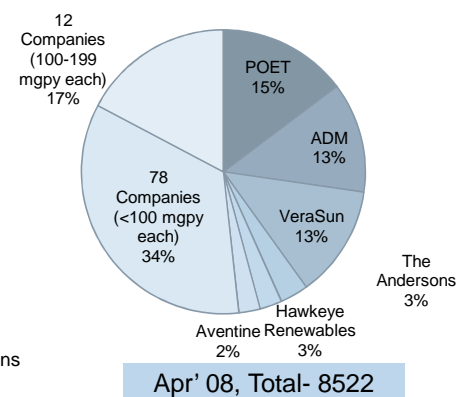
Biofuels data table

As of Aug 17, 2009

E85 Retail Price/Gallon	\$2.14
Gasoline Retail Price/Gallon	\$2.63
Biodiesel Rack Price/Gallon	\$3.39
Diesel Rack Price/Gallon	\$2.01
E85 Station Count	1,944
New E85 Stations Opened	343
Nameplate Ethanol Refineries	201
Nameplate Ethanol Production Capacity	13,063 million gallons

US Ethanol Capacity, by company

Millions gallons per year, market share



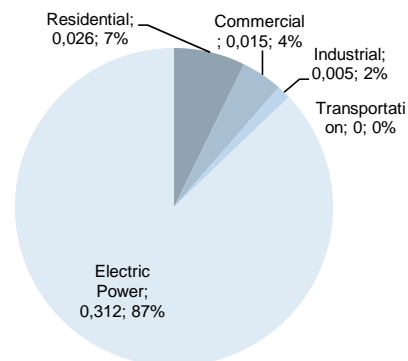
Geothermal– Opportunity Snapshot

Industry Overview

- United States continues to be the world leader in online capacity of geothermal energy and the generation of electric power from geothermal energy.
- As of August 2008, geothermal electric power generation is occurring in seven western U.S. states with capacity rated at 2957.94 MW ; the states being Alaska, California, Idaho, Hawaii, New Mexico, Nevada and Utah
- 120 geothermal projects are under development in 12 States. 190 million acres of BLM land and U.S. Forest Service lands were open to geothermal development as of year-end 2008
- California’s geothermal capacity exceeds that of every country in the world. 4.5% of its total generation (or 13, 439 GWh) came from Geothermal
- U.S. Department of Energy is working with the geothermal industry to achieve \$0.03 to \$0.05 per kilowatt-hour
- Target is to have 15,000 megawatts of new capacity within the next decade
- Emerging consolidation trends seen in the market to raise funds

Geothermal Usage by sector, 2008

Quadrillion BTU, %age from each sector



Companies Involved in Geothermal Heat Pump Activities by Type, 2007

Geothermal Heat Pump or System Design	12
Prototype Geothermal Heat Pump Development	10
Prototype Systems Geothermal Development	4
Wholesale Distribution	12
Retail Distribution	4
Installation	3
Manufacture of System Components	2

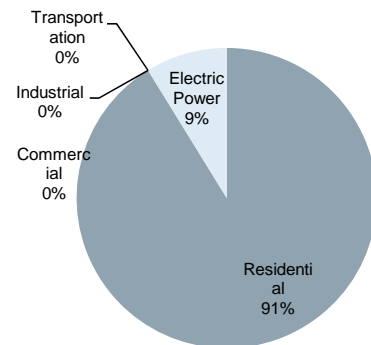
Solar Power– Opportunity Snapshot

Industry Overview

- President announced American Reinvestment and Recovery Act (ARRA) to accelerate the growth of solar and energy in the United States
 - More than \$117 million is dedicated specifically to solar technologies: Photovoltaics (PV) – \$51.5 million, Concentrating Solar Power (CSP) – \$25.6 million, High Penetration Solar Deployment – \$40.5 million
- Current opportunities include funding in the following areas:
 - PV Technology Incubators – focuses on solving technical challenges to scaling up manufacturing and commercializing new products by 2012
 - Solar Market Transformation – funds different Solar America Cities Special Projects which help the 25 Solar America Cities scale-up innovative programs and concepts
 - High Penetration Solar Deployment – accelerates the placement of high levels of PV penetration into existing or newly designed distribution circuits

Solar Power Usage by sector, 2008

Quadrillion BTU, %age from each sector



Companies Involved in Solar Thermal Collector Activities by Type, 2007

Collector or System Design	37
Prototype Collector Development	23
Prototype System Development	22
Wholesale Distribution	49
Retail Distribution	24
Installation	16
Noncollector System Component Manufacture	18

Companies Involved in Photovoltaic Activities by Type, 2007

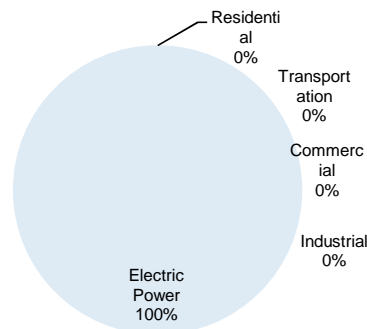
Module or Cell Manufacturing	24
Module or Systems Design	25
Prototype Module Development	16
Prototype Systems Development	13
Wholesale Distribution	25
Retail Distribution	14
Installation	13
Noncollector System Component Manufacture	6

Wind Power– Opportunity Snapshot

Industry Overview

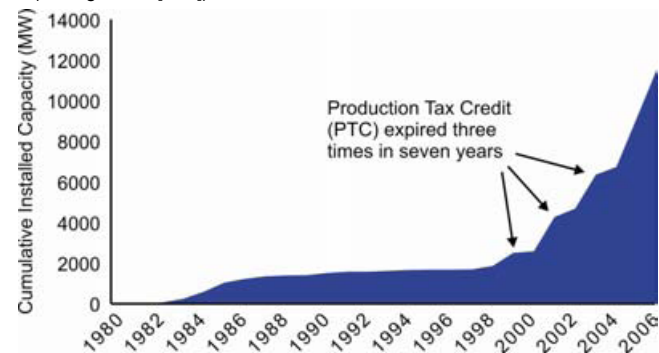
- U.S. wind industry accounted for 42 percent of new electricity generation installed nationwide in 2008
- 20% Wind Energy by 2030 - an opportunity potential according to a DOE report. This entails-
 - boosting current production capacity of 16.8 GW to 304 GW in 2030, an 18-fold increase
 - annual installations of wind power to increase threefold- 2000 to 7000 per year by 2017
- Right policies to sustain renewable energy's momentum
 - national renewable electricity standard to create a stable market for capital investment
 - interstate network of transmission lines or "green power superhighways" to bring renewable energy to market
 - strong climate legislation with early and aggressive emissions reductions targets
- With 25,369 MW in operation at the end of 2008, the U.S. pulled ahead of long-time leader Germany (23,902 MW) both inwind energy production and in cumulative wind power generating capacity.
- U.S. is also the world's largest market in terms of new installations (8,545 MW), ahead of China (6,300 MW)
- Rise in domestic wind turbine component manufacturing - 50% domestic component production now
 - Of the top 10 global utility-scale wind turbine manufacturers, 7 have manufacturing plants in US

Solar Power Usage by sector, 2008
 Quadrillion BTU, %age from each sector



Total- 0.514 Qbtu

Cumulative U.S. wind capacity, by year
 (in megawatts [MW])



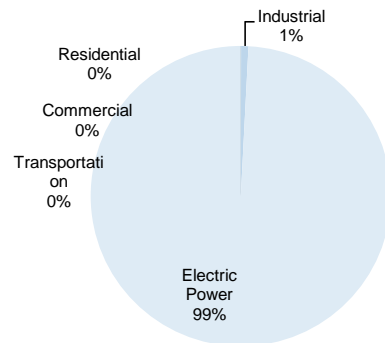
Water Power– Opportunity Snapshot

Industry Overview

- Recovery Act Announcement: DOE Issues Grant Solicitation to Modernize Hydropower Infrastructure- \$32 million in funding to modernize the existing hydropower infrastructure in the U.S.
- Ongoing effort to integrate hydropower with other renewables
- Existing capacity - 80,000 MW of hydroelectric generating plants in the United States
- DOE completed resource assessment for 49 states- identified 5,677 sites in the United States with undeveloped capacity of about 30,000 MW

Water Power Usage by sector, 2008

Quadrillion BTU, %age from each sector



Total- 2.453 Qbtu

Grants and Tax Incentives

- The federal government offers an investment tax credit for the purchase and installation of qualifying small wind electric systems, worth 30% of the value of the system.
- The federal government also offers a Renewable Electricity Production Tax Credit and Business Energy Investment Tax Credit for larger, utility-scale wind power installations.
- The Recovery Act of 2009 also established a cash grant exchange for the Investment Tax Credit

Solar Power– Opportunity Snapshot

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Number of Companies expected to introduce New Solar Thermal Collector Products in 2008

Low-Temperature Collectors	9
Medium-Temperature Collectors	17
High-Temperature Collectors	10
Noncollector Components	7

Year	No of Companies	Shipments of Solar Thermal Collectors
2004	24	14,114
2005	25	16,041
2006	44	20,744
2007	60	15,153

Number of Companies expected to introduce New Photovoltaic Products in 2008

Crystalline Silicon	
• Single-Crystal Silicon Modules	11
• Cast Silicon Modules	6
• Ribbon Silicon Modules	2
Thin-Film	
• Amorphous Silicon Modules	3
• Other (Thin Film)	3
Other (Flat Plate)	1
Concentrators	2
Nonmodule System Components	1

Year	No of Companies	Photovoltaic Cell and Modules Shipments	Average Shipments per company
2004	19	181,116	
2005	29	226,916	
2006	41	337,268	
2007	46	517,684	