EUROPEAN UNION
DELEGATION OF THE EUROPEAN COMMISSION TO THE USA

eufocus

September 2006

The European Union and Energy

Looking to the Future

"The EU is already the largest importer and second largest consumer of energy in the world. We depend on external sources for 50 percent of our energy needs [and] this could rise to 70 percent by 2030. We have to do something about this, and we have to do it now… The year 2030 may seem a long time away, but it is the day after tomorrow in energy terms."

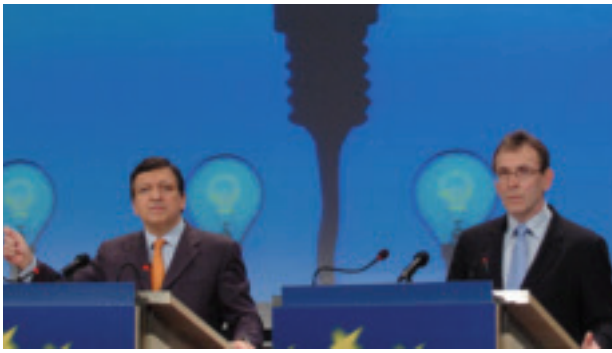
José Manuel Barroso
President of the European Commission

The world today is entering a new energy era requiring global action and cooperation. Concern is growing over the ability to match supply and demand. With present trends, world energy demand will increase over 50 percent by 2030, and global oil consumption is projected to grow by 1.6 percent a year with Chinese and Indian needs playing an increasing role. Meanwhile, the planet's climate is getting warmer, portending serious long-term consequences for ecosystems and economies around the world.

In Europe, the global energy situation is influencing how the EU approaches energy policy and energy security, with Member States facing challenges and uncertainties that call for a common European response. Historically, the nations of Europe have regarded energy policy as a domestic prerogative, but today the EU is engaged in a broad-ranging energy debate aimed at building an integrated approach. Pressure is growing for Europe to speak with a common voice through a competitive internal energy market and a strong external energy policy in order to ensure sustainable development, competitiveness, and security of supply.

Europe, like the United States, is heavily dependent on oil and gas from external sources. Fifty percent of European energy is imported, mainly from Russia, the Middle East, Norway, and Algeria. However, new investments in energy infrastructure by the EU and individual Member States are laying the groundwork for diversification of energy sources, while European companies are playing a prominent role in the development of tomorrow's innovative energy technologies. European citizens themselves contribute by changing habits and taking steps to improve energy efficiency on a day-to-day basis.

Together, the EU and the United States represent about 40 percent of the world's energy consumption and almost 40 percent of CO_2 emissions, although the U.S. uses considerably more energy both in total and on a per capita basis. With energy models that are unsustainable from both an environmental and energy security perspective, the EU and the U.S. share the responsibility and need to develop a strategic partnership to change current trends.



European Commission President José Manuel Barroso and Energy Commissioner Andris Piebalgs discuss the EU energy plan.

In both Brussels and Washington, energy security has moved to the forefront of political debate. As in so many other public policy areas, from promoting world peace and security to fighting poverty and terrorism, Europe, the United States, and the rest of the world all have much to gain from a cooperative, vibrant transatlantic dialogue.

inside

EU Statistics

Oil Consumption Per Capita
(barrels of oil per capita/year)

	2002	2030 (proj.)
U.S./Canada	22.8	23.8
Japan/Korea	15.0	16.9
European Union (25)	**10.4**	**11.6**

Source: European Commission Green Paper, 2006

EU Energy Strategy: Security of Supply,

"While it is up to each Member State to choose its energy mix, it is also clear that choices made by one Member State have an impact on the energy security of its neighbors and of the [EU] as a whole."

Andris Piebalgs
EU Commissioner for Energy

Europe has entered a new energy era requiring a comprehensive strategy that balances three fundamental needs—securing an expanding supply of energy from both domestic and foreign sources, developing a more competitive internal energy market, and encouraging and supporting environmental protection and development of clean and renewable energy resources. Those challenges also define today's global energy landscape.

Europe's dependence on imported oil and gas, some of which comes from regions with varying degrees of stability, is rising at a time when global energy demand is increasing and world prices are at record high levels. Like the United States, Europe needs new investment in the energy sector—it is estimated that more than €1 trillion will be needed over the next 20 years to replace aging infrastructure and meet increased energy demands across the EU.

To address such challenges, the EU is working on a common, Union-wide response. In March 2006, the European Commission published "A European Strategy for Sustainable, Competitive and Secure Energy," a consultation exercise or "Green Paper" designed to stimulate new ideas and thinking on the most pressing energy challenges.

Laying out the new energy realities facing Europe, the Green Paper outlined three fundamental goals, and proposed a series of concrete actions.

- **Sustainability**. Developing competitive renewable sources of energy, particularly alternative transport fuels; and leading global environmental efforts.
- **Competitiveness**. Developing new sources of energy and cutting-edge technologies, stimulating investments in clean energy production and energy efficiency, and mitigating the impact of higher international energy prices on EU economies.
- **Security of supply**. Tackling the EU's dependence on imported energy by diversifying the energy mix, expanding energy sources, and managing shortages more effectively while also improving the conditions for EU companies seeking access to global resources.

The Commission proposed six priority areas and identified recommendations for action in each case:

1. Complete liberalization of gas and electricity markets. A truly competitive, single European electricity and gas market, based on free and open competition among Europe-wide companies rather than dominant national actors, will improve security of supply and boost efficiency and competitiveness. Core areas of focus include developing a European grid by establishing common regulatory standards, stimulating new investment in the energy sector, and improving interconnections among Member State systems.

2. Guarantee security of supply and Member State solidarity in the EU's internal energy market. The EU must ensure that external events—such as natural disasters or terrorist threats—do not create supply interruptions, and

EU Statistics

EU Energy Consumption Mix
2000 vs. 2030 (percent of total)

	2000	2030
Oil	38.4	33.8
Gas	22.8	27.3
Solid fuels	18.5	15.5
Nuclear	14.4	11.1
Renewables	5.8	12.2

Source: European Commission Green Paper, 2006

EU FACTS

By summer 2007, EU consumers will be able to purchase electricity and gas from any supplier in any EU Member State.

Sustainability, Competitive Markets

that EU Member States act in solidarity as they did when releasing emergency oil stocks to the U.S. in response to Hurricane Katrina in 2005. The Commission recommends a review of existing EU laws on oil and gas stocks, establishment of a European Energy Supply Observatory to monitor supply and demand patterns, greater cooperation among energy network operators, and strong, common standards to improve physical security for energy infrastructure.

3. Develop a more sustainable, efficient, and diverse energy mix. EU Member States and energy companies each define their own particular energy mix, but choices made by one Member State affect the EU as a whole. A Strategic EU Energy Review would provide a road map to help Member States make energy decisions while laying the groundwork for agreement on overall strategic objectives.

4. Integrate Europe's approach to tackling climate change. The EU must continue to lead in the response to global climate change. Already one of the world's most energy efficient regions and striving to foster economic growth despite energy and environmental challenges, Europe is working to meet ambitious targets to reduce energy consumption and greenhouse gas emissions by boosting energy efficiency, stimulating investment in clean and renewable energy sources, and further developing energy trading regimes that offer economic incentives to reduce energy use. The EU's innovative Emissions Trading Scheme (ETS) is using market forces to reach environmental goals, effectively putting a price on carbon and CO_2 emissions.

5. Create an energy technology strategy. European companies already lead in many areas of technological development in the energy sector, including cleaner coal, biofuels and fuel cells for automobiles, and nuclear fusion. But the EU is calling for research in every area of energy use—agriculture, industry, transport, housing, and infrastructure—to be expanded, and for a strategy to finance long-term energy research, integrating EU-wide and Member State research programs and budgets.

6. Create a common external energy policy. The EU includes energy in its bilateral and multilateral relationships, particularly with Russia, Ukraine, Turkey, the Middle East, and the Caspian and Mediterranean regions—all important energy suppliers or transit countries for Europe. The EU's goal is to speak with a single, coherent, proactive voice on behalf of 460 million European citizens and develop deepening partnerships with foreign producers, transit countries, and the global community including key consumer countries such as the U.S., China, and India.

While member States have numerous energy choices to make based on their natural preferences and economic interests, in a world of global energy interdependence, the European Commission has mapped out the parameters of what it considers a necessary, comprehensive energy policy for all European citizens.

ENERGY AND THE ENVIRONMENT

Reconciling growing energy needs with environmental protection is a major EU priority. A global environmental leader, the Union already derives 6 percent of its overall energy and 14 percent of its electricity from renewable sources. The EU boasts four-fifths of global production capacity of wind power while European companies supply 90 percent of the world market for wind turbines.

To help meet the EU's commitments under the Kyoto Protocol, the EU created the world's first international market in CO_2 emissions. Based on a similar "cap and trade" regime first used in the United States to manage SO_2 discharges, the Emissions Trading Scheme saw €5 billion in trades in 2005, the first year of operation, with volume expected to triple in 2006 as companies capitalize on the new profitability of reducing greenhouse gas emissions.

The EU has successfully reduced sulfur emissions by more than 60 percent since 1990 and is working to also reduce emissions of sulfur dioxide, nitrogen oxides, particulate matter, and other pollutants.

EU PUBLIC OPINION

- A significant percentage of Europeans (40%) would be willing to pay more for energy from renewable sources.
- Eight in 10 Europeans take energy consumption into consideration when purchasing energy-consuming appliances and devices.

EUROBAROMETER

Source: Eurobarometer Poll, January 2006

The EU is working to boost energy efficiency and use of renewable fuel sources.

Promoting Energy Efficiency

"The EU leads the world in demand management, in promoting new and renewable forms of energy, and in development of low carbon technologies… Europe can lead the global search for energy solutions."

European Commission
Green Paper, 2006

Andris Piebalgs, EU Commissioner for Energy, at an annual fuel efficiency competition.

Europe is more dependent than ever on foreign oil and gas as its own domestic fossil fuel resources dwindle and the demands of economic growth increase energy needs. The transportation sector especially is heavily reliant on oil imports that are increasingly expensive and have high environmental costs.

The EU has been a leader in the field of energy efficiency and has put in place EU laws ("directives") promoting energy efficiency in buildings, energy services, eco-design and eco-labeling. Member States will implement a series of EU energy-saving measures promoting energy efficiency in buildings, lighting systems, appliances, and office equipment, as well as savings resulting from new incentive-based tax policies.

Other measures designed to reduce energy waste include:

- Increasing fuel efficiency in automobiles and transport systems.
- Reducing air traffic congestion through better airport management.
- Restricting automobile usage in crowded urban centers and promoting public transport.
- Reducing "phantom" energy consumption in appliances.
- Reducing energy loss in electricity production and distribution.
- Increasing co-generation (the production of heat and electricity in one process).
- Encouraging "green" architectural design and building construction.
- Promoting best practices and information sharing among EU industries and companies.
- Financing research and demonstration projects for alternative fuels.

Renewable Sources Lead to Energy Savings

Europe also has a history and strong track record in developing renewable energy sources and related "eco-technologies." The EU aims to satisfy at least 12 percent of its total energy needs and over a fifth of its electricity demand from renewable sources by the year 2010.

To this end, the Union is providing financial support through its "Intelligent Energy–Europe" program to local, regional, and national initiatives promoting renewable energy and energy efficiency. The program has provided €250 million in project funding from 2003-2006. Meanwhile, the European Commission has proposed a significant increase in new and renewable energy research funds for the 2007-2013 budget cycle.

The EU also supports and funds demonstration projects in the wind, solar, bio-electricity, hydroelectric, and geothermal sectors. Some prominent success stories involving EU support include:

- **Wind Power.** Denmark, Spain, and the Netherlands have led the way, with France, Portugal, and Italy increasing their use of wind energy in recent years. Technological improvements have been considerable and results impressive: turbine output has increased 100-fold in 15 years; noise and weight levels have

ENERGY STAR: ENERGY EFFICIENCY FOR OFFICE EQUIPMENT

Renewed by the EU and the United States in 2006, the Energy Star Program reduces the amount of energy used in both the standby and normal use modes of computers, monitors, copiers, printers, scanners, and fax machines. Providing an international labeling standard for energy-efficient electronic equipment, the agreement opens the way for another five years of transatlantic cooperation on energy efficiency.

and Renewable Sources

dropped; cost of wind-generated electricity plummeted 600 percent between 1980-2004; the sector has created 200,000 jobs.

- **Solar Energy.** Systems have been integrated into some of the most prestigious buildings and projects in Europe, including the German Reichstag, the Berlin Bank, the Barcelona waterfront, and along highway and railway systems. The production capacity of solar photovoltaics has increased tenfold during the last decade.
- **Bioenergy (biomass and waste).** Currently the largest source of renewable energy in the EU. Overall conversion efficiency for electricity generation has grown from 25 percent to 35 percent over the past 20 years. Waste-to-energy projects simultaneously address both energy production and waste treatment and disposal.
- **Geothermal Energy.** Research is developing new potential for heating systems.
- **Biofuels.** Biodiesel, ethanol, and other biofuels are now used in many industrial processes. As in the U.S., ethanol is used as a gasoline additive, while biodiesel is used in fleets such as city bus systems. The EU is promoting the rapid (next 5-10 years) development and production of synthetic biofuels.
- **Hydrogen and Fuel Cell Technologies.** The EU established the European Hydrogen & Fuel Cell Technology Platform in 2004 to accelerate technological development in the sector. Hydrogen fuel cells today power public bus systems that carry more than 3 million European citizens without noise or harmful emissions in the world's most successful demonstration project of its kind.

In addition, the EU is supporting 28 "energy efficient cities" throughout the Union with the CONCERTO project, which is promoting best practices in electricity system management, "green" buildings, and expanding the use of urban transportation. CONCERTO cities currently include London, Stuttgart, Torino, Barcelona, and Nantes.

Janez Potočnik, EU Commissioner for Science and Research.

FUSION ENERGY RESEARCH: ITER

The EU and six global partners—the United States, Russia, China, India, Japan, and South Korea—are working together to demonstrate the potential of nuclear fusion as an energy source. The €4.57 billion ITER project represents the largest scientific collaboration of its kind in history.

The experimental ITER reactor will seek to realize the potential of nuclear fusion as a large-scale, safe, and abundant energy source with little impact on the environment. The EU has been chosen to host ITER in Cadarache, France, and will contribute over half the costs of construction, which is slated to begin in 2008. ITER's organizational structure will be established by the end of 2006.

EU TARGETS FOR RENEWABLE ENERGY AND ENERGY SAVINGS

- Double proportion of renewable energy in national gross energy consumption from 6 percent to 12 percent by 2010.
- Increase share of green electricity in total electricity consumption from 14 percent to 21 percent by 2010.
- Raise share of biofuels in transportation fuel market to 5.75 percent by 2010.
- Reduce EU energy consumption by 20 percent by 2020.

ENERGY SOURCES: NUCLEAR, COAL

- **Nuclear.** With one-third of EU electricity generated in nuclear power plants, the sector will remain an important part of Europe's energy mix in years to come as the EU seeks to reduce fossil fuel dependency. Since the 1950s, the European Commission has acted as a supranational regulatory authority in this field, overseeing radiation protection for industry workers and civilian populations, ensuring a supply of nuclear fissile materials, and developing and enforcing nuclear safeguards. The EU has an outstanding record of nuclear energy safety.
- **Coal.** Coal has been a reliable energy source for Europe at stable prices for many decades, and the continent still has abundant coal reserves. Some EU countries still derive as much as 60 percent of their electricity from coal today. As recently as 1990, coal provided about a quarter of Europe's overall energy needs, though that share is projected to fall to approximately 15 percent by 2030.

  As in the U.S., clean coal technologies and the development of carbon capture and storage are critical to the future of this solid fuel. Future research and investment will help reduce CO_2 emissions, develop coal-to-liquid fuels and chemical products, and complement the use of renewable biomass.

Energy: On the Agenda with

"The events at the beginning of [2006] between Russia, Moldova, and Ukraine were a wake-up call, reminding us that energy security needs to be even higher on our political agenda. We need to continue to pursue close energy cooperation with our partners in Eastern Europe, South Caucasus, and the Mediterranean."

Benita Ferrero-Waldner
EU Commissioner for External Relations and ENP

External energy relations are an intrinsic component of the EU's overall energy strategy as well as its own European Neighborhood Policy (ENP). Europe's neighbors are vital to EU energy security and the Union and its energy partners are closely linked through commercial relationships as well as bilateral and regional energy dialogues including *Russia, Norway, Ukraine, the Caspian Basin, the Mediterranean countries, OPEC, and the Gulf Cooperation Council.*

The EU has been widening its energy market to include its neighbors and bring them progressively closer to the EU's internal market. The Southeast Europe *Energy Community* is the flagship of this effort, but the principle is also being applied through the EU's ENP, the Euro-Mediterranean Partnership, the EU enlargement process, and in its development assistance relationships.

A common European external energy policy would permit greater integration of energy objectives into Union relations with non-EU countries—especially those facing similar energy and environmental challenges such as the *U.S., Canada, China, Japan, and India*—and would provide additional opportunity for progress on issues such as climate change, energy efficiency and renewables, research and development, market access, and investment.

The EU has been engaged with Mediterranean countries to promote regional economic integration and diversify sources and supply routes. In 2003, the *EU, Algeria, Morocco, and Tunisia* signed an agreement to integrate electricity markets. *Libya, Mauritania, and several sub-Saharan countries* may be added in the future to develop new energy resources and the pipeline and infrastructure systems for energy delivery to European markets. The EU is pursuing the creation of a *Euro-Mashrek harmonized and integrated energy market* that would include the *Balkans, Egypt, Jordan, Lebanon, Syria, Iraq, and possibly Israel and the Palestinian Authority.*

The EU funds a variety of external energy-related programs:

Eastern Europe and Central Asia. Projects support the sourcing of oil and gas, including construction of pipeline systems and stimulation of private sector investment.

Mediterranean. EU efforts support integration of electricity systems, the development of renewable energy, and improved energy efficiency. EU cooperation efforts supported the development of the natural gas industry in Algeria, now a major EU energy provider.

Balkans. The EU funds energy reconstruction and market reform, and the European Investment Bank provides loans for electricity generation and transmission, as well as natural gas extraction, transport, and distribution.

The EU, Russia & Energy

As Russia's largest energy customer, the EU seeks a partnership that would offer security and predictability for both sides while paving the way for the necessary long-term investments. Fair and reciprocal access to markets and infrastructure is critical, including third party access to pipelines. An energy initiative based on these principles could be integrated into the framework of EU-Russia relations and efforts should be intensified in the G8 to secure rapid

EU PROMOTES MULTILATERAL ENERGY COOPERATION

The EU promotes several dialogues and cooperative efforts on energy in multilateral forums, including the International Energy Agency, which plays a major role in oil stockholding. At the United Nations, the EU supports the work of the International Atomic Energy Agency and the UN Economic Commission for Europe. Energy issues are also addressed by the G8 and the Organization for Security and Cooperation in Europe. The EU is part of the 51-country *Energy Charter Treaty*, a legal instrument to provide non-discriminatory access for the trade, transit, and investment of energy products.

Neighbors and Global Partners

"The Energy Community with Southeast Europe has taken us forward, towards the creation of a 'common regulatory space' around Europe, progressively developing common trade, transit and environmental rules, market harmonization, and integration."

Andris Piebalgs
EU Commissioner for Energy

ratification by Russia of the *Energy Charter Treaty* and conclusion of Transit Protocol negotiations.

Russia is the EU's most important energy supplier and has been a reliable partner for 30 years. Sixty percent of Russian oil exports go to the EU and represent 25 percent of total EU consumption; fifty percent of Russia's natural gas exports are consumed by the EU, a quarter of the Union's requirements. Owing to the high level of interdependence between the Russian Federation and the European Union, both partners will pursue a common strategy of energy security on the European continent.

THE EU & SOUTHEASTERN NEIGHBORS: THE *ENERGY COMMUNITY TREATY* AND THE WORLD'S LARGEST ENERGY MARKET

The 2005 *Energy Community Treaty* between the EU and nine neighboring countries in Southeast Europe came into force July 1, 2006, creating the world's largest internal market for electricity and gas and extending EU law on energy and environment to the region. The initiative will help boost reconstruction efforts in the Balkans, where war in the 1990s damaged or destroyed much of the region's energy infrastructure.

Participating states must allow free movement of electricity and gas across their national borders in return for the assurance of fixed environmental and commercial standards. Becoming a central plank of EU external energy policy, the Energy Community importantly provides a means for non-EU countries to access the EU market.

Beyond extending environmental standards and market competition in the energy sector to neighboring countries, the *Energy Community Treaty* addresses strategic EU goals, including: providing a solid basis for macroeconomic reform by ensuring sustainable and secure energy supplies for businesses and consumers; and establishing direct connections to countries bordering the Caspian Sea and the Middle East, ensuring a single regulatory basis for energy imports from these vital nations.

Energy Community Treaty signatories include all 25 EU Member States, Romania, Bulgaria, Croatia, Bosnia and Herzegovina, Serbia, Montenegro, Albania, the Former Yugoslav Republic of Macedonia, and UNMIK Kosovo. Negotiations are underway for Turkey, Ukraine, and Norway to join the Energy Community.

EU Statistics

Source of EU Oil and Gas
(2004 percent of total)

	Oil	Gas
Russia	27	24
Norway	16	13
Middle East	19	
Algeria		10
North Africa*	12	
EU Domestic	21	46
Other Regions	5	7

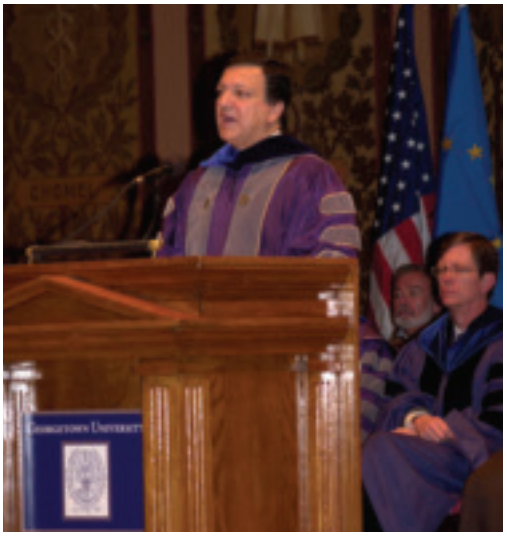
***includes Algeria for oil**

Source: European Commission

The EU and America: Common Energy Goals & Challenges

"Where the transatlantic marketplace leads, the global economy will follow…. We can no longer afford, nor should we accept, the unpredictability of the energy market. Together, the EU and the United States must send a clear signal on the need for a paradigm shift on energy, engaging in deeper cooperation between us and with others."

José Manuel Barroso
President of the European Commission



At a moment of increasing global energy uncertainty, EU-U.S. cooperation on energy security is more important than ever. European Commission President José Manuel Barroso acknowledged that reality early in 2006 with a call for a Strategic Energy Dialogue between Washington and Brussels.

In a speech at Georgetown University in Washington, D.C., President Barroso highlighted the potential for increased EU-U.S. energy collaboration across the globe, including promoting the development of hydrocarbon resources in the Caspian and Central Asian regions, developing global market rules and standards for the energy sector, cooperating to improve energy efficiency, and creating a permanent network of EU and U.S. energy experts to work on common policies and responses to energy crises.

Energy cooperation was prominent on the agenda of the 2006 G8 Summit in Russia and the 2006 EU-U.S. Summit, where Europe and America recognized the "strategic role of security of supply, competitiveness and sustainability in the energy sector." Key points of emphasis at the EU-U.S. Summit included energy diversification, infrastructure security, competition and market access, technology development, and investment in cleaner fossil fuel technologies and renewable energy sources. The EU and the U.S. agreed to reinforce their strategic energy cooperation and to conduct an annual strategic review.

Together, the European Union and the United States can help shape the post-petroleum world of the 21st century. With shared values and common interests, Europe and America can lead the way and help build an energy economy that is secure, protective of the environment, and conducive to economic growth and prosperity around the globe.

EU Statistics

Oil Consumption of Leading World Economies
(millions of barrels per day)

	2002	2030	Projected Growth
U.S./Canada	19.7	26.3	34%
European Union (25)	**13.0**	**14.9**	**15%**
Japan/Korea	7.1	7.9	11%
China	4.9	12.7	157%
India	2.4	5.3	124%

Source: IEA

ADDITIONAL EU-U.S. INTERNATIONAL ENERGY COOPERATION

- **Carbon Sequestration Leadership Forum (CSLF).** International climate change initiative to develop cost-effective technologies for the separation and capture of carbon dioxide.
- **International Partnership for the Hydrogen Economy (IPHE).** International institution committed to accelerating the development of hydrogen and fuel cell technologies.
- **Renewable Energy and Energy Efficiency Partnership (REEEP).** Global public-private partnership structuring policy initiatives for clean energy markets and facilitating financing for sustainable energy projects.

For further information: http://www.eurunion.org/eufocus

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EU Focus is published bi-monthly by the Delegation of the European Commission to the United States.

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ISSN: IQ-AA-06-004-EN-C

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