



The EU and Energy Security

Reliable Energy Supply in the Transition to a Low-Carbon Economy

“Climate change and energy security are two sides of the same coin. The same remedies must be applied to both problems...climate change is a major opportunity to transform global energy security and to move towards a more sustainable economic model.”

— Andris Piebalgs,
EU Energy Commissioner

The realities of modern life are dependent upon reliable, clean and affordable energy. From the long gas lines and rationing experienced in the United States in the 1970s to last winter’s interruption in the EU of natural gas supplies from Russia, the costs of energy dependence have been making headlines for decades.

Energy supply vulnerability in the current age is linked primarily to fossil fuels and the need for countries without sufficient supply to import what they require, subject to the ebb and flow of international politics and pricing. Although the increasing demands of climate change mandate a significantly decreased environmental impact from the use of traditional energy sources, reliance on fossil fuels is unlikely to decline significantly in the near future without dramatic changes in policies and energy use and production.

Energy cooperation is at the heart of European integration. More than 50 years ago, six European countries agreed to submit their coal and steel industries to common management, so that no country alone could fabricate the weapons of war to be used against another. The European Coal and Steel Community, established in 1952, inextricably linked energy production among its six original members. Six years later, the European Atomic Energy Community and the European Economic Community came into being.

EU collaboration has resulted in a unique energy market in Europe, linking half a billion consumers into a single internal energy market for electricity and gas and binding all market players to the same rules on competition and security of supply. Currently, the EU meets more than 50 percent of its energy needs through imports; if no action is taken, that figure could rise to 70 percent in the next 10 to 20 years. Forty-five percent of the EU’s oil imports come from the Middle East, and 40 percent of natural gas imports come from Russia.



To tackle the energy challenges of the 21st century, the EU has developed a comprehensive energy and climate change package designed to increase the security and sustainability of energy supply by mitigating the environmental impact of fossil fuels, catalyzing advances in renewable energy, and increasing energy efficiency.

The EU is also working closely with its main energy suppliers, as well as key transit nations for oil and natural gas, to ensure a continuous, uninterrupted flow of required fossil fuels. It is also developing contingency plans to weather energy supply disruptions resulting from geopolitical, natural, or accidental causes. As part of these contingency plans, the EU is promoting investment in new energy networks and technologies.

EU support for technology and innovation is spurring the development of clean, renewable, home-grown energy. The EU’s European Technology Platforms bring together stakeholders including industry, research organizations, and academia to stimulate investment in and development of renewable technologies like offshore wind farms, photovoltaic and concentrated solar power, second generation biofuels, and the carbon capture and storage technology that promises clean coal possibilities.

These policies will serve the EU well as it undertakes the next industrial revolution: the transition to a low-carbon economy that retains the secure, reliable energy supply vital to a thriving, modern economy.

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Ramping Up Energy Security

The EU Energy and Climate Change Program

In 2007, the EU introduced a forward-looking, integrated climate change and energy strategy designed to reduce greenhouse gas emissions to 20 percent below 1990 levels, increase the share of renewables in energy consumption to 20 percent, and improve energy efficiency by 20 percent—all by the year 2020. Combating climate change and ensuring competitive, sustainable, and secure energy supplies go hand-in-hand and call for complementary solutions.

Greenhouse Gas Emissions (GHG). The EU's Emissions Trading Scheme (ETS)—the foundation for reducing GHG emissions—uses a cap-and-trade market mechanism to put a price on carbon, allowing companies to cut CO₂ emissions cost-effectively. Emissions are limited (or “capped”) at a specific level. Companies with emissions exceeding their credits or allowances must then purchase allowances (“trade”) from other companies who emit less.

In 2008, revised legislation clarified and made more effective the approach to be followed from 2013. By granting fewer emission allowances under the ETS, emissions from power plants and energy intensive industries are to be cut to 21 percent below 2005 levels by 2020. Aviation will be subject to emissions trading under the ETS from 2012 onward, and emissions from sectors outside the ETS regime—farming, waste, households, and transportation—will be reduced by 10 percent below 2005 levels by 2020.

The EU is the first major region in the world to commit to such far-reaching and legally binding emission reductions and is leading the fight against climate change.

Renewable Energy Sources. A new Renewable Energy Directive establishes a target of 20 percent renewable energy in the EU's energy mix and 10 percent of renewable sources in its transport fuel by 2020; this will be implemented through binding national targets. Such legal certainty will help encourage the necessary investments in new generation, new networks, and new technologies.

Energy Efficiency. Energy efficiency is the most cost-effective way to reduce energy consumption and still maintain an equivalent level of economic activity. It also addresses the challenges of climate change, energy security, and competitiveness.

While existing EU energy efficiency legislation targets key energy-consuming sectors, it is insufficient to meet the 20 percent target. EU proposals aim to make buildings—especially their heating and cooling systems—more energy efficient, improve the energy labeling of energy-consuming household and commercial products, and apply a specific labeling requirement for the fuel efficiency of tires.

Second Strategic Energy Review

The EU vision for the low-carbon economy of the future benefits from periodic scrutiny. With its Second Strategic Energy Review in November 2008, the EU has built on the “20 20 20 by 2020” architecture to respond to short-term supply vulnerability, and to work toward a low-carbon energy scenario in the longer term, according to a five-part blueprint:

- Infrastructure needs and the diversification of energy supplies, including stimulating investment in more efficient, low-carbon networks;
- External energy relations;
- Oil and gas stocks and crisis response mechanisms, including enhanced energy solidarity among Member States;
- Energy savings through the adoption of energy efficiency proposals;
- The best possible use of the EU's indigenous energy resources.

Regulating Rationally. The EU has adopted new rules that strengthen its internal energy market, stimulate energy efficiency, increase consumer protection, lower energy prices, and enable companies to compete on a level playing field. A competitive internal energy market gives consumers a choice between different

“The EU's climate and energy package represents a green ‘new deal’ which will enhance the competitiveness of EU industry in an increasingly carbon-constrained world. Moving to a low carbon economy will encourage innovation, provide new business opportunities, and create new green jobs.”

— European Commission
President José Manuel Barroso

European Energy Program for Recovery (EEPR)

The European Energy Program for Recovery makes €3.98 billion available to support new energy-related investments (2009-2010), including €1.05 billion for investment in carbon capture and storage (CCS), €565 million for offshore wind projects, €1.44 billion for gas infrastructure, €910 million for electricity infrastructure, and €15 million for two small island projects.

companies supplying gas and electricity at reasonable prices, and makes the market accessible for all suppliers. One element in particular—unbundling energy supply from its transmission—is aimed at eliminating conflicts of interest, promoting network investments, and preventing discriminatory behavior.

Fostering Solidarity. The EU is determined to strengthen energy solidarity among its Member States, particularly in the wake of the three-week gas supply interruption in early 2009, which held European gas consumers hostage to a dispute between Russia and Ukraine. Thanks to solidarity among the EU Member States and their close neighbors (including Norway, Algeria, and Libya, who increased their gas exports to the EU), and mitigation measures taken by EU companies and Member States, most countries managed the situation successfully.

New measures are vital to ensure that similar energy disruption do not recur; all Member States should be able to withstand a certain degree of supply disruption through better interconnections and additional supply sources, both within and outside the EU.

Energy Emergencies and Crisis Management. To meet its energy security objectives, the EU strives for optimal internal crisis mechanisms and security standards. New legislative proposals will help Member States better prepare to withstand potential future supply disruptions by updating existing EU rules on gas supply and oil stocks.

Gas Supply Directive. More than one-quarter of the EU's energy supply comes from natural gas, half of which is imported. By 2030, up to 70 percent of the EU's gas will come from external sources and some Member States are already totally dependent upon imported gas, a vulnerability highlighted during the January 2009 gas crisis.

New EU rules would introduce significant changes to improve the security of gas supplies in the EU and ensure that all Member States more effectively manage the consequences of potential supply disruptions. A serious supply disruption would be defined by a common indicator, such as the shutdown of a major import pipeline or production facility. A designated authority within each Member State would be responsible for monitoring gas supply developments, assessing risks to supplies, establishing preventive action plans, and setting up emergency procedures.

Gas Coordination Group

Created in 2006, the Gas Coordination Group helps guarantee the security of natural gas supply. Chaired by the European Commission (the EU's executive arm), it is composed of Member State gas authorities, European natural gas organizations, and consumers. The group meets at least quarterly to exchange information and develop measures that reinforce the security of the EU's gas supply.

Close cooperation among Member States during a crisis would be obligatory and a strengthened EU Gas Coordination Group would facilitate shared access to reliable supply information and data.

Natural gas reaches EU consumers throughout the EU through an elaborate mix of transport infrastructure, ranging from transnational pipelines to liquefied natural gas (LNG) vessels and terminals. By improving the framework for investment in new cross-border interconnections, new import corridors, reverse flow capacities, and storage—projects set to benefit from the European Energy Program for Recovery (EEPR)—the EU can encourage diversity of both energy sources and supply routes

Emergency Oil Stocks. Almost 40 percent of the EU's energy comes from oil, and its economy is dependent on a continuous, reliable, and affordable supply. The new legislation updates requirements for Member States' oil stocks and more closely aligns them with those of the International Energy Agency (IEA). By the end of 2012, EU Member States must constantly maintain oil stocks equivalent to at least 90 days of average daily net imports or 61 days of average daily inland consumption, whichever is greater. One-third of these oil stocks must be readily available in the form of refined products.

Since reserves may not be pledged or otherwise encumbered, the availability of emergency oil stocks will improve. The stocks must be owned by the Member States or their stockholding agency, or held through arrangements ensuring the same level of public control. The legislation enables the EU to audit Member States' reserves and also ensures a coordinated and timely contribution by the EU to any action taken by the IEA.



“Experience shows that the release of emergency oil stocks is the easiest and fastest way of making large volumes of additional oil and/or petroleum products available to an undersupplied market, thereby alleviating market shortage and mitigating negative impacts on the economy.”

— European Commission |

Energy Security, Infrastructure, and Geopolitics

“As much as the European Union seeks security of supply through greater predictability and diversity, including from different companies within upstream markets, foreign governments and external suppliers seek security of demand, particularly where large investments in new upstream gas supplies for delivery by pipeline are concerned.”

— European Commission |



Like most developed economies, the EU will continue to rely heavily on traditional fossil fuels—oil, gas, and coal—in the near and medium term. The EU’s drive to improve energy security revolves around measures to guarantee uninterrupted supplies of traditional energy sources while working to mitigate their environmental impact and investing in infrastructure that can help secure the supply of fossil fuels and exploit existing renewable technologies.

Diversifying energy sources and transit routes for energy supplies is fundamental for energy security. Introducing a reliable but flexible supply source depends on a comprehensive and efficient energy infrastructure. Maintaining cooperative and mutually beneficial relations with external energy partners is also a critical part of the energy security equation.

Infrastructure. The EU’s strategy to improve energy security and enhance Member State solidarity relies heavily on physical infrastructure, whether by connecting the remaining isolated energy markets in Europe, linking external supplier and transit countries to the EU via pipelines or LNG infrastructure, or interconnecting national electricity grids in regions that can benefit from planned offshore wind projects. The following infrastructure actions rank high among the EU’s energy security priorities:

- **Baltic Energy Market Interconnection Plan (BEMIP).** Eight EU Member States bordering the Baltic Sea—Denmark, Estonia, Finland, Germany, Lithuania, Latvia, Sweden, and Poland—are working with the European Commission to create an integrated regional energy market. BEMIP

projects, some of which receive EEPR funding, are designed to remove barriers and provide the necessary infrastructure for an integrated regional energy market, and to enhance the region’s security of gas supply through greater diversification of routes and sources. Norway, a non-EU country, is a BEMIP observer.

- **Southern Gas Corridor.** One of the EU’s energy priorities is the development of a southern energy corridor to facilitate the supply of gas to the EU from Caspian and Middle Eastern sources. The EU and its Member States are working closely with the countries concerned, including Azerbaijan, Turkmenistan, Iraq, and the Mashreq countries, to secure firm commitments for the supply of gas and the construction of the pipelines necessary to develop this modern-day “Silk Road.”

- **Liquefied Natural Gas (LNG).** LNG provides flexibility, liquidity, and diversity to EU gas markets. The EU is working on an LNG Action Plan to ensure that sufficient capacity is available either directly or through “solidarity” arrangements among the Member States. Access to LNG is a valuable and flexible option for countries overwhelmingly dependent on a single gas supplier.

- **Mediterranean Energy Ring.** To provide electricity and gas interconnections for the countries that ring the Mediterranean Sea, and establish the infrastructure necessary to leverage the region’s vast solar and wind energy potential, EU and Mediterranean energy ministers have adopted a blueprint that outlines priority projects in the region, including the Mediterranean Solar Plan.

- **North-South Gas and Electricity Interconnections with Central and Southeast Europe.** Building on the existing energy community, the EU is developing North-South gas and electricity interconnections with Central and Southeast Europe. The European Commission is working with national energy regulators and transmission system operators to prepare a 10-year Network Development Plan that will include a common gas transmission operator, an Energy Community Gas Ring, priority interconnections identified by the EU, and a Pan-European Oil Pipeline.

Energy Community Treaty: Linking the EU with Southeast Europe and Beyond

The EU and seven partners in Southeast Europe are creating an integrated market for electricity and gas, and potentially oil, across 34 European countries. Signatories to the Energy Community Treaty, in force since 2006, include the 27 EU Member States plus Albania, Bosnia & Herzegovina, Croatia, the former Yugoslav Republic of Macedonia, Kosovo, Montenegro, and Serbia. Georgia, Norway, the Republic of Moldova, Turkey, and Ukraine are observers, with the latter three poised to become full participants pending the successful outcome of negotiations.

The Energy Community Treaty helps strengthen energy security and diversification and creates the world’s largest internal market of its kind, creating a single regulatory space for energy by extending EU rules on energy, the environment, renewable energy, and competition to the region.

■ **North Sea Offshore Grid.** The EU is developing a blueprint for interconnecting national electricity grids in Northwest Europe and linking them into planned offshore wind projects. Together with the Baltic Interconnection Plan and the Mediterranean Ring, this constitutes one of the building blocks of a future European supergrid.

External Energy Relations. To guarantee secure, competitive, and sustainable energy at a time of import vulnerability, potential energy crises, and price and supply uncertainty, the EU is deepening its partnerships with key energy suppliers, transit countries, and consumer nations. The EU's evolving external energy policy highlights "energy interdependence"—a balance between the security of supply and the security of demand—and proceeds through regular energy dialogues, and bilateral and multilateral relations with key energy partners throughout the world.

EU-Russia. For decades, Russia has been a reliable energy supplier to the European Union and the EU continues to be the principal market for Russian energy exports. The EU-Russia Energy Dialogue, initiated in 2000, aims to improve the investment opportunities for foreigners in Russia's energy sector. It should help upgrade and expand energy production and transportation infrastructure; mitigate their environmental impact; encourage competition within energy markets; facilitate the market penetration of more environmentally friendly technologies and energy resources; and promote energy efficiency and energy savings.

Caucasus and Central Asia—INOGATE Program. The EU-funded Interstate Oil and Gas Transport to Europe (INOGATE) program supports international cooperation between the EU, the coastal states of the Black and Caspian Seas, and their neighboring countries. INOGATE has expanded its scope to cover electricity, renewable energy, and energy efficiency, but its focus on the oil and gas sector continues. It promotes

regional integration of the pipeline systems, and facilitates the transport of oil and gas from former Soviet republics to European markets.

EU-Ukraine. Ukraine is a key transit country for energy resources from Russia to the EU, particularly natural gas. Guaranteeing the overall performance, safety, and security of the Ukrainian natural gas transit network is a major challenge. The EU-Ukraine Memorandum of Understanding enables the establishment of roadmaps for key energy sectors: nuclear safety, the integration of electricity and gas markets, enhancing the security of supply and transit of hydrocarbons, energy efficiency and renewables, and improving effectiveness, safety, and environmental standards in the coal sector.

EU-China. China is a major energy consumer and its heavy reliance on coal requires international support to move toward a low-carbon economy. The EU-China Energy Dialogue includes cooperation on clean coal technologies, renewable energy sources, nuclear energy and energy efficiency. In 2005, the EU and China signed a Memorandum of Understanding to test a coal-fired power plant equipped to capture and store carbon in China by 2020.

EU-OPEC. The EU-OPEC Energy Dialogue provides a forum for joint assessment of the factors affecting prices, necessary investment in both producer and consumer countries, and the impact of technological developments. Now in its fifth year, the dialogue facilitates constructive exchanges between the parties, particularly during turbulent times, and helps restore order and stability to the markets.

EU-U.S. Strategic Energy Cooperation, inaugurated at the 2006 EU-U.S. summit, reinforces transatlantic cooperation in areas of common concern, including energy efficiency, security of supply, market-based energy policies, and alternative energy development. Accomplishments include the renewal of the EU-U.S. Energy Star agreement for the promotion of energy efficient office equipment.

Nabucco Pipeline: Key EU priority for the long-term supply of natural gas

Following six months of intense negotiations, in July 2009 four EU Member States (Bulgaria, Romania, Hungary, and Austria) and Turkey signed the Nabucco Intergovernmental Agreement, the first agreement to outline the terms and conditions under which gas can be exported from the Caspian Sea and the Middle East to the EU and Turkey.

Not only will the Nabucco pipeline (expected to be completed around 2015) have the potential to supply between 5 and 10 percent of European gas demand, it will also provide tangible energy security benefits to countries that are currently 100 percent reliant on a single external supplier.

"The need for investment, both public and private, in energy infrastructure over the coming years is enormous, in the range of €2 trillion for the EU alone.... the EU has identified a number of strategic "cluster" projects, such as the Baltic Energy Market Interconnection Plan, the Mediterranean Energy ring, and the North Sea Offshore Wind Network....projects [that] are essential to improve security of supply and sustainability in the EU."

— EU Energy Commissioner
Andris Piebalgs



Laying the Groundwork for the Low-Carbon Economy

Technology and Innovation Support Secure, Sustainable Energy

“In maximizing the EU’s natural resources, the role of technology is crucial. The need for renewable energy will only grow as our greenhouse gas objectives increase, so it is vital to catalyze rapid advances in the competitiveness, efficiency, and sustainability of renewable energy production. Indeed, this represents a huge economic opportunity for the EU as much as an energy security and sustainability priority.”

—European Commission |

Technology is crucial to achieving the EU’s “20 20 20 by 2020” targets and maximizing the EU’s own natural resources and energy security in a cost-effective and environmentally-sustainable manner. The EU’s Strategic Energy Technology Plan (SET Plan) is designed to accelerate the development and deployment of cost-effective, low-carbon technologies.

The SET Plan brings researchers and industry together and addresses the increased need for both financial and human resources. The European Commission has committed an annual €1 billion investment to energy technology research and innovation from 2007 to 2013.

Short-term goals include increasing research to reduce the costs, improve the performance, and encourage the commercialization of existing technologies. These objectives apply to second-generation biofuels; carbon capture, transport, and storage; the integration of renewable energy sources into the electricity network; and enhanced energy efficiency in construction, transport, and industry.

Longer-term objectives support the development of a new generation of competitive low-carbon technologies for renewable energies; energy storage; sustainable nuclear fission energy; fusion energy; and the development of trans-European energy networks.

The EU’s SET Plan takes full advantage of the large-

scale research opportunities offered by the European Research Area and the internal market, and the EU has launched six European industrial initiatives focusing on sectors best managed at the EU level.

Renewable Energy. Indigenous production contributes to 46 percent of Europe’s energy consumption. The greatest potential for homegrown energy in the EU lies with renewable energy, which currently hovers at 9 percent of the EU’s energy consumption mix.

The EU is a world leader in renewable energy. In certain locations and under certain conditions, onshore wind, hydro, biomass, and solar thermal are already economically viable. Other renewable energy sources will depend on increased demand to improve economies of scale and lower costs.

In particular, photovoltaic, offshore wind, solar thermal electricity, and second-generation biofuels require more financial support in the short term, but are key to achieving the EU’s 2020 target. Proactive EU policies on renewable energy have launched the transition to a low-carbon economy, while providing opportunity for industry.

According to a new European Commission study, reaching the 2020 renewable energy targets is expected to support around 2.8 million jobs and generate a total added value of about 1.1 percent GDP. The report notes that the energy security and climate



European Industrial Initiatives

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| European Wind Initiative | Double the power generation capacity of the largest wind turbines, with off-shore wind as the lead application. The focus is on large turbines and large systems validation and demonstration. |
| Solar Europe Initiative | Demonstrate the commercial readiness of large-scale Photovoltaic and Concentrated Solar Power. |
| Bio-energy Europe Initiative | Ensure the sustainable production of “second generation biofuels” and make them competitive alternatives to fossil fuels. |
| European CO₂ Capture, Transport, and Storage Initiative | Prove the viability of zero-emission fossil fuel power plants at industrial scale, while focusing on the whole system requirements, including efficiency, safety, and public acceptance. Make the commercialization of CCS technology possible through industrial-scale demonstration, including whole system efficiency and advanced research. |
| Sustainable Nuclear Fission Initiative | Maintain competitiveness in Generation-IV fission technologies, along with long-term waste management solutions. |
| European Electricity Grid Initiative | Develop a single European electricity smart grid (and storage) that integrates renewable and decentralized energy sources. |

change benefits of renewables go hand-in-hand with economic benefits. However, reaping such benefits requires an astute mix of legislation, innovation, and determination.

The EU has set mandatory national renewable energy targets for each Member State to achieve the 20 percent by 2020 goal. Each country must design long-term plans that reflect their targets for the share of renewable energy consumed by transport, electricity, and heating and cooling. National targets, ranging from 10 to 49 percent, take into account the current level of development of renewable sources in the country.

Significant advances have already been made in the competitiveness, efficiency, and sustainability of renewable energy production, particularly in the context of the SET Plan and the six European industrial initiatives (see table, left). These initiatives are being developed in close cooperation with existing Technology Platforms and European industry.

European Technology Platforms bring together industry, research organizations, academia, and other stakeholders willing to contribute to the realization of a common vision for research, development, and innovation in key areas of science and technology.

European consumers increasingly favor doing what it takes to convert to more renewable energy sources. A July 2009 Eurobarometer public opinion poll found that more than two-thirds of Europeans consider climate change a very serious problem—one of the top three facing the world today. However, they also feel that climate change can be stopped and consider themselves well-informed on the issue as well as its consequences, causes, and means for combating it.



Energy Efficiency. A new Energy Efficiency Package proposed in 2008 aims to accelerate progress toward the 20 percent energy efficiency target. It covers updated EU legislation on the energy performance of buildings; energy labeling requirements applied to additional products; a labeling scheme to expose the fuel efficiency of tires; guidelines clarifying how to calculate the amount of electricity from co-generation; and emphasis on the savings from co-generation—generating heat and electricity simultaneously.

Energy use in residential and commercial buildings is responsible for about 40 percent of the EU's total energy consumption and CO₂ emissions. Significant energy savings—a 30 percent reduction in energy use in the building sector—are feasible by 2020, equivalent to a reduction of 11 percent of the EU's final energy use. The EU has laid out the minimum requirements for the energy performance of buildings, for issuing energy performance certificates, and for regular inspections of boilers and air conditioning systems.

Carbon Capture and Storage. Coal remains an essential component of Europe's domestic energy supply. Widely available and easily stored, the use of coal and coal-based electricity generation continues to grow globally. However, coal's CO₂ emissions are fundamentally incompatible with combating climate change. Continued widespread use will depend on whether highly efficient coal plants become the norm and carbon capture and storage (CCS) becomes widely available and affordable.

CCS is considered to be one of the key technologies for cutting CO₂ emissions from coal-fired power plants: carbon emissions are captured before entering the atmosphere and stored underground. The EU supports the development of CCS and dedicates a portion of its current multi-year research and development program (FP7) funding to researching CCS as well as other clean coal projects. The EU's intention is to stimulate the construction and operation of a set of CCS demonstration projects by 2015, and realize commercially feasible zero-emission power generation by 2020. EEPR funding is available for this purpose.



“Doing the same with less energy is arguably the best way to reduce our carbon footprint and to reduce dependency on foreign oil and gas.”

— European Commission President
José Manuel Barroso

Intelligent Energy Europe (IEE)

Technology alone is not the answer to the EU's energy future. The EU's IEE scheme seeks to make Europe more competitive and innovative, while helping to deliver on its 2020 energy objectives. The program fosters energy efficiency and the rational use of energy resources and promotes new, renewable, and diversified energy sources.

The EU's support (€724 million 2007-2013) under IEE funds up to 75 percent of the cost of projects selected for their creative approaches to achieving the 2020 targets. Projects are expected to involve at least three partners from three European countries and have a significant impact on the market in areas such as knowledge transfer; improved understanding among different decision-making organizations; and building confidence and understanding in the market.

Revisiting Nuclear Energy

On the Web

- **European Commission-Energy**
<http://ec.europa.eu/energy>
- **Climate Change: Energy for a Changing World**
<http://ec.europa.eu/climateaction>
- **Press Pack: Energy and Climate Change**
http://europa.eu/press_room/press_packs/climate
- **Energy Research**
<http://ec.europa.eu/research/energy>

The partial core meltdown at Three Mile Island in 1979 and the 1986 Chernobyl nuclear reactor accident both remind us that the scale of a nuclear energy disaster is exponentially larger than a comparable fossil fuel event. The issue of storing spent nuclear fuel far into the future is fraught with environmental, safety, and security concerns.

However, nuclear energy plays an important role in the transition to a low-carbon economy and reduces external supply dependency. Nuclear energy produces clean, secure, and affordable power. Individual nations must carefully consider the trade-offs between nuclear and more conventional energy sources in the medium term until renewable energy becomes more prevalent.

Each EU Member State decides whether or not to pursue the nuclear power option. Nuclear power stations currently produce around one-third of the electricity and 13 percent of the energy consumed in the EU. The EU has the largest number of operational commercial nuclear power plants in the world—approximately 150—and some Member States are considering extending the life of existing nuclear installations or investing in new ones to meet growing energy demand, improve the security of supply, and tackle climate change.

Nuclear Safety. The EU mandates a common approach to nuclear safety among its member countries through binding rules guaranteeing the highest possible levels of safety at nuclear plants. EU rules enhance the role and independence of national regulatory authorities, and assign license holders the primary responsibility for nuclear safety. Member States must encourage a high level of transparency in regulatory actions and guarantee regular independent safety assessments.

The EU is the first major regional nuclear actor to provide binding legal force to the main international nuclear safety standards—the Safety Fundamentals established by the International Atomic Energy Agency and the obligations resulting from the Convention on Nuclear Safety.

Nuclear Waste Management. According to a July 2008 Eurobarometer public opinion poll, nearly two-thirds of European citizens recognize the key benefits of nuclear energy, notably a diversified energy supply, decreased dependence on oil, and reduced greenhouse gas emissions.

The survey reported that 40 percent of those opposed to nuclear energy would change their minds if there were a safe, permanent solution for the management of radioactive waste.

High-level radioactive waste and spent fuel require long-term isolation and containment, and the accepted international standard is geological disposal—considered the safest and most sustainable option for long-term management. Three EU Member States—Finland, Sweden, and France—are likely to have operational disposal facilities by 2025.

Nuclear Research. The EU launched the Sustainable Nuclear Energy Technology Platform (SNETP) in September 2007 to promote the research, development, and demonstration of nuclear fission technologies. SNETP is designed to keep the EU competitive in the nuclear fission technology arena; provide long-term waste management solutions; demonstrate new fission reactors with increased sustainability; and expand nuclear fission applications beyond electricity.

Transatlantic Energy Research Cooperation and Cleaner Vehicles

The European Commission is working closely with the U.S. Department of Energy (DoE) under the umbrella of existing agreements to define concrete plans to reinforce EU-US cooperation on energy research.

The European Commission and DoE have developed a joint rolling action plan on solar power, bio-energy, carbon capture and storage, fuel cells, and hydrogen. The agreement includes cross-cutting issues such as a coordinated approach toward third countries, and explores expanding cooperation to other areas.



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