

# CLIMATE CHANGE MITIGATION MEASURES IN THE EUROPEAN UNION

INTERNATIONAL BRIEF 3

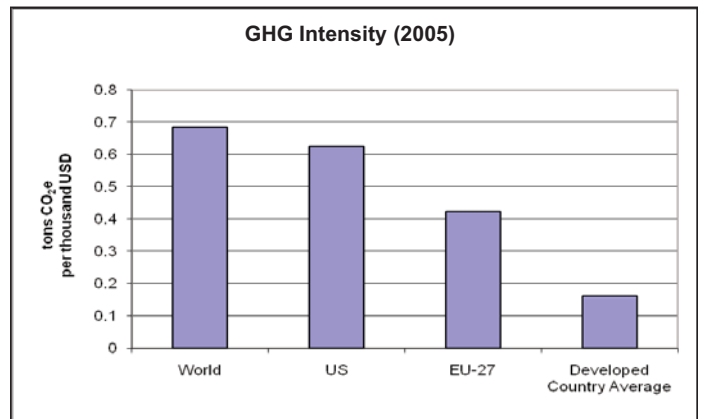
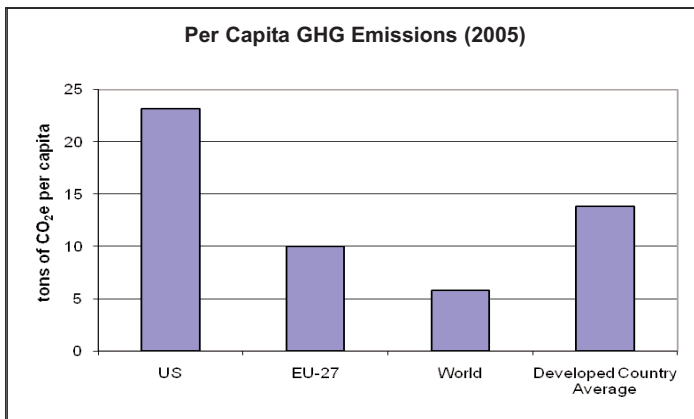
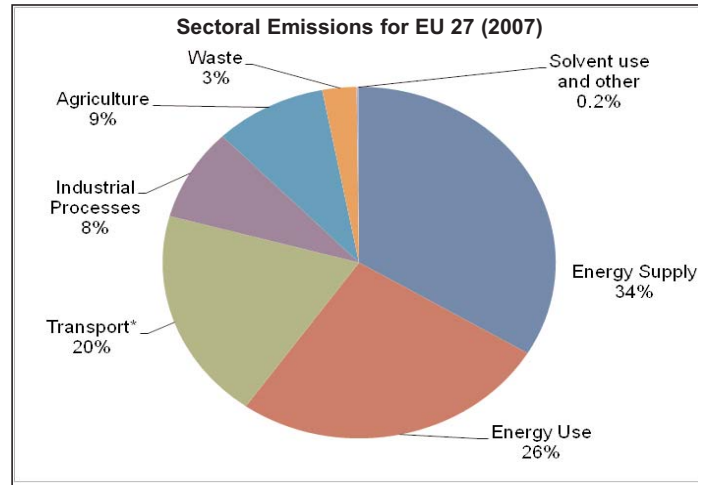
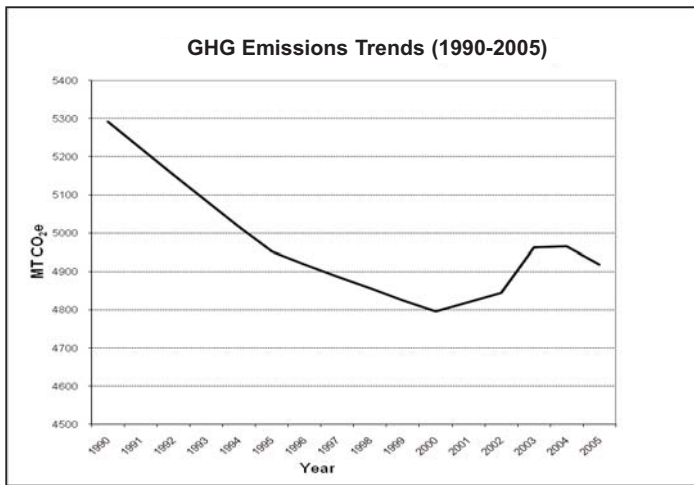
DECEMBER 2009

## EMISSIONS OVERVIEW

The European Union (EU)<sup>1</sup> is the world's third largest greenhouse gas (GHG) emitter after the United States and China, accounting for 13 percent of global emissions in 2005.<sup>2</sup> Since 1990, EU emissions have declined about 10.7 percent as a result of structural changes, such as Germany's reunification and the substitution of natural gas for coal in the United Kingdom, and new policies at both the EU and member state level.<sup>3</sup> Reductions have occurred across most sectors of the EU economy, although in the transportation sector, emissions have increased significantly.

The EU's emissions *intensity* (GHG emissions per unit of GDP) is about a third lower than the United States' and the second lowest among industrialized countries – only Japan's is lower. Intensity has declined 31 percent since 1990. *Per capita* emissions in the EU are about a third lower than the developed country average and about half those of the United States.

The EU's current fuel mix is predominantly oil (37 percent) and natural gas (24 percent), followed by solid fuels including coal (18 percent), nuclear power (14 percent), and renewable energy (7 percent).<sup>4</sup>



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## POLICY FRAMEWORK

### Status Under UNFCCC and Kyoto Protocol

The European Community and the EU member states are parties to the UN Framework Convention and the Kyoto Protocol.<sup>5</sup> The 15 EU member states at the time of the Protocol's negotiation agreed collectively to reduce emissions 8 percent below 1990 levels by 2008-2012. The Kyoto Protocol allows countries belonging to a "regional integration organization" such as the European Community (which is the legal representative of the EU) to fulfill their commitments jointly. In 1998, the EU-15 agreed on an internal reallocation of their collective Kyoto Protocol obligation allowing emissions to grow in some countries and requiring steep cuts in others. Ten of the twelve member states that acceded to the EU at a later stage have their own targets under the Kyoto Protocol, which must be met separately from the collective EU-15 target.

Current EU-15 emission levels are 6.2 percent below 1990 levels. Member states have had mixed results in achieving their individual targets. While some member states like the United Kingdom, France and Greece have reduced domestic emissions below their Kyoto targets, others like Italy and Spain have underperformed. Some member states like Portugal and the Netherlands will need to undertake additional policies and measures or use Kyoto credits to meet their targets.<sup>6</sup>

The EU-15 projects that its emissions will reduce by 8.5 percent below 1990 levels by 2012, going beyond the Kyoto Protocol target of -8 percent. This projection includes a 6.8 percent reduction from existing policies and measures and a 1.6 percent reduction from additional planned policies and measures. Further reductions could be achieved through the purchase of EU allowances and Kyoto credits by operators, and through the use of Kyoto crediting mechanisms and carbon sinks. If all these reductions are achieved, it is projected that the EU-15 would overachieve their Kyoto target by 5.1 percent (i.e. reduce its emissions by 13.1 percent below 1990 levels by 2012).<sup>7</sup>

### Post-2012 Domestic Policy Framework—Climate and Energy Package

The European Union has set a long-term objective of limiting average global temperature increase to 2 degrees

Celsius. In line with that objective, in March 2007 European heads of state and government agreed on binding targets to reduce greenhouse gas emissions and to increase the share of renewable energy sources in the EU's energy mix. The implementing Climate and Energy package adopted by the Parliament and Council of the European Union in April 2009<sup>8</sup> includes the following elements:

- 1) **Emissions Target.** A binding absolute emissions reduction target, including a "firm independent commitment" by all the 27 EU member states to reduce their emissions unilaterally 20 percent below 1990 levels by 2020. The package also establishes a more ambitious reduction target of 30 percent below 1990 levels by 2020 provided there is a global agreement i.e., developed countries commit to "comparable emission reductions" and advanced developing countries agree to "contributing adequately". The unilateral 20 percent target will be met by strengthening the EU Emissions Trading System (ETS) to reduce emissions 21 percent below 2005 levels in covered sectors; and reducing emissions 10 percent in all other non-ETS sectors, including waste, transportation and buildings, through EU-wide and member state policies. To allow flexibility for member states to meet the 10 percent target in the non-ETS sectors, member states, along with their national policies, can make limited use of CDM credits, bank excess reductions, and trade among member states.
- 2) **Renewables Target.** A binding target of 20 percent renewable energy sources in the EU's final consumption of energy by 2020 which includes a binding minimum 10 percent share of biofuels and other renewable transportation fuels in each member state's transport energy consumption by 2020.
- 3) **Energy-Efficiency Goal.** A non-binding energy efficiency goal of reducing primary energy consumption by 20 percent by 2020 compared to projections.
- 4) **Carbon Capture and Storage Goal.** A commitment to invest in the construction of up to 12 large-scale power plants using carbon capture and storage (CCS) technology.

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5) *Vehicle Emission Performance Standard*. A stringent emission performance standard of 120g CO<sub>2</sub>/km (approximately 46 miles per gallon (mpg)) for all new cars by 2015.

The Council has also called for developed countries to reduce their emissions 80 percent to 95 percent below 1990 levels by 2050.<sup>9</sup>

## POLICIES AND MEASURES

### Emissions Trading System (ETS)

In 2005, the EU launched a mandatory Emissions Trading System (ETS) to limit carbon dioxide (CO<sub>2</sub>) emissions across Europe. The ETS represents the world's most far-reaching GHG reduction policy and is the centerpiece of European climate change policy. The ETS operates in phases: the initial “warm-up” phase ran from 2005 to 2007; the current and second phase coincides with the Kyoto commitment period (2008-2012); a third phase will run from 2013 to 2020; and subsequent phases for the system to continue beyond 2020.

In the first two phases, the ETS covered CO<sub>2</sub> emissions from power plants and five major industrial sectors (including oil, iron and steel, cement, glass, and pulp and paper), which together produce nearly half of the EU's CO<sub>2</sub> emissions. Emission allowances were allocated to roughly 11,000 facilities. Overall ETS policy for these two phases was set at the EU level, while target levels and allocation rules within the legal limits of the ETS Directive have been left to individual member states, subject to approval by the European Commission. In 2008, 3 billion tons of CO<sub>2</sub> were traded at a market value of US\$92 billion in the EU-ETS (up from 2 billion tons of CO<sub>2</sub> at a market value of about US\$50 billion in 2007).<sup>10</sup>

Allowance prices rose to a high of €30 a ton but in May 2006 fell to less than €10 a ton when emission reporting by member states revealed that allowances in the system exceeded emissions. This “over-allocation” has been largely attributed to two factors: inadequate emissions baseline data for individual facilities, and member states' reluctance to impose stringent targets. Learning from this experience of over-allocation in phase I, and with better emissions data reported under the ETS since its launch,

the Commission approved a more stringent cap of 6.8 percent below 2005 levels.

In the third phase (2013-2020), to enable the EU to meet its unilateral 2020 target, the EU Council reviewed and strengthened the ETS establishing an overall cap of 21 percent from 2005 levels by 2020. This will allow the EU to meet its unilateral target of reducing emissions by 20 percent relative to 1990 levels by 2020. The coverage of the ETS has been broadened to include CO<sub>2</sub> emissions from the petrochemicals, ammonia, aviation and aluminum sectors; nitrous oxide emissions from acid production; and PFC emissions from the aluminum sector. Unlike phases I and II where the cap was determined at the member state level, the cap in phase III is set at the EU level. The EU-wide cap decreases by -1.74 percent each year, starting in 2013, resulting in the overall cap of 21 percent below 2005 verified emissions by 2020. The linear decrease will continue beyond 2020 until new legislation is enacted.

*Allocation*—In addition, there are EU-wide harmonized allocation rules; full auctioning to sectors that can pass on their costs, e.g. the power sector and partial free allocation to industry based on EU-wide harmonized benchmarks. This translates to more than 50 percent auctioning of allowances (compared to only about 4 percent in phase II) with a move towards 100 percent auctioning.

In the power sector, the EU is moving towards auctioning 100 percent of allowances. As a transitional measure, some member states (mainly eastern-European) have the option to continue free allocation for existing power generators. If these countries choose this option, the auctioning rate in 2013 must be at least 30 percent, progressively increasing to 100 percent no later than 2020. Member states that decide to exercise this option must invest in upgrading their infrastructure and in clean technologies. All new power plants under this option must buy their allowances. In all other member states, 100 percent of the allowances in the power sector will be auctioned.

For the industrial sectors under ETS, the auctioning rate is set at 20 percent in 2013, increasing to 70 percent in 2020, with a view to reaching 100 percent in 2027. Industrial sectors that are exposed to carbon leakage will

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receive allowances for free covering 100 percent of historic emissions adjusted according to a top-tier benchmark system (corresponding to the top 10 percent of the most efficient). The Commission will determine which sectors are exposed to carbon leakage by June 2010. Additionally, 300 million allowances (some 6-12 billion at a CO<sub>2</sub> price of 20 or 40 respectively) will be set aside for funding of up to twelve CCS demonstration projects and innovative renewable energy projects.

**Linking**—To meet the 20 percent reduction target, facilities can use a total of 1.7 to 1.9 billion tons of international credits such as from the Clean Development Mechanism (CDM) and Joint Implementation (JI), the Kyoto Protocol's two crediting mechanisms, for compliance. If there is an international agreement where the EU agrees to a 30 percent reduction target, the amount of CDM and JI credits that can be used will increase to 2.5 billion tons, and only credits that come from countries that have ratified the agreement will be accepted.

The ETS Directive allows for linking the ETS with other cap and trade systems through an international agreement. The new Directive however goes a step further in that it foresees different types of linking arrangements, e.g. via a treaty, an international agreement as foreseen under EU law, and through a reciprocal commitment applied through domestic systems. The latter provision is innovative both internally and internationally as essentially systems could be linked through administrative decisions. Linking with other GHG trading systems established in countries that are not party to Kyoto is also possible, as long as that system is part of a mandatory program that caps absolute emissions.

**Aviation emissions**—In mid-2008, the EU adopted a Directive to include airline emissions in the EU-ETS in 2012. All airlines, landing or taking off in the EU, will be included in the cap-and-trade system in 2012 except where a third country implements equivalent measures. The cap on emissions will be 3 percent below average emissions levels in 2004-2006 and 5 percent below from 2013 onwards. 15 percent of allowances will be auctioned, and all auction revenues should be used towards tackling climate change in the EU or other countries.

**Mandatory GHG Reporting**—As part of the trading system, mandatory EU-wide monitoring and reporting guidelines are in place, including third party verification for all self-reported emissions.

## Non-ETS Sectors

**Renewable Energy**—As part of the Climate and Energy package, the EU set a binding target of 20 percent renewable energy sources in the EU's final consumption of energy by 2020. This includes a 10 percent minimum target for biofuels and other renewable transportation fuels. National binding targets for individual member states have been agreed upon for the first time, ranging from 10 percent for Malta to 49 percent for Sweden. The Directive obliges member states to submit periodic national action plans (the first by 2010) to ensure that the European Commission can track progress. To reach their national target, member states can undertake support schemes, interlinking of support schemes, and cooperative initiatives with other member states and third countries. A member state can sell or trade excess renewable energy credits with another member state only if the selling member state has reached its own interim target.

To address concerns over the potential impact of increased biofuel production on food supply and prices, the Council has set sustainability criteria that are related to biodiversity, protection of species and ecosystems, and GHG emissions savings.

**Energy Efficiency**—In 2008, as part of its Climate and Energy package, the EU adopted a non-binding energy efficiency improvement commitment of 20 percent from projected 2020 levels. This is being implemented through the Directive on Energy End-use Efficiency and Energy Services that requires member states to draw up national action plans to achieve 1 percent annual energy savings from 2008 through 2017. The plans cover retail, supply and distribution of electricity, natural gas, urban heating, and other energy products including transport fuels. National action plans must be submitted to the European Commission for approval and will be reviewed every three years. Currently, the sum of member state action plans will only achieve 9 percent by 2017. New action plans will be needed to reach the 2020 non-binding commitment.

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**Carbon Capture and Storage**—The Climate and Energy package establishes a regulatory framework for member states that decide to use CCS technologies. The framework helps to remove barriers for safer deployment of CCS technologies including assessment of storage sites, procedures for authorization, and closure of CCS sites. It leaves the decision up to each operator to use CCS technology which will be determined by the price of carbon and cost of technology. Member states must ensure that all new combustion plants with an electrical output of greater than 300 MW assess whether “suitable storage sites” are available, transport facilities are technically and economically feasible and the plant can be retrofitted. If these conditions are met then space must be kept aside at the plant to install CCS technology.

The package also commits the EU to invest in the construction of 12 large-scale CCS demonstration plants. 300 million allowances of the phase III of the ETS are set aside for the construction of CCS demonstration plants and other innovation renewable technologies.

**Energy Taxes**—The EU Community Tax Framework establishes a system of minimum rates of taxation for energy products used for motor and heating fuels, and for electricity, including a tax on gasoline of \$2.30/gallon. The scheme also authorizes member states to grant tax advantages to businesses that take specific measures to reduce their emissions, and provides exemptions for biofuels, renewable energy, and energy used for transporting goods by rail or other modes of environmentally-friendly transport.

## **Buildings and Residential**

**Building Standard**—The Energy Performance of Buildings Directive requires member states to adopt energy performance standards and introduces energy labeling of buildings across the EU. The Directive sets minimum energy efficiency requirements for new commercial and residential buildings with floor area of over 1,000 m<sup>2</sup>, including those undergoing renovation. The Directive also requires builders to evaluate opportunities to install renewable energy systems in buildings above a certain size. The Directive is currently being reviewed.

## **Transportation**

**Vehicle Emission Performance Standard**—After voluntary agreements with automakers to reduce CO<sub>2</sub> emissions from new passenger cars proved insufficient, the European Parliament and Council adopted a Regulation in April 2009 that requires 65 percent of all new passenger cars sold in 2012 to emit no more than 120g CO<sub>2</sub>/km or 46 mpg (current levels are about 160g CO<sub>2</sub>/km or 34 mpg). Car manufacturers can use an integrated approach to meet this target – achieve an emissions limit of 130g CO<sub>2</sub>/km (or 42 mpg) and an additional reduction of 10g CO<sub>2</sub>/km from other measures such as air conditioning, tire efficiency and biofuels. By 2015 all new cars must meet this standard. The long-term goal for the fleet average of new cars is 95g CO<sub>2</sub>/km (or 58 mpg) by 2020 with a review in 2013. The Regulation specifies penalties for non-compliance.

**Fuel Quality**—The revised Fuel Quality Directive, adopted in April 2009, requires fuel suppliers to report life cycle emissions. Suppliers must begin to reduce emissions from the entire life cycle production chain from 2011 onwards to achieve at least 6 percent by 2020. At a review in 2012, the Commission will decide on increasing the target to a more ambitious 10 percent target through the use of CCS, electric cars, and CDM credits.

## **References**

- <sup>1</sup> This report refers only to EU-27 unless otherwise stated. EU-27 includes the EU-15; Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and the United Kingdom; plus the twelve newer countries: Bulgaria, Czech Republic, Estonia, Latvia, Lithuania, Slovakia, Slovenia, Hungary, Poland, Romania, Malta and Cyprus.
- <sup>2</sup> Data from IEA, 2007. “CO<sub>2</sub> Emissions from Fuel Combustion 1971-2005”; IEA, 2007. “World Energy Outlook 2007: China and India Insights” and USEPA, 2006. “Global Anthropogenic Non-CO<sub>2</sub> Greenhouse Gas Emissions: 1990-2020”. All emission figures are for total greenhouse gas emissions as estimated by the International Energy Agency (CO<sub>2</sub> from fossil fuels), the US EPA (other greenhouse gases) and the World Energy outlook (projections), except for GHG emissions by sector which is from the European Environment Agency.

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<sup>3</sup> As of 2009. European Environment Agency, 2009. “Greenhouse gas emission trends and projections in Europe 2009”. Available at [http://www.eea.europa.eu/publications/eea\\_report\\_2009\\_9](http://www.eea.europa.eu/publications/eea_report_2009_9)

<sup>4</sup> Commission of the European Communities. 2008. “Europe’s current and future energy position. Demand – resources – investments”. Available at: [http://ec.europa.eu/energy/strategies/2008/doc/2008\\_11\\_ser2/strategic\\_energy\\_review\\_wd\\_future\\_position2.pdf](http://ec.europa.eu/energy/strategies/2008/doc/2008_11_ser2/strategic_energy_review_wd_future_position2.pdf)

<sup>5</sup> The field of environment is a so-called “shared competence” where both the EU or member states can have legal authority, depending on the exact field of action. In such cases, the EU decides on a case by case basis on its representation in international negotiations. For climate change it has chosen that both member states and the EU participate, however with the EU formally represented by the (six-monthly) rotating EU presidency. The European Commission as a representative of the EU plays an important co-ordination role and for specific issues takes part in the negotiations.

<sup>6</sup> European Environment Agency, 2009. “Greenhouse gas emission trends and projections in Europe 2009”. Available at [http://www.eea.europa.eu/publications/eea\\_report\\_2009\\_9](http://www.eea.europa.eu/publications/eea_report_2009_9)

<sup>7</sup> European Environment Agency, 2009. “Greenhouse gas emission trends and projections in Europe 2009”. Available at [http://www.eea.europa.eu/publications/eea\\_report\\_2009\\_9](http://www.eea.europa.eu/publications/eea_report_2009_9)

<sup>8</sup> For a press statement on the Council’s adoption of the ‘climate-energy legislative package’ as well as links to all of its elements, visit

[http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/misc/107136.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/misc/107136.pdf)

<sup>9</sup> Council of the European Union. 2009. “Council Conclusions on EU Position on the Copenhagen Climate Conference (7-18 December 2009).” Available at:

[http://www.consilium.europa.eu/uedocs/cms\\_data/docs/pressdata/en/envir/110634.pdf](http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/envir/110634.pdf)

<sup>10</sup> Capoor, K. and P. Ambrosi, 2009. “State and Trends of the Carbon Market 2009”.

[http://siteresources.worldbank.org/EXTCARBONFINANCE/Resources/State\\_and\\_Trends\\_of\\_the\\_Carbon\\_Market\\_2009-FINALb.pdf](http://siteresources.worldbank.org/EXTCARBONFINANCE/Resources/State_and_Trends_of_the_Carbon_Market_2009-FINALb.pdf)

<sup>11</sup> For individual national targets see:

[http://ec.europa.eu/energy/renewables/targets\\_en.htm](http://ec.europa.eu/energy/renewables/targets_en.htm)

<sup>12</sup> The minimum tax rates for motor fuels range from €125/1000 liters (\$0.70/gallon) of liquid petroleum gas (LPG) to €421/1000 liters (\$2.30/gallon) of gasoline. Heating fuel minimum rates vary from zero (for LPG) to €21/1000 liters for diesel (\$0.30/gallon). Electricity taxation rates are at €0.5/MWh to €1/MWh (\$0.70/MWh to \$1.50/MWh) for business and non-business use respectively.

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