

Fact Sheet

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European Union's Carbon Pollution and Clean Energy Policies Have Spurred Investments, Created Jobs, and Reduced Carbon Emissions

In recent years, the European Union (EU) has enacted policies to promote clean energy investment and deployment, while simultaneously reducing carbon pollution emissions. In January 2005, the EU commenced the Greenhouse Gas Emission Trading Scheme, which remains the world's largest and most scrutinized large-scale carbon pollution reduction program.¹ In December 2008, the European Parliament agreed to a climate action and renewable energy package that committed the EU to reducing its greenhouse gas emissions by 20 percent by 2020, increasing its energy efficiency by 20 percent by 2020, and generating 20 percent of its electricity from renewable energy sources by 2020²—an increase from the 12 percent renewable energy goal by 2010 agreed to in 1997.³

Important lessons have been learned from the enactment of these policies—particularly from the EU's carbon pollution reduction program. The impacts that these policies are having on clean energy deployment, investment, economic growth, and job creation, however have not been particularly well researched. This Fact Sheet examines these impacts by:

- 1) creating a general timeline that details when these EU policies were enacted;
- 2) tracking clean energy deployment, greenhouse gas emissions reductions, and economic growth in the EU;
- 3) reporting on clean energy investments being made in the EU;
- 4) contrasting the clean energy investments being made by EU businesses both in the EU and the U.S.; and

- 5) comparing the clean energy investments that EU companies are making in the United States to the clean energy investments that U.S. businesses are making in the United States.

The European Union's Clean Energy and Carbon Pollution Reduction Program Timeline

1997: European Commission calls on member states to have renewable energy supply 12 percent of the EU's total energy consumption by 2010.⁴

September 27, 2001: The European Parliament and Council of the European Union (Council) direct the European Commission to assess the extent to which member states can meet the goal of producing 12 percent of its electricity from renewable energy resources by 2010.⁵

October 13, 2003: The European Parliament and Council agree to establish a greenhouse gas emission allowance trading program in the EU. The goal of the emissions trading program is to promote reductions of greenhouse gas emissions in a cost-effective and economically efficient manner.⁶

January 1, 2005: The first phase of the EU's carbon pollution reduction program begins in a "learning or gear-up phase" throughout twenty-five EU member countries. The carbon pollution reduction program covers oil refineries, power plants over 20 megawatts in capacity, coke ovens, and iron and steel plants, along with cement, glass, lime, brick, ceramics, and pulp and paper installations.⁷ The program covers carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, and sulphur hexafluoride emissions.

June 30, 2006: EU member states are required to publish their National Allocation Plans for the upcoming second phase of the European Union's carbon pollution reduction program. These national allocation plans determine the total quantity of emission allowances that member states grant to their companies.⁸

November 29, 2006: The EU assesses National Allocation Plans for the second phase (2008 to 2012) of the EU's carbon pollution reduction program.⁹

March 2007: Twenty-seven EU member countries agree to adopt the target that the EU should produce 20 percent of its electricity from renewable energy sources by 2020. The agreement is not legally binding.

December 31, 2007: The first phase of the EU's carbon pollution reduction program ends.

January 1, 2008: The second phase of the EU’s carbon pollution reduction programs begins, known as the first commitment period, and it requires that emissions be reduced by 6.5 percent below 2005 levels.¹⁰

December 17, 2008: The European Parliament votes to have the EU improve its energy efficiency by 20 percent by 2020, generate 20 percent of its electricity from renewable energy by 2020, and cut its greenhouse gas emissions by 20 percent by 2020. The agreement also committed the EU to a 30 percent reduction in greenhouse gas emissions if a “satisfactory international agreement” is reached.¹¹ The agreement legally binds EU member countries to collectively meet the goals adopted by the European Parliament.

2010: Member states will submit their sector-specific National Action Plans for reaching the electricity, heating and cooling, and transport sector targets. Progress will be evaluated every two years.

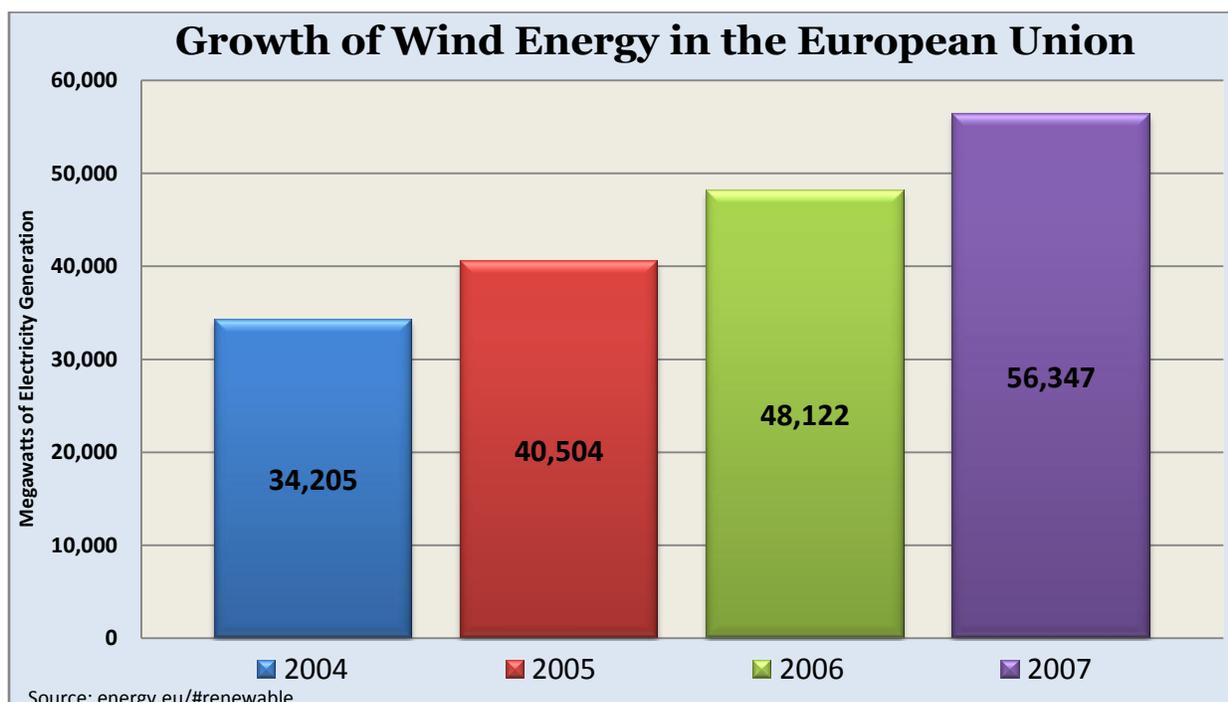
December 31, 2012: The second phase of the European Union’s carbon pollution reduction program is scheduled to end.

January 1, 2013: The third phase of the European Union’s carbon pollution reduction program is scheduled to begin and it will require emissions to be reduced by 20 percent from 1990 levels and by 30 percent if an acceptable international agreement is reached by 2012.

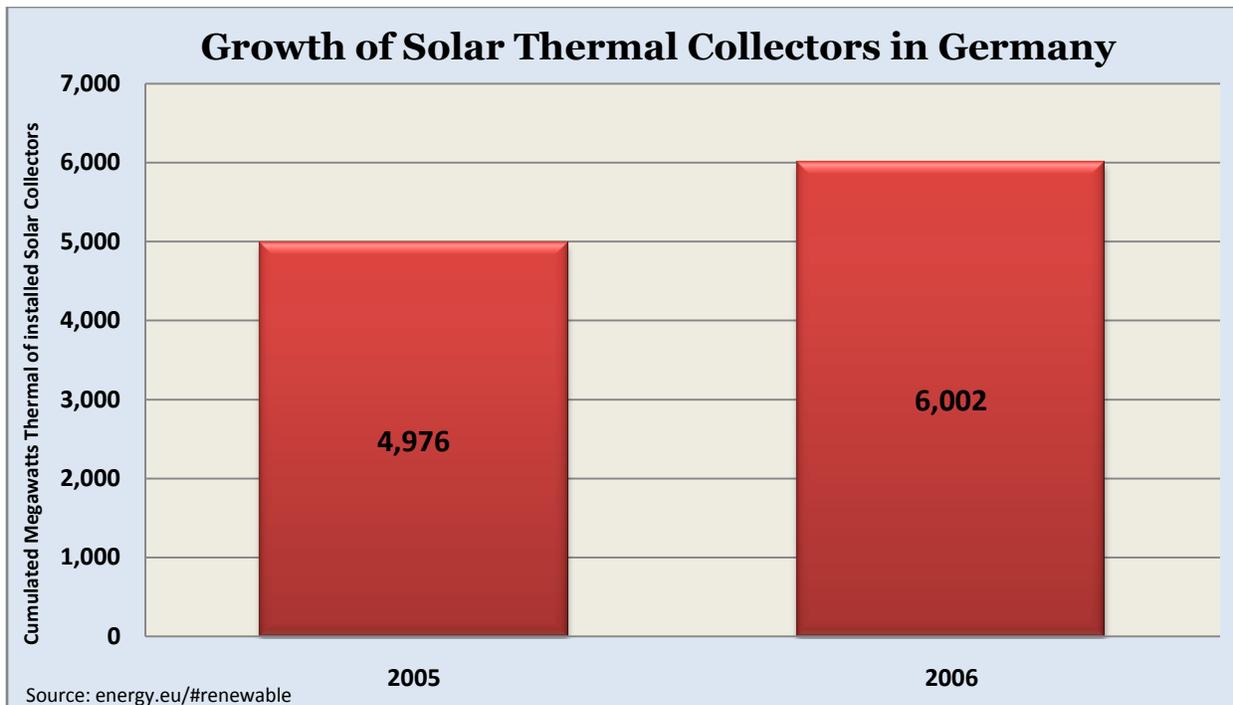
Clean Energy Deployment in the European Union

Clean energy deployment. Since the adoption of the EU’s clean energy and carbon pollution reduction program in 2005 and 2008, the EU has experienced unparalleled growth in clean energy deployment (wind, solar, and biogas). The following data and charts demonstrate that growth:

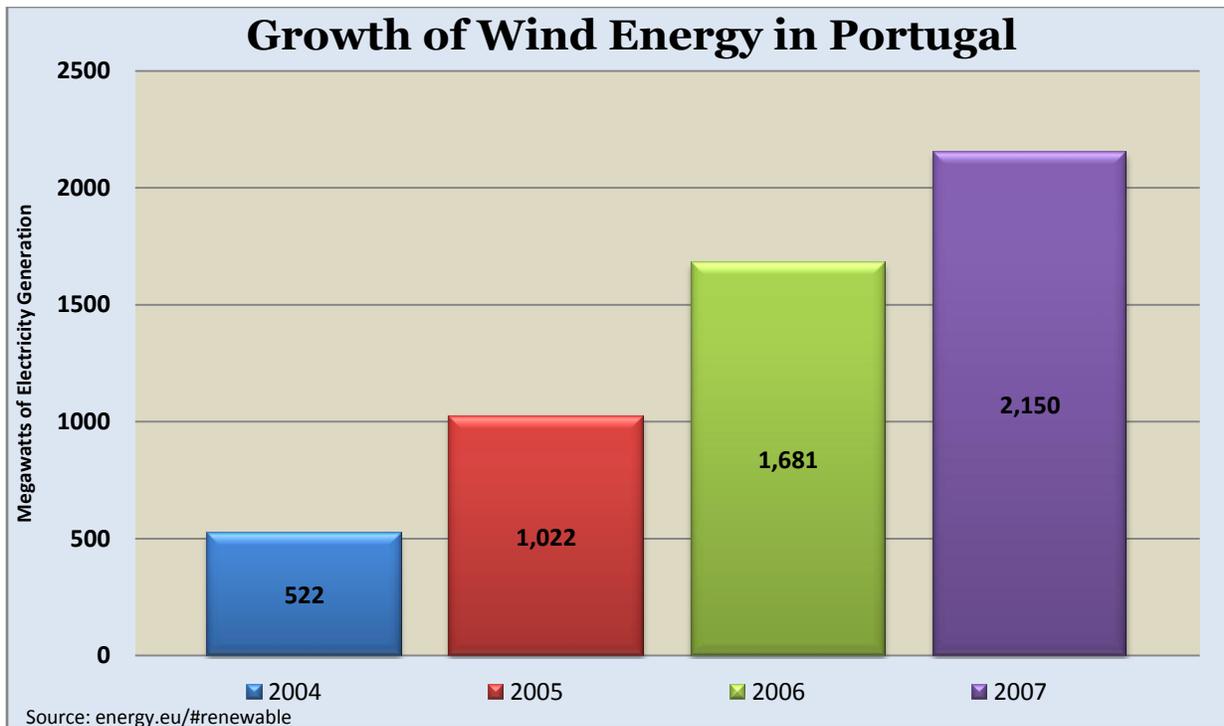
- **European Union.** In recent years, the EU has experienced strong growth in its wind, solar, and biogas deployment. For example:
 - Installed wind energy capacity totaled 34,205 megawatts in 2004 and by the end of 2007 it had grown to 56,347 megawatts (see chart below).¹²
 - Installed capacity for solar photovoltaic electricity generation grew from 914 megawatts peaking (MWp) in 2006 to 1,541 MWp in 2007.¹³
 - Installed cumulated capacity of thermal solar collectors increased from 12,246 megawatt thermal (MWth) in 2005 to 14,280 MWth in 2006.¹⁴
 - Electricity production from biogas increased from 13,397 gigawatt hours (GWh) in 2005 to 17,272 (GWh).¹⁵



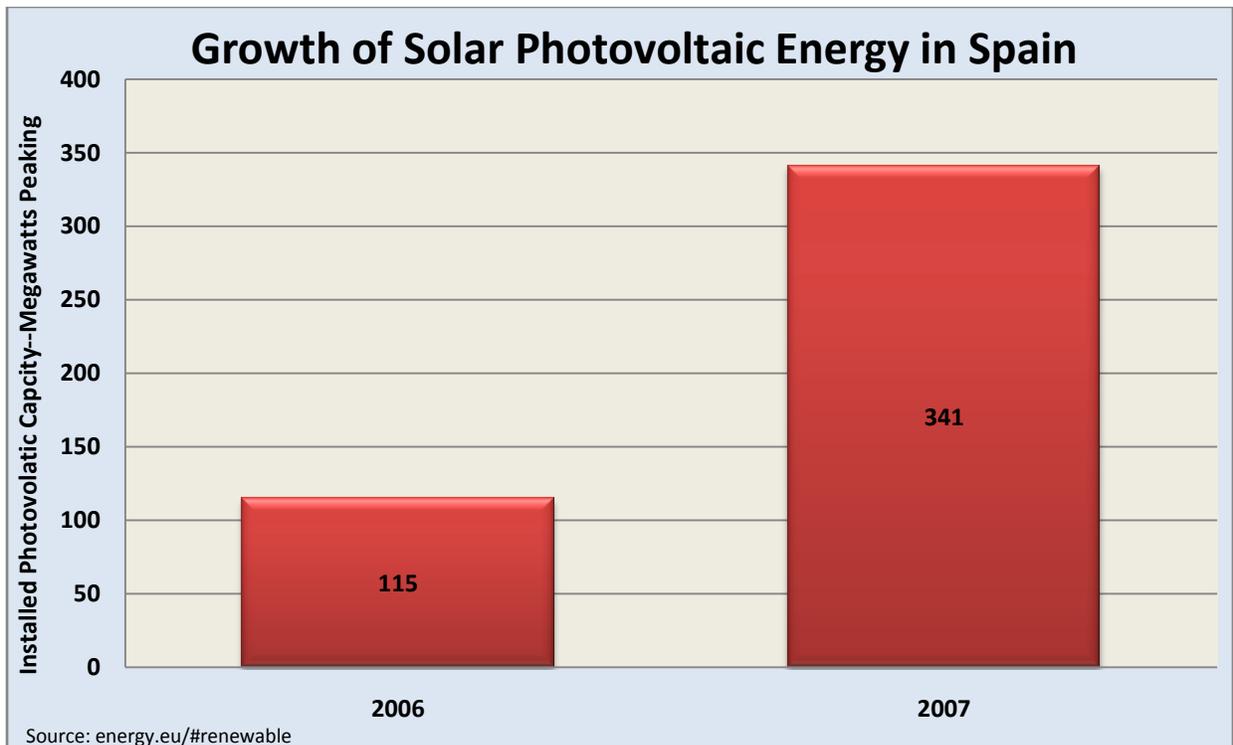
- **Germany.** In recent years, Germany has experienced strong growth in its wind, solar, and biogas deployment. For example:
 - Installed wind energy capacity totaled 16,629 megawatts in 2004 and by the end of 2007 it had grown to 22,247 megawatts.¹⁶
 - Installed capacity for solar photovoltaic electricity generation grew from 833 megawatts peaking (MWp) in 2006 to 1,103 MWp in 2007.¹⁷
 - Installed cumulated capacity of thermal solar collectors increased from 4,976 megawatt thermal (MWth) in 2005 to 6,002 MWth in 2006 (see chart below).¹⁸
 - Electricity production from biogas increased from 4,708 gigawatt hours (GWh) in 2005 to 7,338 (GWh).¹⁹



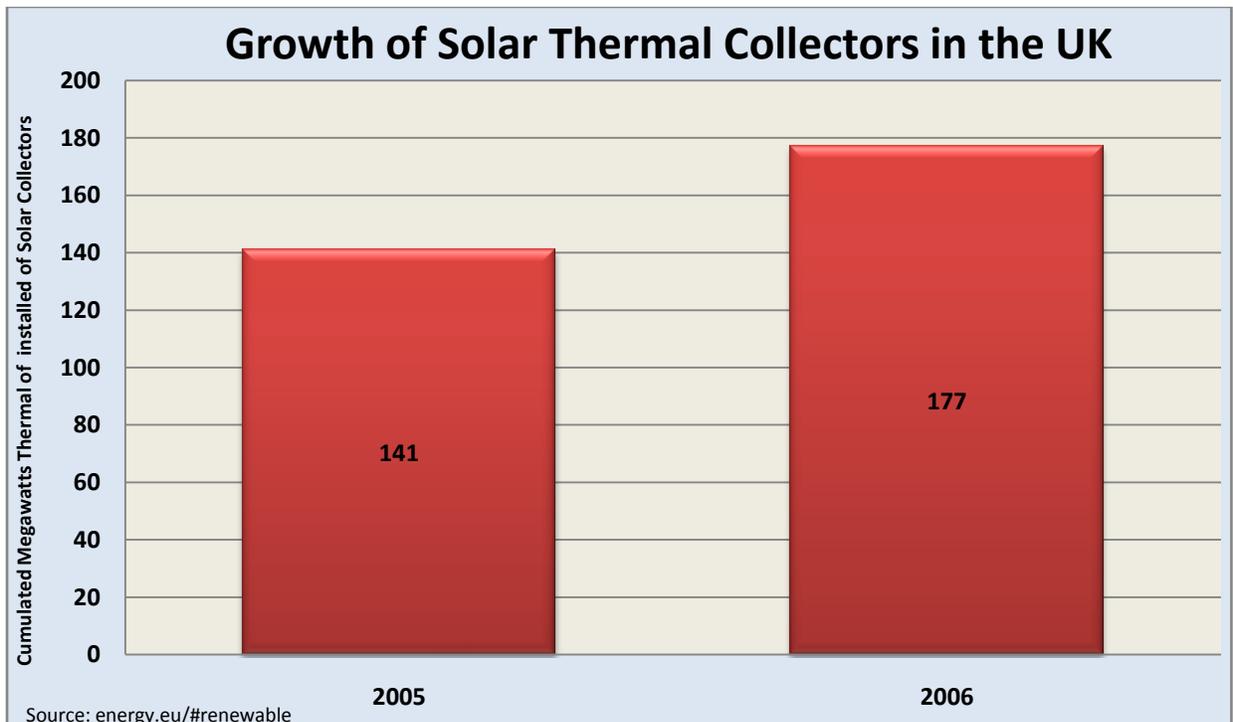
- **Portugal.** In recent years, Portugal has experienced strong growth in its wind, solar, and biogas deployment. For example:
 - Installed wind energy capacity totaled 522 megawatts in 2004 and by the end of 2007 it had grown to 2,150 megawatts (see chart below).²⁰
 - Installed capacity for solar photovoltaic electricity generation grew from 0.43 megawatts peaking (MWp) in 2006 to 14.45 MWp in 2007.²¹
 - Installed cumulated capacity of thermal solar collectors increased from 87.6 megawatt thermal (MWth) in 2005 to 102 MWth in 2006.²²



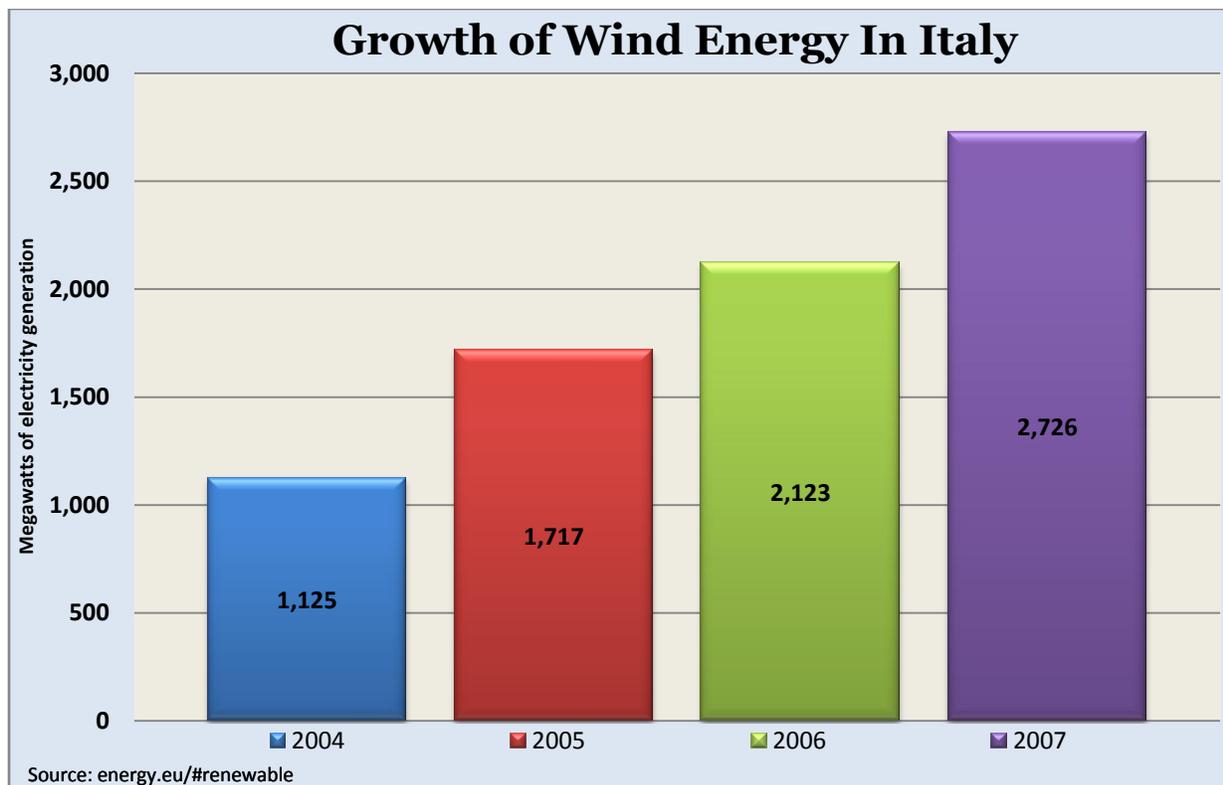
- **Spain.** In recent years, Spain has experienced strong growth in its wind, solar, and biogas deployment. For example:
 - Total wind energy capacity totaled 8,263 megawatts in 2004 and by the end of 2007 it had grown to 15,145 megawatts.²³
 - Installed capacity for solar photovoltaic electricity generation grew from 115 megawatts peaking (MWp) in 2006 to 341 MWp in 2007 (see chart below).²⁴
 - Installed cumulated capacity of thermal solar collectors increased from 383 megawatt thermal (MWth) in 2005 to 477 MWth in 2006.²⁵
 - Electricity production from biogas increased from 620 gigawatt hours (GWh) in 2005 to 674 (GWh).²⁶



- **United Kingdom.** In recent years, the United Kingdom has experienced strong growth in its wind, solar, and biogas deployment. For example:
 - Total installed wind energy capacity totaled 888 megawatts in 2004 and by the end of 2007 it had grown to 2,388 megawatts.²⁷
 - Installed cumulated capacity of thermal solar collectors increased from 141 megawatt thermal (MWth) in 2005 to 177 MWth in 2006.²⁸
 - Electricity production from biogas increased from 4,690 gigawatt hours (GWh) in 2005 to 4,997 (GWh).²⁹



- **Italy.** In recent years, Italy has experienced strong growth in its wind, solar, and biogas deployment. For example:
 - Installed wind energy capacity totaled 1,125 megawatts and by the end of 2007 it had grown to 2,726 megawatts (see chart below).³⁰
 - Installed capacity for solar photovoltaic electricity generation grew from 13 megawatts peaking (MWp) in 2006 to 50 MWp in 2007.³¹
 - Installed cumulated capacity of thermal solar collectors increased from 476 megawatt thermal (MWth) in 2005 to 606 MWth in 2006.³²
 - Electricity production from biogas increased from 1,198 gigawatt hours (GWh) in 2005 to 1,234 (GWh).³³



Greenhouse Gas Emission Reductions

At the same time the EU was experiencing strong growth in clean energy deployment, the EU and its member states were also decreasing their emission of greenhouse gases. For example:

- In May 2009, the EU announced that between 2006 and 2007 the EU-15's³⁴ greenhouse gas emissions decreased by 1.6 percent (64 million tons of carbon dioxide equivalent), while the economy grew by 2.7 percent. The EU-27's³⁵ emissions fell by 1.2 percent over the same period. This was the third consecutive year that the E.U.'s greenhouse gas emissions had fallen.³⁶
- Between 1990 and 2006, greenhouse gas emissions decreased by 7.7 percent in the EU-27. The largest absolute emission reductions took place in Germany and the United Kingdom; and³⁷
- Between 2005 and 2006, greenhouse gas emissions decreased by 0.3 percent in the EU-27 and some of the largest absolute reductions took place in France, Italy, and Spain.³⁸

While most recent projections indicate that the EU may not be able to reach its target of reducing greenhouse gas emissions by 20 percent by 2020, those projections do not

take into account the impacts that the EU's increased renewable (20 percent by 2020) targets and efficiency (20 percent increase by 2020) will have on emissions projections.

Economic Growth and Job Creation

Economic growth, job creation and the EU's clean energy deployment. The enactment of clean energy policies in the EU is expected to continue to give a significant boost to the EU economy and create hundreds of thousands of jobs.

The achievement of the EU's target of producing 20 percent of its electricity from renewable energy in 2020 is expected to provide a net increase of about 410,000 jobs and an increase of 0.24 percent in gross domestic product. In 2020, it is also expected that the total number of people employed as the result of policies which support renewable energy will reach 2.8 million in the EU.³⁹

Growth of Clean Energy Investments

The enactment of the EU's carbon pollution reduction and clean energy programs has resulted in strong clean energy investments in the EU. Since 2005 Clean energy investment in Europe increased from \$17.7 billion to \$49.7 billion in 2008, an increase of \$32 billion. By comparison, clean energy investment in North America only increased from \$10.3 billion to \$30.1 billion, an increase of \$19.8 billion.⁴⁰

In 2008, clean energy investment in North America actually decreased by eight percent in 2008, falling from \$32.7 billion to 30.2 billion. By comparison, clean energy investment continued to increase in Europe from \$48.6 billion to \$49.7 billion.⁴¹

As clean energy investments in the EU have outpaced those in North America, the EU's clean energy businesses have become global clean energy leaders. In fact, the EU clean energy sector has grown so large that these firms have begun to make significant investments in U.S. renewable energy resources.

Clean Energy Investments by EU Businesses

Clean energy businesses in the EU continue to make the vast majority of their clean energy investments in the EU, where carbon pollution reduction and clean energy programs exist. This comes despite the fact that the United States is estimated to possess significantly greater renewable energy resources than the EU. The following information compares and contrasts the clean energy investments that EU clean energy businesses are making in the EU and the United States.

Iberdrola. Iberdrola, which is based in Spain, is a world leader in wind energy. Iberdrola has a global installed wind energy capacity of 9,302 megawatts, and in the United States, has a presence in fourteen states, with a total installed capacity of 2,876

megawatts. In 2008, Iberdrola's revenues totaled approximately \$2 billion Euros and its net profit was approximately 390 million Euros.

In 2009, despite the fact that the United States has vast but largely untapped wind energy resources, Iberdrola will only be making 30 percent of its planned wind energy investments in the United States (totally approximately 540 million Euros). Instead, Iberdrola is choosing to make 70 percent of its wind energy investments (approximately \$1.26 billion Euros) in Europe, where clean energy and carbon pollution reduction programs exist.⁴²

Q-Cells. Q-Cells, which is based in Germany, is the largest solar cell manufacturer in the world. Q-Cells began producing silicon solar cells in the summer of 2001 and had 19 employees, by 2005 it had 767 employees, and in 2008 it 2,568 employees.

Q-Cells has also seen a similar increase in its net profits and revenue. In 2005, Q-Cells revenues totaled 299 million Euros and by 2008 had increased to 1.25 billion Euros. Q Cells also saw its profits increase from 70.5 million Euros in 2005 to 191 million Euros in 2008. Q-Cells strongest sales were in Germany at 30 percent and in Spain at 17 percent, but sales in America reached only 6.3 percent.

In 2008, despite the fact that the United States has vast untapped solar energy resources, Q-Cells reported that the \$427 million Euros it invested were concentrated in 1) the expansion of its crystalline solar cell factory in Germany from a 516 megawatt peaking (MWp) plant to a 760 MWp factory; and 2) the opening of a new 46 million Euro research center that will better allow it to mass produce advanced solar cells⁴³.

Siemens. Siemens, which is based in Germany, is one of the world's largest developers and manufacturers of turbines for wind farms, and is the world's number one supplier of offshore wind turbines.

Already in 2009, Siemens has announced plans to supply⁴⁴:

- 500 turbines for a 1,800 megawatt offshore wind farm in Northern Europe;
- 175 turbines for a 630 megawatt offshore wind farm in the United Kingdom;
- 88 turbines for a 315 megawatt offshore wind farm in the United Kingdom;
- 80 wind turbines for a 288 megawatt offshore wind farm in Germany's North Sea; and
- 21 wind turbines for a 48 megawatt offshore wind farm in the Baltic Sea;

Siemens has not signed any agreements to supply turbines for offshore wind energy projects in the United States because none have currently been ordered, though several

continue to be developed in various planning and development phases. The United States has more than 1,000 gigawatts of wind energy potential off the Atlantic coast and more than 900 gigawatts of wind potential off the Pacific Coast⁴⁵.

Vestas. Vestas, which is based in Denmark, is the world's leading supplier of wind turbines. Between 2005 and 2008, Vestas's revenue increased by 95 percent, its gross profit increased by 1,300 percent, and its average number of employees increased from 10,300 to 17,924.

In 2008, despite the fact that the United States has vast untapped wind energy resources, wind turbines that were manufactured by Vestas produced approximately 1,300 more megawatts of electricity in Europe than in the United States⁴⁶.

ACCIONA Energy. ACCIONA Energy, which is based in Spain, is a world leader in wind and solar energy. In 2007, ACCIONA Energy invested more than \$250 million in a solar thermal electric plant near Las Vegas, Nevada. The plant was the world's largest solar thermal electric built in the last 17 years that generates 64 megawatts of electricity.

Since then, despite the fact that the United States has vast untapped solar energy resources, ACCIONA Energy has been investing in Spain's solar energy sector, where carbon reduction and clean energy programs are in place. For instance, ACCIONA Energy is in the process of constructing five solar thermal electric plants in Spain that will generate 250 megawatts of electricity.⁴⁷ ACCIONA Energy is also expected to invest at least \$1.25 billion Euros in those five solar thermal electric plants, five times as much as invested in the United States.⁴⁸

Solon SE. Solon SE (Solon), which is based in Germany, is one of the largest solar manufacturers in Europe. Since 2005, Solon has increased its revenues by 315 percent to 815 million Euros, its profits by 313 percent to 134 million Euros, and constructed solar power plants with a total solar power output of over 130 megawatts.

In October 2007, Solon opened its first U.S. subsidiary in Arizona and expanded its production capacity to 50 MWp. This investment in the United States, however, does not match Solon's 2008 investments in its plants in Germany and Italy, where it increased its production capacity to 200 MWp and 100 MWp. In comparison, the entire U.S. solar market is expected to reach 500 MWp in 2009.⁴⁹

Abengoa. Abengoa, which is based in Spain, is one of the world's leading solar and bioenergy companies with over 20,000 employees and operations in 70 countries. At the end of 2008, Abengoa had developed over 880 megawatts of solar energy and was constructing over 320 megawatts around the world.

In the United States, Abengoa has announced plans to construct the Solana solar thermal plant in Arizona which, when completed, could be the world's largest solar

power plant. The construction of this project, however, has been delayed because Abengoa has had difficulty in securing financing for the project, and it is unclear when construction will begin.

During the same time in 2008, despite the U.S.'s vast untapped solar energy resources, Abengoa invested 800 million Euros on more than 170 megawatts solar energy in Spain, where carbon pollution reduction and clean energy programs exist.⁵⁰

In 2009, Abengoa Brought online the world's largest concentrating solar power tower plant (20 megawatts). This type of solar plant uses more than 1,250 mirrors to focus the sun's rays at the top of a tower 165 meters high, which in turn boils water to create steam which drives a turbine to generate electricity.⁵¹

Abengoa also plans to continue to expand its solar operations by investing 1.2 billion Euros in the Solúcar solar energy plants, which are expected to generate 300 megawatts of electricity and be responsible for the creation of 300 jobs.⁵²

Renewable Energy Investments in the United States

The EU's clean energy investments in the United States have been significant. In fact, most investments being made in U.S. renewable energy resources are being made by companies based in the EU. The following information compares the investments that EU based companies are making in the United States versus the investments that U.S. headquartered businesses are making here.

The United States has one (General Electric) of the world's top ten wind energy companies, as measured by market capitalization. In contrast, six (Siemens, Vestas, Acciona, Gamesa, Nordex and Clipper) of the world's top ten wind energy companies are located in the E.U.⁵³

Approximately 40 percent of the twenty-five largest wind projects on U.S. soil are owned by firms headquartered in the E.U. The remaining 60 percent of the twenty-five largest wind projects in the United States are owned by firms headquartered in the U.S.

These E.U. companies have announced 34 wind projects in the United States, which are expected to produce 7,222 megawatts of electricity. In comparison, U.S. companies have announced 37 wind projects in the United States, which are expected to produce 4,823 megawatts of electricity.⁵⁴ Thus, EU headquartered companies plan to add 2,400 more megawatts of electricity in the United States than the U.S. wind energy companies.

Conclusion

The enactment of the EU's carbon pollution reduction and clean energy policies have

coincided with significant increases in clean energy deployment, investment, and new businesses in the EU.

While the EU's clean energy businesses continue to make the vast majority of their clean energy investments in the EU, where carbon pollution reduction and clean energy programs exist, they have begun to make significant investments in U.S. renewable energy resources. The extent of the clean energy investments being made by EU-based companies in the United States, especially when compared to clean energy investments made by U.S. firms, is raising questions about our ability to compete in a 21st century clean energy economy, particularly if the United States does not enact its own set of carbon pollution reduction and clean energy standards.

If structured properly, carbon pollution reduction and clean energy policies in the United States will create a system of incentives that will spur the development of new clean sources of energy while confronting the threat of carbon pollution. These incentives will lead to innovations that will, in turn, create millions of high-wage jobs and ensure that America will continue to lead in the 21st century global economy.

¹ Directive 2003/87/EC of the European Parliament and of the Council, Establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive, October 13, 2003, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0087:EN:HTML>

² European Union, Climate change: Commission welcomes final adoption of Europe's climate and energy package, December 17, 2008, <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1998&format=HTML&aged=0&language=EN&guiLanguage=en>

³ EU Energy Portal, Feasibility of EU renewable energy targets, July 25, 2006, <http://www.energyportal.eu/reviews/green-energy/32-feasibility-of-eu-renewable-energy-targets.html>

⁴ *Ibid.*

⁵ Official Journal of the European Communities, Directive 2001/77/EC of the European Parliament and of the Council, September 27, 2001, http://eur-lex.europa.eu/pri/en/oj/dat/2001/l_283/l_28320011027en00330040.pdf

⁶ Directive 2003/87/EC of the European Parliament and of the Council, Establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive, October 13, 2003, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:32003L0087:EN:HTML>

⁷ Europa, Emission Trading System (EU ETS), Last Updated May 7, 2009, http://ec.europa.eu/environment/climat/emission/index_en.htm

⁸ Europa, Questions and Answers on Emissions Trading and National Allocation Plans for 2008 to 2012, Memo 06/542, November 29, 2006, http://ec.europa.eu/environment/climat/pdf/m06_452_en.pdf

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¹⁰ Europa, Questions and Answers on the Commission's proposal to revise the EU Emissions Trading System, January 23, 2008, <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/08/35>

¹¹ Europa, Climate change: Commission welcomes final adoption of Europe's climate and energy package, December 17, 2008, <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1998>

¹² Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable> and European Wind Energy Association, Wind Power Installed in Europe by End of 2004, http://www.ewea.org/fileadmin/ewea_documents/documents/graphs_maps_tables/europe_data_05_final.pdf and http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/2005statistics.pdf

¹³ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable>

¹⁴ *Ibid.*

¹⁵ *Ibid.*

¹⁶ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable> and European Wind Energy Association, Wind Power Installed in Europe by End of 2004, http://www.ewea.org/fileadmin/ewea_documents/documents/graphs_maps_tables/europe_data_05_final.pdf and http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/2005statistics.pdf

¹⁷ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable>

¹⁸ *Ibid.*

¹⁹ *Ibid.*

²⁰ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable> and European Wind Energy Association, Wind Power Installed in Europe by End of 2004, http://www.ewea.org/fileadmin/ewea_documents/documents/graphs_maps_tables/europe_data_05_final.pdf and http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/2005statistics.pdf

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²³ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable> and European Wind Energy Association, Wind Power Installed in Europe by End of 2004, http://www.ewea.org/fileadmin/ewea_documents/documents/graphs_maps_tables/europe_data_05_final.pdf and http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/2005statistics.pdf

²⁴ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable>

²⁵ *Ibid.*

²⁶ *Ibid.*

²⁷ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable> and European Wind Energy Association, Wind Power Installed in Europe by End of 2004, http://www.ewea.org/fileadmin/ewea_documents/documents/graphs_maps_tables/europe_data_05_final.pdf and http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/2005statistics.pdf

²⁸ *Ibid.*

²⁹ *Ibid.*

³⁰ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable> and European Wind Energy Association, Wind Power Installed in Europe by End of 2004, http://www.ewea.org/fileadmin/ewea_documents/documents/graphs_maps_tables/europe_data_05_final.pdf and http://www.ewea.org/fileadmin/ewea_documents/documents/publications/statistics/2005statistics.pdf

³¹ Europe's Energy Portal, Renewables, <http://www.energy.eu/#renewable>

³² *Ibid.*

³³ *Ibid.*

³⁴ The EU15 is comprised of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, Sweden and the United Kingdom.

³⁵ The EU27 is comprised of Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden and the United Kingdom.

³⁶ Europa, Climate change: Commission welcomes fall in 2007 greenhouse gas emissions for third consecutive year, May 29, 2009, <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/09/851&format=HTML&aged=0&language=EN&guiLanguage=en>

³⁷ European Environment Agency, Greenhouse Gas Emissions Trends and Projections in Europe 2008, EEA Report No. 5/2008, October 16, 2008, http://www.eea.europa.eu/publications/eea_report_2008_5

³⁸ *Ibid.*

³⁹ DG Energy and Transport—Financed by the European Commission, The Impact of renewable energy policy on economic growth and employment in the European Union, April 2009, http://ec.europa.eu/energy/renewables/studies/doc/renewables/2009_employ_res_summary.pdf

⁴⁰ United Nations Environment Programme, Global Trends in sustainable energy investment 2009, http://sefi.unep.org/fileadmin/media/sefi/docs/publications/UNEP_SEFI_Global_Trends_Report_2009_f.pdf

⁴¹ *Ibid.*

⁴² Iberdrola Renewables, 2008 Annual Report, P. 11, http://www.iberdrolarenovables.es/wcren/gc/en/doc/Informe_anual08.pdf

⁴³ Q-Cells, 2008 Annual Report, http://www.q-cells.com/medien/ir/berichte/2008/qcells_gb2008_englisch.pdf

⁴⁴ Siemens, 2009 Press Releases, <http://w1.siemens.com/press/en/pressrelease/index.php>

⁴⁵ Department of Interior, Vice President Biden, Secretary Salazar and Senator Carper underscore renewable energy potential on Outer Continental Shelf, May 4, 2009, http://www.doi.gov/news/09_News_Releases/050409.html

⁴⁶ Vestas, 2008 Annual Report, <http://www.vestas.com/en/investor/financial-reports/financial-reports-2008.aspx>

⁴⁷ ACCIONIA Energy, 2008 Annual Report, [http://memoria2008.acciona.es/media/61324/Acciona_energy\(pdf\).pdf](http://memoria2008.acciona.es/media/61324/Acciona_energy(pdf).pdf)

⁴⁸ Renewable Energy Resources, ACCIONA starts work on its third concentrating solar power plant in Spain, representing an investment of 237 million euros, March 9, 2009, <http://www.renewable-energy-sources.com/2009/03/09/acciona-starts-work-on-its-third-concentrating-solar-power-plant-in-spain-representing-an-investment-of-237-million-euros/>

⁴⁹ Solon SE, 2008 Annual Report, http://www.solon.com/cw/en/investor_relations/financial_publications/annual_report/

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⁵¹ Reuters, Abengoa launches world's biggest solar power tower, April 27, 2009,
<http://www.reuters.com/article/rbssIndustryMaterialsUtilitiesNews/idUSLR63434520090427>

⁵² Abengoa Solar, Solúcar Platform, http://www.abengoasolar.com/sites/solar/en/our_projects/solucar/index.html

⁵³ Lazard, Top Alternative Energy Companies by Market Capitalization, April 1, 2009.

⁵⁴ Information provided by New Energy Finance.