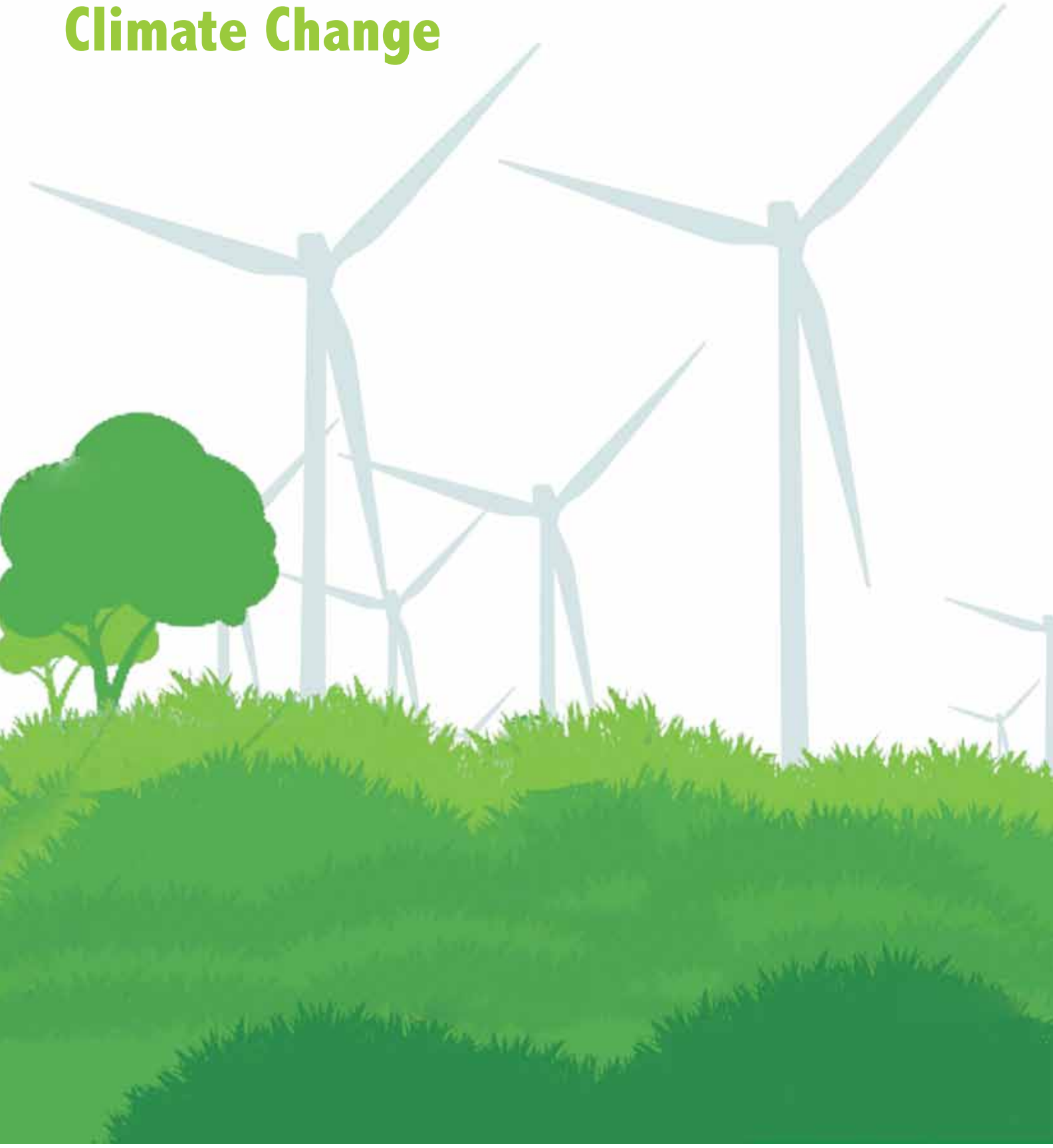
Working with India to Tackle Climate Change



EU action against climate change in Europe and India

EUROPEAN UNION

Information about the European Union is available on the Internet. It can be accessed through the Europa server (www.europa.eu) and the website of the Delegation of the European Union to India (http://eeas.europa.eu/delegations/india/index_en.htm).

Foreword

Climate change is one of the greatest challenges of our time. The consequences of the decisions we take or fail to take will be mainly borne by future generations. Reining in climate change carries a cost, but doing nothing will be far more expensive in the long run and will even jeopardise the very presence of mankind in many parts of our planet.

Therefore, combating climate change is a top priority for the European Union. Europe is working hard to cut its greenhouse gas emissions substantially while encouraging other nations and regions to do likewise. The EU has also developed a strategy for adapting to the impacts of climate change that can no longer be prevented.

The EU's climate change goals are closely linked to our plans for catalyzing economic growth through new, green initiatives. Investing in the green technologies that cut emissions will also create jobs and boost the economy. Renewable energy, energy efficiency including eco-efficient industries and products, water management, re-use of resources and recycling of waste and low carbon growth paths are now an intrinsic part of our economic planning.

For all these reasons, I am very happy to introduce this brochure on interventions of the European Union and its Member States in the area of climate change and energy. This document provides information about many tangible results that have been achieved based on the EU's commitment to work pro-actively both at home and with India.

In our work here in India, our overall objective is to support India's efforts towards sustainable growth and to build mutual understanding on global environmental issues, including climate change. The brochure before you gives on the one hand, an impression of what the EU is doing 'at home', showing that we are walking the talk and delivering on our international commitments, as well as what the EU stands for internationally.

The brochure also gives information about some case studies of actions, which the European Commission and the Member States of the European Union are supporting in India. Of course, this is a limited but still a representative selection of the activities.

The European Union and its Member States stand ready to step up cooperation with India on environment and climate/ energy related policies and programmes. Given the very welcome policies and measures already in place in India and the ones in the pipeline as part of the 12th five year plan, I am sure that we will have more and more occasions to enhance our cooperation and efforts to jointly combat the global challenge of climate change and its impact in India and the European Union.

João Cravinho
Ambassador and Head of Delegation
of the European Union to India

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What the European Union is doing in Europe

Climate Change Policies in Europe

The European Union has long been committed to tackling climate change through robust policy-making at home and has been taking serious steps to address its own greenhouse gas emissions since the early 1990s. Over the years, a comprehensive package of policy measures to reduce greenhouse gas emissions at European level has been initiated, and EU Member States have also put in place their own domestic actions to complement them.

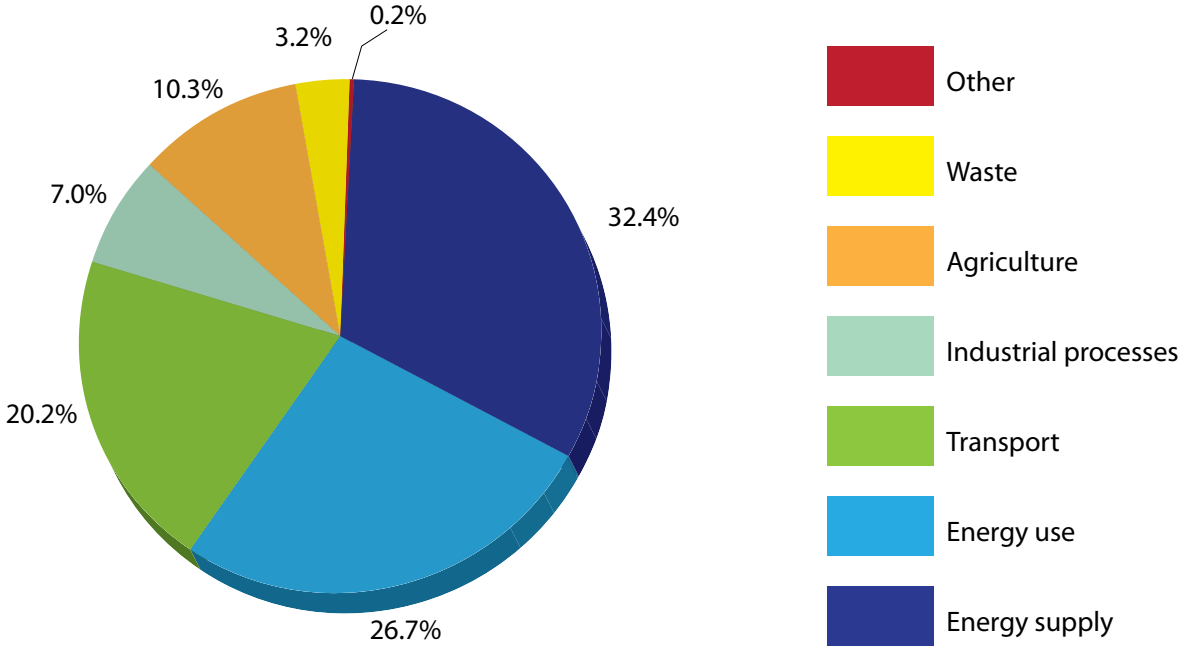
In June 2000 the European Union launched the European Climate Change Programme 2000-2004 (ECCP) with the goal of identifying and developing all the necessary elements of an EU strategy to implement the Kyoto Protocol. The ECCP has led to the adoption of a wide range of new policies and measures. These include the pioneering EU Emissions Trading Scheme, which has become the cornerstone of EU efforts to reduce emissions cost-effectively.

Other ECCP measures include improving the fuel efficiency of cars and the energy efficiency of buildings; increasing the use of renewable energy sources such as wind, sun, tidal power, biomass and geothermal power; and reducing methane emissions from landfills.

The development of the first ECCP involved all stakeholders working together, including representatives from the Commission's departments (DGs), the Member States, industry and environmental groups.

The second European Climate Change Programme (ECCP II) was launched in October 2005. The focus was on strengthening the EU ETS by tackling emissions from aviation and road transport, developing carbon capture and storage technology, and funding measures to adapt to climate change. Proposals to include airlines in the EU ETS and reduce CO_2 emissions from new cars have now been agreed upon.

Share of greenhouse gas emissions by main source (excluding international bunkers), 2009



Source: EEA, 2008

The EU Emission Trading Scheme

The EU Emissions Trading Scheme (EU ETS), launched in 2005, is a key instrument for reducing industrial greenhouse gas emissions cost-effectively. Being the first and biggest international scheme for the trading of greenhouse gas (GHG) emission allowances, it covers some 11,000 installations such as power stations, combustion plants, oil refineries and iron and steel works, as well as factories making cement, glass, lime, bricks, ceramics, pulp, paper and board. Nitrous oxide emissions from certain processes are also covered. Between them, the units currently in the scheme account for almost half of the EU's CO_2 emissions and 40% of its total greenhouse gas emissions. The remaining 60% of emissions are covered by the "non-ETS" Effort Sharing Decision, which sets binding targets for each Member State to reduce GHG emissions from non-ETS sources (e.g. road and sea transport, buildings, services, agriculture and smaller industrial installations) between 2013 and 2020.

The EU ETS works on the "cap and trade" principle. This means there is a "cap", or limit, on the total amount of certain greenhouse gases that can be emitted by the factories, power plants and other installations in the system. Within this cap, companies receive emission allowances which they can sell to or buy from one another as needed. The limit on the total number of allowances available ensures that they have a value.

At the end of each year each company must surrender enough allowances to cover all its emissions, otherwise heavy fines are imposed. If a company reduces its emissions, it can keep the spare allowances to cover its future needs or sell them to another company that is short of allowances. The flexibility that trading brings ensures that emissions are cut where it costs least to do so. The number of allowances is reduced over time so that total emissions fall. In 2020 emissions will be 21% lower than in 2005.

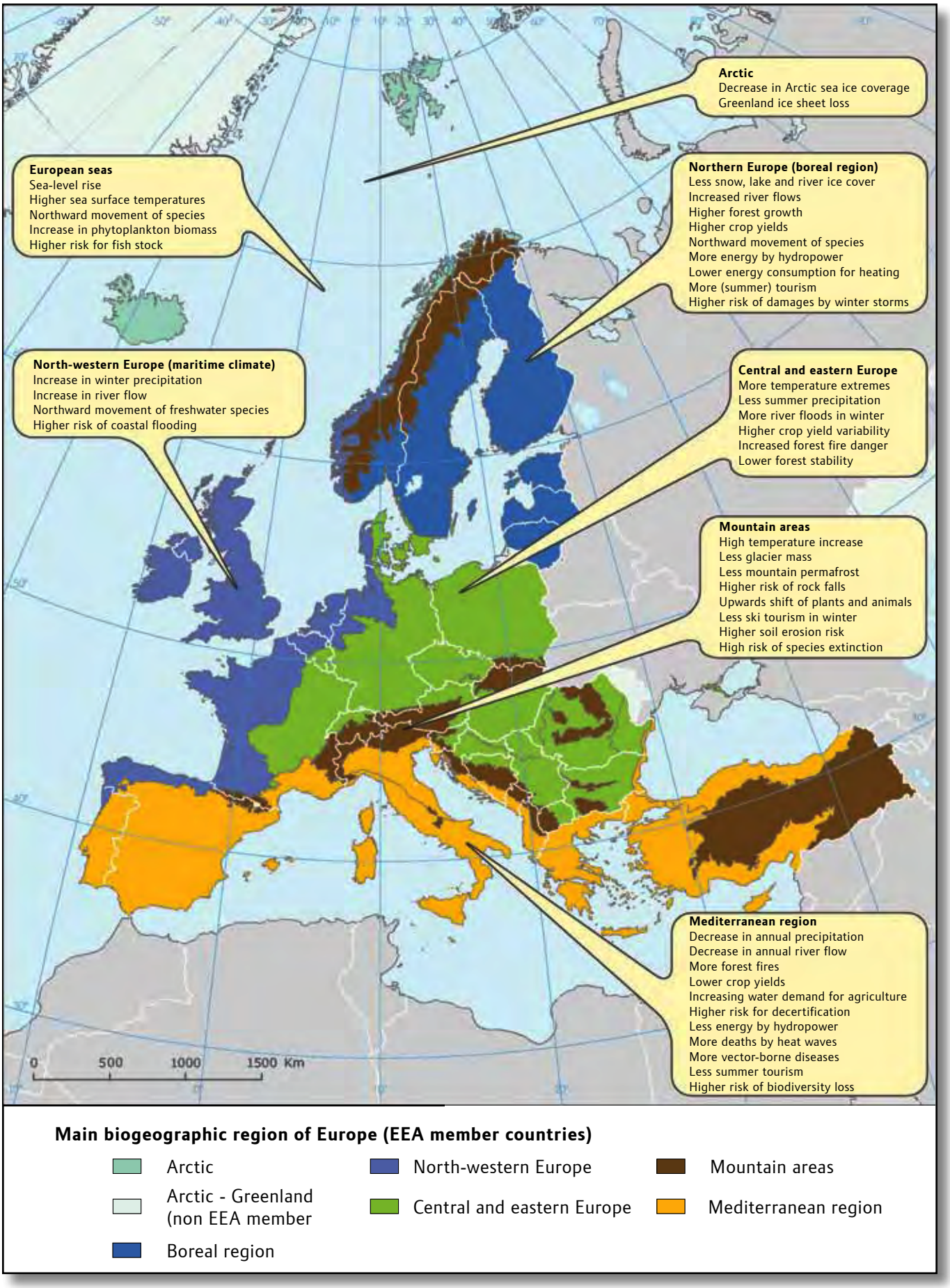
Airlines have joined the scheme in January 2012. The EU ETS will be further expanded to the petrochemicals, ammonia and aluminium industries and to additional gases in 2013, when the third trading period will start. At the same time, a series of important changes in the way the EU ETS works will take effect in order to strengthen the system.

The revised EU ETS will apply from 2013 to 2020, and should lead to a reduction of 21% of greenhouse gas emissions compared to the 2005 levels. To stimulate the adoption of clean technologies, the new ETS provides that GHG emissions permits will no longer be given free to industry, but instead be auctioned by Member States. There is also a solidarity mechanism in order to help less affluent EU states with the transition to a low-carbon economy. They will receive an increased amount of emissions permits to auction, giving them the opportunity of generating substantial revenues from selling allowances. Although each EU Member State will determine the use of its revenues from auctioning the pollution permits, at least half of the proceeds should be used to fight climate change in the EU and abroad and also to alleviate the social consequences of moving towards a low-carbon economy. The revenues of auctioning permits in the aviation sector will all be used to combat climate change, and Member States have to report to the European Commission about the measures taken.

The EU ETS has put a price on carbon emissions and shown that it is possible to trade in them. Emissions from installations in the scheme are falling as intended.

The success of the EU ETS has inspired other countries and regions such as China and California to launch cap and trade schemes of their own. The EU hopes to link up the ETS with compatible systems around the world to form the backbone of a global carbon market.

Key past and projected impacts and effects on sectors for the main biogeographic regions of Europe



Source: IPCC, 2007; EEA

Kyoto Targets and GHG Emissions in Europe

European Union emissions of climate-changing greenhouse gases (GHG) declined further in 2010. The EU-27's overall domestic emissions were 15.5% below base year (mainly 1990) levels and the EU-15's emissions are 10.7% below its Kyoto Protocol base year levels, putting it well on track to meet and even exceed its target of 8% during the 1st commitment period of the Kyoto Protocol.

In late May 2002 the EU and its then 15 Member States ratified the Kyoto Protocol, wherein developed countries committed themselves to reducing their collective emissions of six key greenhouse gases by at least 5% by the period 2008-2012. The 15 EU Member States went further and committed collectively to an 8% reduction in their emissions. There is no EU-27 emissions target under the Kyoto Protocol since 12 countries were not Member States at the time. However, most of the EU-12 countries have individual Kyoto commitments to cut emissions to 6% or 8% below base year levels, except Cyprus and Malta which have no targets.

The downward emissions trend indicates that pro-active climate policies and measures taken nationally and at the EU level since Kyoto are now starting to pay off. The 10.7% drop in EU-15 emissions between 1990 and 2010 contrasted with an increase in GDP of more than 41% over the period. This means that the EU has succeeded in further decoupling emissions from economic growth. Falling emissions since 2005 have largely resulted from the lower use of fossil fuels (particularly oil and gas) in households and services. These sectors, not covered by the EU Emission Trading Scheme (EU ETS), are among the largest sources of GHG emissions in the EU.

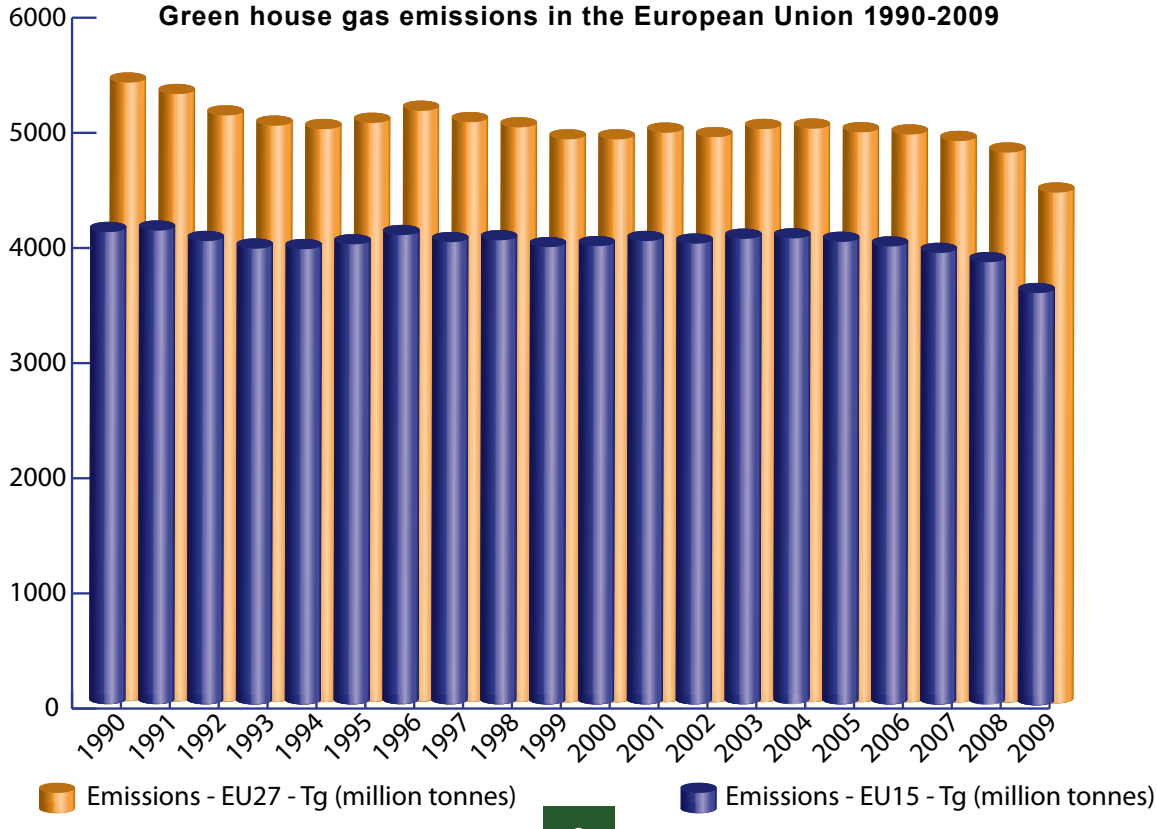
At the Conference of Parties of the UN Framework Convention on Climate Change in December 2011 in Durban, South Africa, the EU has again shown leadership by accepting to set a target for a 2nd commitment period under the Protocol.

Adapting to Climate Change

The European Commission has issued a policy paper, the White Paper on Adapting to Climate Change (April 2009), establishing a framework for action with focus on:

- Building a stronger knowledge base on the risks and impacts of climate change.
- Taking account of climate change impact in key EU policies.
- Combining different policy measures to best effect – innovative funding (including market based schemes) may be required to facilitate adaptation.
- Supporting wider international efforts on adaptation.
- Working in partnership with national, regional and local authorities.

Green house gas emissions in the European Union 1990-2009



European countries sharing an 8% reduction target under the Kyoto protocol (EU-15)			
Austria	-13%	Italy	-6.5%
Belgium	-7.5%	Luxembourg	-28%
Denmark	-21%	Netherlands	-6%
Finland	0%	Portugal	+27%
France	0%	Spain	+15%
Germany	-21%	Sweden	+4%
Greece	+25%	UK	-12.5%
Ireland	+13%		

European countries with individual targets under the Kyoto protocol (EU-12)			
Czech Rep.	-8%	Slovak Rep.	-8%
Cyprus	N/A	Slovenia	-8%
Estonia	-8%	Bulgaria	-8%
Hungary	-6%	Romania	-8%
Latvia	-8%		
Lithuania	-8%		
Malta	N/A		
Poland	-6%		

1) The official 2008 greenhouse gas emissions for the EU will be available in June 2010, when the EEA publishes the EU Greenhouse Gas Inventory 1990–2008 and Inventory Report 2010, to be submitted to the UNFCCC.

Carbon Capture and Storage (CCS)

The technology of carbon capture and storage has the potential to contribute both to the EU's climate goals and to its security of energy supply. However, it must be deployed safely and with the support of the public and stakeholders. The Commission is currently developing a work programme aiming to ensure this, both within the EU and internationally.

Work in the EU focuses on the enabling legal framework, addressing the environmental integrity of the technique and other deployment issues.

Internationally, the EU is actively engaging in discussions in the context of the UN Framework Convention on Climate Change, and the Kyoto Protocol. It is also working to encourage the establishment of a network of demonstration plants across Europe and key third countries.

The EU is also actively promoting research into CCS – both to promote the rapid commercialisation of the technology, and to assess the environmental risks.

Rules for cleaner cars in Europe

The EU has adopted the first legally-binding standards for CO_2 emissions from new passenger cars.

A regulation applicable from 2012 gives legal effect to the EU's existing goal of reducing average emissions from new cars to 120 gr CO_2 / km. This is to be achieved in two ways: a reduction to 130 gr CO_2 / km through improvements in engine technology, plus an additional cut of 10 gr CO_2 / km through more efficient vehicle components, for instance air-conditioning systems and tyres.

The new regulation makes these objectives binding for the average fleet of a given car manufacturer in successive stages. The EU proposed this phase-in to make allowance for the length of industrial planning and production cycles and give the automotive industry the necessary time to adjust. If car manufacturers do not comply, they face penalties depending on how much their fleet exceeds the emissions targets by and on the number of their new passenger cars. Manufacturers can improve their fleet performance by incorporating eco-innovations, or producing ultra-low emissions cars, which emit less than 50 gr CO_2 / km.

New environmental quality standards for fuels and biofuels

The EU has approved the revision of a Directive that will improve air quality and reduce greenhouse gas emissions through higher environmental standards for fuel. It will also facilitate the more widespread blending of biofuels into petrol and diesel and, to avoid negative consequences, set ambitious sustainability criteria for biofuels.

By 2020, fuel suppliers have to decrease by 6% climate-harming emissions over the entire life-cycle of their products by admixing biofuels to petrol and diesel as well as by improving production technology in refineries.

EU Member States may require an additional 4% reduction from fuel companies, achieved through the supply of energy for electric vehicles or other clean technologies, including carbon credits from third countries (so-called "Clean Development Mechanism"). To enable these GHG emissions cuts, petrol may have a higher biofuel content. From 2011, petrol may contain up to 10% ethanol. In order to avoid damage to old cars, however, fuel with 5% ethanol (E5) will continue to be available until 2013, with the possibility of allowing Member States to extend that period.

The directive also lays down stringent environmental and social sustainability criteria for biofuels, which correspond to those in the directive on the promotion of energy from renewable sources.

It also imposes limits on the content of sulphur and metallic additives in engine fuel. To minimise emissions of volatile air pollutants, the maximum vapour pressure of fuel is also prescribed.

The Way Forward: The EU Climate and Energy Package

In December 2008 the EU adopted an integrated approach to climate and energy policy that aims to combat climate change and increase the EU's energy security while strengthening its competitiveness. The EU's ambition is to transforming itself into a highly energy-efficient, low carbon economy.

To kick-start this process, EU Heads of State and Government set a series of demanding climate and energy targets to be met by 2020, known as the "20-20-20" targets.

These are:

- Reduction in EU greenhouse gas emissions of at least 20% below 1990 levels.
- 20% of EU energy consumption to come from renewable resources.
- 20% reduction in primary energy use compared with projected levels, to be achieved by improving energy efficiency.

The EU also offered to increase its emissions reduction to 30%, on condition that other major emitting countries in the developed and developing worlds commit to do their fair share under a global climate agreement. United Nations negotiations on such an agreement are ongoing.

In May 2010, the European Commission published a communication "Analysis of options to move beyond 20% greenhouse gas emission reductions and assessing the risk of carbon leakage" which revisits the implications of the different levels of ambitions (20% and 30% targets).

The climate and energy package

In January 2008 the European Commission proposed binding legislation to implement the 20-20-20 targets. This 'climate and energy package' was agreed by the European Parliament and Council in December 2008 and became law in June 2009.

The core of the package comprises four pieces of complementary legislation:

1. A revision and strengthening of the Emissions Trading System (ETS), the EU's key instrument for cutting emissions cost-effectively. A single EU-wide cap on emission allowances will apply from 2013 and will be cut annually, reducing the number of allowances available to businesses to 21% below the 2005 level in 2020. The free allocation of allowances will be progressively replaced by auctioning, and the sectors and gases covered by the system will be expanded.
2. An 'Effort Sharing Decision' governing emissions from sectors not covered by the EU ETS, such as transport, housing, agriculture and waste. Under the Decision each Member State has agreed to a binding national emissions limitation target for 2020 which reflects its relative wealth. The targets range from an emissions reduction of 20% by the richest Member States to an increase in emissions of 20% by the poorest. These national targets will cut the EU's overall emissions from the non-ETS sectors by 10% compared with 2005 levels by 2020.
3. Binding national targets for renewable energy which collectively will lift the average renewable share across the EU to 20% by 2020 (more than double the 2006 level of 9.2%). The national targets range from a renewables share of 10% in Malta to 49% in Sweden. The targets will contribute to decreasing the EU's dependence on imported energy and to reducing greenhouse gas emissions.
4. A legal framework to promote the development and safe use of carbon capture and storage (CCS). CCS is a promising family of technologies that capture the carbon dioxide emitted by industrial processes and store it in underground geological formations where it cannot contribute to global warming. Although components of CCS are already deployed at commercial scale, the technical and economic viability of its use as an integrated system has yet to be shown. The EU therefore plans to set up a network of CCS demonstration plants by 2015 to test its viability, with the aim of commercial update by around 2020. Revised EU guidelines on state aid for environmental protection, issued at the same time as the legislative package was proposed, enable governments to provide financial support for CCS pilot plants.

The climate and energy package creates pressure to improve energy efficiency but does not address it directly. This is being done through the EU's energy efficiency action plan.

Towards a low carbon and energy efficient economy

In the longer term, the EU is committed to cutting its emissions by 80-95% below 1990 levels by 2050 as part of the effort required from the developed world as a whole. In March 2011 the European Commission published a roadmap that charts a cost-effective pathway for making the necessary transition to a competitive, low carbon European economy by 2050. In December 2011, the Commission published the Energy Roadmap indicating how, by mid-century, Europe's energy production will be almost carbon-free without disrupting energy supplies and competitiveness. Based on the analysis of a set of scenarios, the document describes the consequences of a carbon free energy system and the policy framework needed. This should allow Member States to make the required energy choices and create a stable business climate for private investment, especially until 2030.

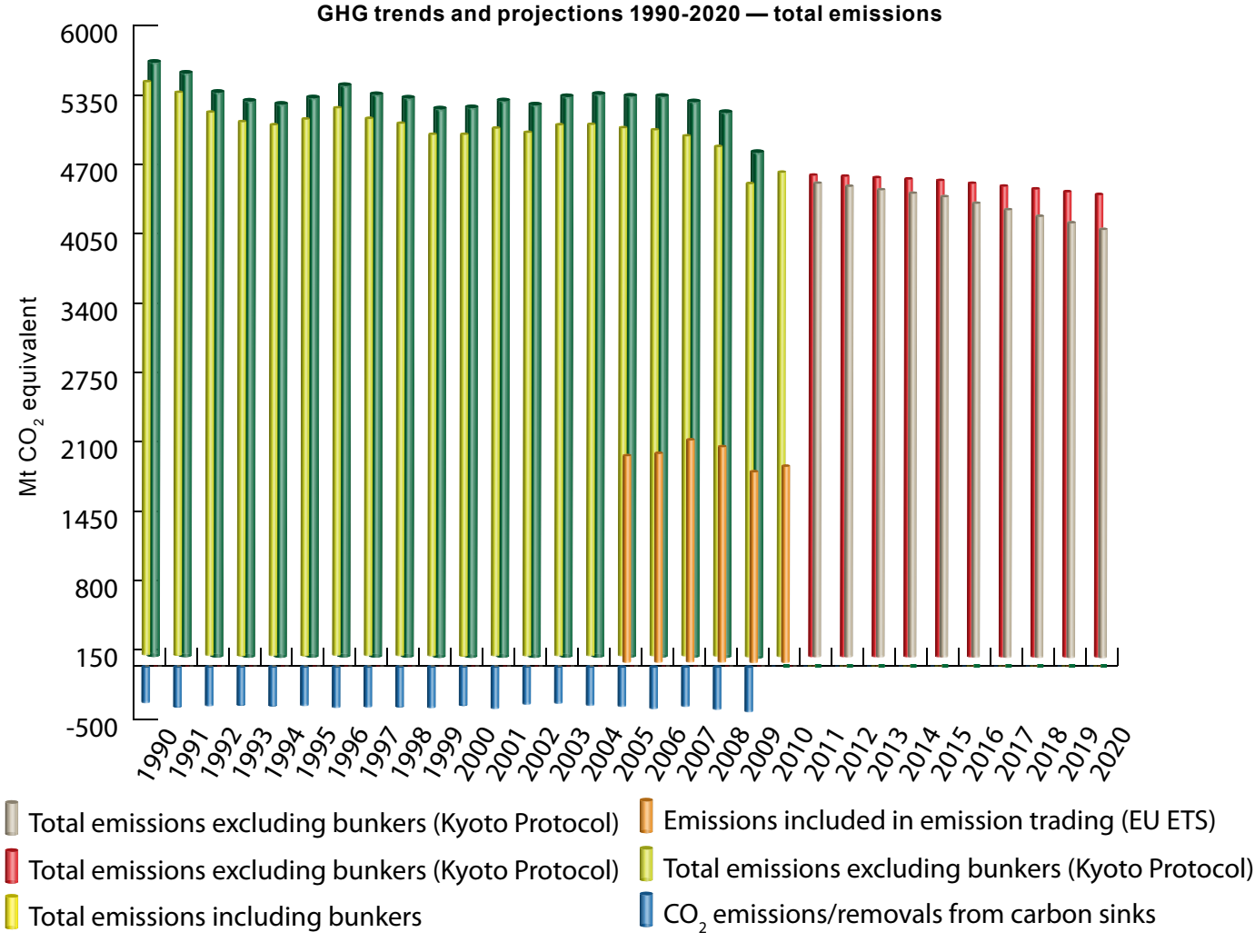
A low-carbon economy would have a much greater need for renewable sources of energy, energy-efficient building materials, hybrid and electric cars, 'smart grid' equipment, low-carbon power generation and carbon capture and storage technologies.

To make the transition and to reap its benefits, such as a lower oil bill, the EU would need to invest an additional € 270 billion or 1.5% of its GDP annually, on average, over the next four decades. The extra investments will bring the EU back to investment levels from before the economic crisis and will spur growth in a wide range of manufacturing sectors and environmental services in Europe. By stepping up climate action 1.5 million additional jobs could be created by 2020. The transition to clean technologies and electric cars will also drastically reduce air pollution in European cities. Fewer people would suffer from asthma and other respiratory diseases; considerably less money would need to be spent on health care and on equipment to control air pollution. By 2050, the EU could save up to € 88 billion a year.

The key driver for this transition will be energy efficiency. By 2050, the energy sector, households and business could reduce their energy consumption by around 30% compared to 2005, while enjoying more and better energy services at the same time.

More locally-produced energy would be used, mostly from renewable sources. As a result, the EU would be less dependent on expensive imports of oil and gas and its economies would be less vulnerable to increasing oil prices. On average, the EU could save € 175 - 320 billion annually on fuel costs over the next forty years.

GHG trends and projections 1990-2020 — total emissions



Working with International Partners

Climate change is one of the greatest challenges facing mankind. The European Union is working to promote an ambitious global response to climate change through the UN and in other international fora, as well as through its bilateral relations with third countries.

The international community has recognized the scientific evidence that global warming needs to be held below 2°C (3.6°F) above the pre-industrial temperature in order to prevent climate change from reaching dangerous proportions. However, international action taken to date is not sufficient to prevent this ceiling from being exceeded. Scientific evidence indicates that a temperature rise of more than 2°C could have irreversible and potentially catastrophic environmental consequences, with high costs in human and economic terms.

The EU is successfully reducing its emissions of greenhouse gases but worldwide emissions are continuing to grow. The concentration of CO_2 in the atmosphere is increasing annually and is at its highest level in 650,000 years, scientific research shows. Emissions from the developing world now exceed those from developed countries, and this share will continue to rise. To be effective, action to combat climate change needs to become global. Developed countries must continue to take the lead, but the major emerging economies in the developing world will also have to reduce their emissions. With development comes responsibility.

The move towards more global action has started. Some 90 countries in the developed and developing worlds alike - covering some 80% of global emissions – have made pledges to reduce or limit their emissions by 2020. Furthermore, at the EU's initiative, it was agreed in December 2011 in Durban (South Africa), that a global and more ambitious UN legal framework covering all countries will be implemented from 2020. This is to be adopted by 2015.

The fight against climate change is also an important issue in the EU's bilateral relations with developed and developing countries. As the world's biggest provider of official development assistance (ODA), responsible for almost 60% of global ODA in 2010, the EU is the largest contributor of climate finance to help developing countries adapt to climate change and develop on a low-emission path.

New technology development is essential to achieve EU and global climate change objectives, but is also a major contributor towards the EU's innovation, jobs and growth agenda. Europe has the know-how, the ability and the ambition to lead the world in developing the technologies required to tackle climate change.

As well as taking a leading global role in the development of low-carbon technology, the EU also supports joint research and development as well as the uptake of low-carbon technology internationally, in the places where it is most needed.

The EU has initiated the Global energy Efficiency and Renewable Energy Fund (GEEREF), an innovative global risk capital fund that will use limited public money to mobilize private investment in small-scale energy efficiency and renewable energy projects in developing countries and economies in transition. It is both a development tool and a contribution to global efforts to fight climate change and is concrete proof of Europe's commitment to transfer clean technologies to developing countries.




EU-India cooperation on climate change

EU-India Dialogue on Energy, Clean Development and Climate Change

Environment is recognised as a strategic area for dialogue in the EU-India Partnership, and a Joint Action Plan provides the basis for enhancing cooperation on environment and climate change. The launch of an EU-India Environment Forum and the EU-India Initiative on Clean Development and Climate Change are some of the key commitments undertaken to strengthen bilateral cooperation.

The EU has a long-standing bilateral cooperation with India. At the 5th EU-India Summit in The Hague, EU-India relations were upgraded to a "Strategic Partnership". The 6th EU-India Summit, in 2005, endorsed the wide-ranging Joint Action Plan giving substance to the Strategic Partnership. The Joint Action Plan covers all aspects of EU-India relations, for which it proposes practical steps to be achieved.

This Action Plan, establishes an EU-India Initiative on Clean Development and Climate Change which focuses on cooperation in the area of clean technology and the CDM as well as on adaptation to climate change and the integration of adaptation concerns into sustainable development strategies. The initiative has strengthened the political dialogue on international action to tackle climate change between India and the EU. Also under the Joint Action Plan, an EU-India Joint Working Group on Environment meets regularly to discuss a range of environment issues, including climate change.

At the 2008 EU-India Summit held in Marseille, the Leaders of the European Union and the Government of India, stressed that climate change is one of the great challenges of our time and decided that clean and sustainable development should be a joint priority area of EU-India cooperation. To this aim, they agreed on a Joint Work Programme for EU-India Cooperation on Energy, Clean Development and Climate Change[1]).

At the EU-India Summit of 6th November 2009 in New Delhi, the importance of an early implementation of this Joint Programme was underlined, especially in the fields of solar energy, development of clean coal technology and increase in energy efficiency.

This Joint Work Programme for EU-India Cooperation on Energy, Clean Development and Climate Change calls for tangible action involving all stakeholders. Leaders also reiterated their determination to step up the pace of negotiations in order to reach an ambitious and comprehensive agreed outcome, in accordance with the principle of common but differentiated responsibilities and respective capabilities as set out in the UN Framework Convention on Climate Change.

Recognising each other's efforts to tackle climate change, as demonstrated by India's National Action Plan on Climate Change and the EU's emissions reduction targets of at least 20% by 2020 (and 30% in the event of a satisfactory global agreement), the Leaders agreed to work towards long term cooperative action including a long term global goal. The EU and India also reaffirmed their commitment to promoting energy security and energy efficiency as a key to stable and sustainable development.

During the EU-India Summit in December 2010, EU and Indian leaders reaffirmed their commitment to cooperation on Energy, Clean Development and Climate Change. They requested a Joint Report on the implementation of the 2008 Joint Work Programme on Energy, Clean Development and Climate Change to be presented at the next Summit.

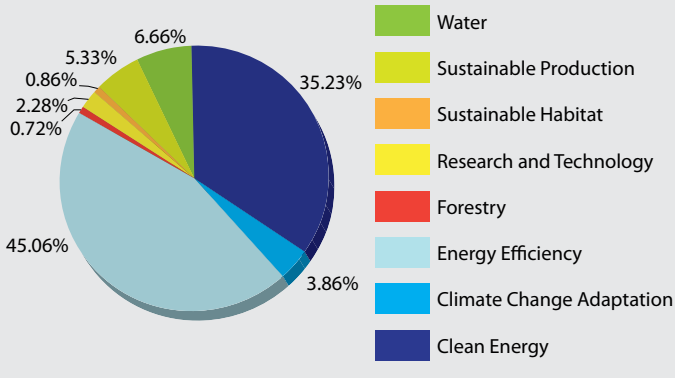
In the course of the last three years a large number of activities have been launched in the different areas of cooperation between EU institutions and India in response to the Programme. Many activities in these areas have also been undertaken between EU Member States and India.

Ongoing and planned activities are developed in the context of current EU policies and in relation with the themes of the National Action Plan on Climate Change of the Government of India.

The overall total of the EU and its Member States ongoing operations represents public funding of more than € 3.1 Billion. This demonstrates the strong commitment of European and Indian leaders towards a low carbon economy and to address the adverse effects of climate change.

In the following, an illustrative collection of climate change related projects/programmes is presented. These projects have been financially supported in India by European Union Member States and/or by the European Commission and the European Investment Bank.

Main sectors of intervention in sustainable development in India (EU and EU Member States)
(as a % of funds committed)



Source: Delegation of the European Union to India, 2011

[1] Full text available at: http://www.ue2008.fr/webdav/site/PFUE/shared/import/09/0929_UE_Inde/Climate_Change_Programme_EN.pdf

Clean Energy

Developing a Cluster for Clean Technologies and Carbon Capture and Storage Technologies for the Indian Thermal Power Sector

The main objective of the action is to promote a cluster on Clean Coal Technologies (CCT) and Carbon Capture and Storage (CCS) in order to increase awareness, capabilities, development actions, innovation and sustainable initiatives, and to effectively address the environmental commitments and ambitions of the Indian thermal power sector.

Partners

Tiruchirappalli Regional Engineering College – Science and Technology Entrepreneurs Park

(TREC-STEP) Bharat Heavy Electricals Limited (India)

Facts and Figures

Total Budget:

€ 830,005

(European Commission contribution: 61%)

Duration: 3 years

December 2010 to December 2013

For further information:

Mr R.M.P. Jawahar, Executive Director TREC-STEP, jawa_ts@yahoo.com

European Union

Project Background

The geographical and organizational concentration of the major CO_2 emission centres, the coal based thermal power plants, provide an easy target for designing and deploying a suitable mitigation strategy for surmounting the CO_2 emission problem. However, skill sets, knowledge resources, policy supports and scaffolds remain fragmented and so create road blocks. Developing a cluster of different skill sets, resource centres, decision making bodies, knowledge generation and exchange platforms, interest groups, and development agents will provide the necessary impetus to CCT and CCS initiatives.

Project Activities

The activities proposed for the project progressively address:

- Building a new organizational structure in the form of a carbon cluster, with its hub located in Trichy.
- A series of studies to decide the terrain and navigational directions for the cluster initiative, and capacity leveraging initiatives in both awareness and skills development in CCT and CCS areas.
- Benchmarking and learning visits and internships, demonstration and deployment joint action.
- Innovation development and incubation.
- Documentation, dissemination and establishment of publicity platforms and events.

Results/Impact

The project will provide awareness to more than 3000 professionals through its conferences, web video streams, training programmes, reports, project concept CDs and others instruments. It will also train nearly 200 technologists in the Indian power sector and allied fields in the latest technologies and global standards and make them conform to global benchmarks. The project will also develop an expertise centre for international experts for cooperation and support.

Clean Energy

Waste to Energy

This aim is to reduce the emission of greenhouse gases and generate energy through co- fermentation of organic solid waste and septage.

Project Background

Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH - Advisory Services in Environmental Management, the Indo-German Environment Programme (GIZ-ASEM) under the thrust area "Sustainable Urban Habitat" is currently supporting 7 municipal corporations under the Jawaharlal Nehru National Urban Renewal Mission (JNNURM). The German Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU) under the framework of International climate initiative is supporting the Government of India's objectives in climate protection by reduction of green house gases. In this context and within the framework of the "International Climate Change Initiative" of BMU, GIZ-ASEM with the support of Nasik Municipal Corporation intends to demonstrate an innovative waste to energy project through production of biogas.

Project Activities

Nashik has been selected on the basis of existing infrastructure for solid waste management, the availability of concentrated septage from community toilet complexes, possible reuse of digested sludge, and utilization of generated energy onsite. An innovative approach for the combined treatment of solid organic waste and septage particularly tailored to local conditions in India has been considered for the project. The combined treatment of septage (i.e. concentrated wastewater) from community-toilet-complexes (CTC's) and organic waste from restaurants and hotels can generate a range of advantages. In addition to energy production, this treatment allows the pasteurisation and material recovery of urban material flows.

Results/Impact

- Demonstration of a viable anaerobic digestion technology option for co-fermentation of septage and organic solid waste.
- Demonstration of feasibility of green house gas capture and bio-energy generation from the intended waste materials
- Closing of local material loops by means of reuse and energy recovery.
- Avoidance of greenhouse gas emissions, recovery of nutrients, solid waste treatment and transferability of results.

Partner

Ministry of Environment and Forests, Govt. of India

Facts and figures:

Budget:

€ 1,010,000

Duration: 3 years

March 2010 to February 2013

For further information:

www.giz.de

Germany

Clean Energy

Waste-to-Energy; Biogas utilisation study for Ghazipur Abatoir, Delhi

The project aims at showcasing the value of a systems approach to waste management and the potential financial benefits available from municipal solid waste.

Project Background

Urban India needs urgently to develop solid waste management systems to keep pace with growth. Currently, municipal solid waste (MSW) is handled by local municipalities and disposal is considered to be a burden. The aim of the project is to present new and sustainable methods for management of organic waste, turning it from a local and global environmental problem to a renewable source of energy. Projects like the one undertaken by COWI AB aim at showcasing the value of a systems approach to waste management, and the potential financial benefits available from MSW. Multiple second order benefits come from handling MSW in this way, including improved the health of surrounding water bodies and associated agriculture as well as replacing fossil fuel use in vehicles with biogas.

Project Activities

- Study and evaluation of different available feedstock options for biogas production.
- Study of different end use possibilities of the landfill biogas, such as electricity and vehicle fuel
- Design of suggested technique put forward, with investment estimate.
- Development of business model for project development and execution.

Results

- Design created for increased potential for energy production from the available feedstock.
- Showcase possibilities of using waste as an energy resource for replacing fossil fuels.

Partners

COWI AB

Sweco

IL&FS Environmental Infrastructure & Services Ltd.

Facts and Figures

Budget:

€ 18000

(funded in part by Swedish International Development Cooperation Agency – Sida)

Duration – 18 months

2009 - 2011

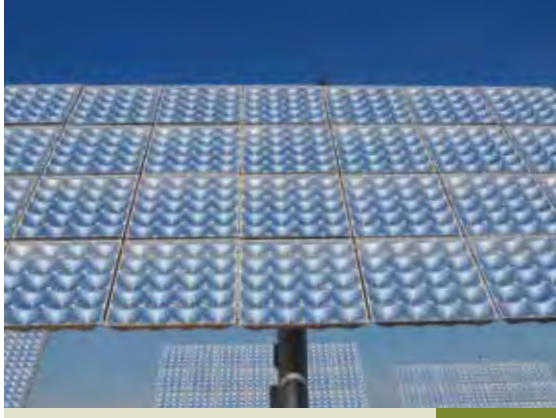
For further information:

Arati.davis@foreign.ministry.se

Sweden

Clean Energy

Solar Photovoltaic Plant Sakri



The project aims to establish one of the world's largest solar photovoltaic plants, building economies of scale in the Indian renewable energy market.

Project background

To tackle the twin problems of widening power deficits and mounting carbon emissions, the Indian Government has set ambitious goals to increasingly replace coal with renewable sources. The German Government has offered its assistance for this ambitious agenda. One of the activities of cooperation is the 125 MW solar power plant planned at Sakri which supports the Government of India's focus on a low carbon growth strategy for power generation in India and is partly financed by Indo-German Financial Cooperation through KfW.

Project Activities

- Establish one of the world's largest solar PV plants with option for further expansion.
- Invoke world class quality assurance and project implementation support.
- Facilitate the exchange of experience and knowledge between India and Europe.

Results/impact

- Generate electricity of 180 GWh p.a. and savings of 155,000 tonnes of CO_2 p.a.
- Build economies of scale in the Indian renewable energy market involving solar PV.
- Support distribution utilities in attaining their renewable energy purchase obligations mandated by the Government of India.

As a supplementary activity to the Sakri Solar power plant, KfW is also assisting the formulation and implementation of The Solar Valley Cluster Initiative in Maharashtra.

- The initiative will support the development of projects which explore the viability of different solar energy based technologies in the Indian geographical and meteorological context.
- It will also provide Consulting, coaching and training for key staff of the selected state agencies, thereby enhancing the technical capabilities of the selected state agency in the planning, implementation and monitoring of renewable energy projects.

Partners

KfW Entwicklungsbank, Germany

MAHAGENCO, India

Facts & Figures

Indicative budget:

€ 370 million

KfW loan amount:

€ 250 million

Duration: 2,5 years

August 2011 to End 2013

For further information:

kfw.newdelhi@kfw.de

Germany

Partners

Employer - THDC India Limited (TEHRI HYDRO DEVELOPMENT CORPORATION)

Employer's Engineering Consultant - Coyne et Bellier (TRACTEBEL Engineering)

Contractor - Consortium of: Alstom Hydro France

Alstom Projects India Limited

Hindustan Construction Company Ltd.

Contractor's Engineering Consultant - Électricité de France (EDF)

Ministry of Finance and Industry, France

Facts and figures

Budget: 1843 crores INR (Debt – Equity Ratio: 70:30)

Duration: 54 months

(26 January 2016)

For further information:

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Flore Lafaye de Micheaux

Flore.lafayedemicheaux@dgtresor.gouv.fr

France

Clean Energy

Construction of the first pumped storage power plant in India with variable speed technology

Pumped storage is the most efficient and flexible form of storing electricity on a large scale, enabling utilities to respond quickly to demand and replacing the fossil fuels traditionally used during peak demand periods with renewable, CO_2 free energy. Variable speed pump turbines, which offer even greater efficiency, represent the latest innovation in pumped storage technology.

Project background

The Tehri dam, located on the river Bhagirathi in North India (State of Uttarakhand), was constructed in 2006 and is among the biggest dams in India. The dam has an installed hydro capacity of about 1,000 MW along with an additional 1,000 MW of pumped storage (PSP) hydroelectricity.

The 4x250 MW Tehri PSP Project, is an integral part of Tehri Hydro Power Complex (HPC) comprising (1) a 260-m-high earth-and-rock-fill dam (Tehri dam) (2) an underground 1000-MW hydropower plant (Tehri HPP) and (3) a combined 400 MW hydro-power plant and dam (Koteshwar). The reservoir of Tehri Dam will operate as upper reservoir and Koteshwar reservoir as lower reservoir for Tehri PSP.

In order to optimize power generation of the dam without creating a new super-infrastructure, the pumped storage power project connected to the Tehri dam emerged in the 1990's. French government supported technical assistance provided to Tehri Hydro Development Corporation by EDF and Coyne et Bellier (Tractebel Engineering) for pre-feasibility studies. Tenders were floated in 2008, wherein the consortium of Alstom (world leader in hydro power generation) for EM/HM & Hindustan Construction Company Ltd. for Civil works bid for the project and were awarded the contract in July 2011. Tehri PSP is a challenging project requiring state-of-the-art technology in civil works & electro-mechanical equipment.

Project Activities

Major civil works to be taken up in PSP involve the challenging construction of upstream and downstream surge shafts, underground machine hall, penstocks, bus duct galleries, tailrace tunnels and outlet structure.

The main electro-mechanical works include the design, supply, installation and commissioning of four vertical shaft reversible pump turbine units of 250 MW each, butterfly valves, electronic speed governors, excitation system & static voltage source Inverters, main inlet spherical valves, balance of plant - Mechanical & Electrical items, protection system, plant computer control system & SCADA.

The main hydro-mechanical works include the design, supply, installation and commissioning of Steel Lined Penstocks, draft tube Gates, Outlet Stoplogs, Trash Racks.

Expected Results/Impact

- Production of 1377 GWh/year (including 1270 GWh of power during peak hours)
- CO_2 emissions reduction :1.38 million MT CO_2/ year (estimation)

Clean Energy

India UK - Partnership with The Energy and Resources Institute (TERI)

The project aims to provide clean cooking energy and solar lighting to poor households as well as to increase community awareness and demand for clean energy.

Project Background

The project supports the scaling up of programmes to provide clean cooking energy access and solar lighting to poor households, and to develop a stronger evidence base for integrating environmental sustainability and access to energy into national and state policies and programmes.

Project Activities

The programme will be implemented by TERI. The main outputs for India focus on:

- Piloting scalable models for provision of clean cooking energy to poor households in India.
- Ensuring long-term sustainability of models for scaling up of solar energy in India as a source of household lighting for poor households.
- Strengthening formulation and implementation of policies for sustainable development.
- Strengthening TERI's own capacity to plan, execute research and influence policy debates.

Through the programme, DFID will support research and piloting of innovative or improved technologies and private sector-led business models which will increase community awareness and demand, enable provision of appropriate products and services, and thereby promote use of improved cookstoves and solar home lighting on a much larger scale.

Results/Impact

The programme aims to have improved cookstoves delivered and being used by 100,000 households, and to have created Technology Resource Centres serving an estimated 400,000 households adopting solar lighting systems in India. As a result, a total of 500,000 poor women will benefit from lower health risks from indoor air pollution and reduced drudgery, and 2.5 million people will benefit from new or sustained access to modern, clean energy either for cooking or lighting needs. In addition, TERI plans to contribute research and evidence to at least 13 new or revised national or state-level policies in the area of sustainable development.

Partner

The Energy and Resources Institute (TERI)

Facts and figures:

Project Budget: € 9.64 million

Project Duration: 4 years

(2011/12 – 2014/15)

United Kingdom

Energy Efficiency

Renewable Energy, Clean Technology and Energy Efficiency

The programme aims to support, on the one hand, policy implementation through capacity building at the central, state and local level and exchange of best practices with the EU and on the other hand, technology implementation through demonstration/pilot projects in renewable energy and energy efficiency across India.

Partners

Ministry of New and Renewable Energy, Government of India

Ministry of Environment and Forests, Government of India

Facts and Figures

Total Budget:

€ 28,650,000 (European Commission contribution: 82%)

Duration: 4 years

December 2011 to December 2017

For further information:

EU Delegation to India

European Union

Project Background

The Government of India is seeking through this project exposure to European best practice experiences on green energy sources, energy efficiency and access to clean technologies. Helping India to increase its usage of clean technologies and green energy will have a significant impact in the long-term in mitigating its contribution to global greenhouse gases, along with enhancing its national energy security. In addition, the widespread deployment of an eco-friendly economy would also create significant employment potential for skilled and semi-skilled workers.

Project Activities

The project will focus on three sets of activities.

- Support to policy development and implementation through capacity building and best practice exchange
- Support to the expansion of New Renewable Energy Sources
- Support for the promotion of energy efficiency and adoption of clean technologies

Results/Impact

- Enhanced capacity of Indian authorities to create an enabling environment promoting renewable energy and energy efficiency.
- Increased penetration of renewable energies and improved use of clean technologies and energy efficiency.
- Enhanced human capacity and new employment opportunities, through the transfer of the required skills and technical know-how for the use and development of clean technology in the local context.
- Increased awareness among public and private actors and the public at large on environmentally friendly development activities.

Energy Efficiency

Improving the Winter Livelihood of Populations living in the Cold Desert of Western Indian Himalayas

The project aims at improving the winter livelihood and setting up a network to disseminate energy efficiency among populations living in severe environments.

Project Background

The cold deserts of the Western Indian Himalayas are located at 3500 msl in Ladakh in Jammu & Kashmir and Himachal Pradesh states. The environment is severe: temperatures falling below -25°C, with scarcity of biomass, low rainfall, roads closed for 6 months. Women and children spend 2 months in summer to collect biomass to heat the rooms during the long winter. This results in an energy vulnerability which leads to sub-zero indoor temperatures and indoor air pollution.

Project Activities

- Improving the living conditions of 1000 families and facilitating their economic, human and social development.
- Setting up an institutional network to promote energy efficiency.
- Training and organizing stakeholders to disseminate energy efficiency.
- Reducing pressure on the local and global environment.

Results/Impact

- Energy efficiency is integrated in 650 buildings as on December 2011.
- Fuel wood consumption is reduced by 60%, inner temperature is increased by 12°C, inner air is healthier and smokeless, fuel wood expenditure is reduced, winter diseases are reduced.
- 35 women self help groups (SHG) with 434 women members are able to produce handicrafts in winter in energy efficient buildings generating additional income.
- A strong network is set up for dissemination of energy efficiency and a policy is under development.
- 1307 ton of biomass will be saved yearly for 1000 PSH, 981 t CO_2 equivalent are saved in year 1 and year 2 and 21600 t CO_2 equivalent will be saved for 1000 PSH during a 10 year period.

Partners

Groupe Energies Renouvelables et Environnement GERES, France, Project leader

LEDEG (Ladakh Ecological Development Group),

LEHO (Ladakh and Health Organisation),

LNP (Leh Nutrition Project),

SECMOL (Student and Cultural Movement)

STAG (Spiti Trans Himalaya Action Group).

Facts and Figures

Total Budget:

€ 1.9 million (European Commission Contribution: 39%)

Duration: 4 years 10 months

March 2008 to December 2012

For further information:

Website: http://www.india.geres.eu

l.adelin-mehta@geres.eu

European Union

Energy Efficiency

Promotional Programme for Energy Efficient New Residential Housing

The project aims to dovetail with the current efforts of the Government of India towards bringing in energy efficiency in the residential housing sector.

Partners

KfW Entwicklungsbank, Germany

National Housing Bank, India

TERI, India

Fraunhofer Institute, Germany

Facts & Figures

Duration: 5 years

End 2009 to end 2014

Loan: € 50 million

Technical Assistance: € 1.5 million

For further information:

Binitesh Kumar, KfW Delhi office, binitesh.kumar@kfw.de

Silke Hermes, KfW Headquarter, silke.hermes@kfw.de

The assessment tool is accessible at: www.ittoolkitindia.com

Germany

Project Background

With KfW's experience in financing energy efficient residential buildings in Germany and the current construction boom in India which leads to increasing energy consumption and green house gas emissions, cooperation between Germany and India has come naturally and at just the right time. KfW Entwicklungsbank of Germany has extended a line of credit of up to € 50 million to the National Housing Bank (NHB) of India and provided technical assistance for the promotion of energy efficiency in residential buildings under the "Promotional Programme for New Residential Housing" programme.

Project Activities

The Programme provides financing for new apartments through the refinance window of NHB. To date, € 14 million. has been disbursed to NHB for on lending to Housing Finance Corporations and Banks for energy efficient buildings. Under KfW's guidance, TERI and Fraunhofer Institute for Building Physics have jointly adapted an Assessment Tool (software) for calculating, optimizing and certifying the energy efficiency of residential buildings. The tool is used to determine the eligibility of buildings for receiving financing under the Programme. On an average, the buildings refinanced under the Programme need 30% less electricity than the standard Indian apartment building.

Impact

The Programme improves the electricity intensity of housing by providing soft loans for energy efficient apartments. It rewards efforts such as the use of improved design and orientation in building architecture, use of innovative and energy efficient building materials and of energy efficient building technology (cooling, water heating, lighting). Reduced electricity consumption in the residential sector leads to significant CO_2 emission reductions. Close cooperation with the supply (builders and developers including Government housing boards and development authorities) and demand side (providers of housing finance at the individual level) develops the sector and contributes to policy development for the promotion of energy efficiency.

Energy Efficiency

Energy Efficiency, Process Optimization and Capacity building in Water Management

The project aims at improving energy efficiency and achieving process optimization for enabling clean water in the river Yamuna.

Project Background

The Danish Water Forum has aligned with the Delhi Jal Board to recommend improvements in the wastewater treatment of the city.

With specific focus on wastewater treatment it was felt that there was a need in India for optimising processes, increasing the capacity and indeed saving energy. The latter seems a subject for potential pay-back through energy savings. It was observed that the functioning of sewage treatment plants all across the country could be improved by retrofitting certain new technologies focussed on energy efficiency and process optimization, thereby saving a lot of money for the Municipalities and improving the health of the water bodies.

The aim of this Indo-Danish Pilot project has been to upgrade one sewage treatment plant in Delhi, where Danish companies could help in upgrading the facility, focussing on reducing the energy consumption, optimising the processes and providing training to staff to run a modern sewage treatment plant.

Project Activities

A feasibility study of the selected STP was carried out in agreement with the relevant municipality; in this case the Delhi Jal Board. The objective of the study was to make an inventory of the current load of wastewater treated at the selected STP using standard parameters and investigate the possible reasons in order to improve the efficiency of the treatment plant.

The main recommendations of the study show that the energy efficiency of the plant could be improved with use of diffused aerators and centrifugal/ turbo blowers in place of surface aerators.

The Pilot Project is aimed at creating a reference point in India for retrofitting of similarly aged treatment plants all across the country. Sludge Management is another related area where most Indian municipalities are facing problems. Danish technologies can be used by the Indian contractors to present the solution to the municipalities.

Results/Impacts

The feasibility report provided the tangible study of improvements in the equipment The feasibility report listed improvements in the equipment and processes that need to be done to achieve improved quality of treated water and much lower use of energy.

It is also assumed that once the sludge management technologies are implemented, the STPs would become self-reliant insofar as energy consumption in concerned.

The training provided to the staff operating the equipment will help in achieving greater efficiency, by way of sharing the best practices implemented in Denmark.

Partners

Indian Ministry of Forests and Environment

Delhi Jal Board

Danish Ministry of Foreign Affairs

Danish Environment Protection Agency

Danish Water Forum

Facts and Figures

Project Budget: € 99,500

Duration – 3 years

January 2009 to December 2012

For Further information:

Website: www.ambnewdelhi.um.dk

Email: ansjai@um.dk

Denmark

Energy Efficiency

India UK Collaboration on Energy Efficiency and Trading

The project aims to share experience on policy instruments in energy efficiency and climate change arrangements.

Partners

Bureau of Energy Efficiency

Facts and Figures

Project Budget:

€ 301,300

Project Duration:

2011 – 2012

Project Background

This project supports the Bureau of Energy Efficiency in design and implementation of the Perform, Achieve and Trade (PAT) Scheme. The PAT scheme is very similar in nature to UK policy instruments like Climate Change Agreements. The project shares UK experience, and draws on other international experiences in implementing similar schemes over the last decade.

Project Activities

- Support to the Bureau of Energy Efficiency (BEE) in designing the PAT scheme; particularly for issues such as securing early price discovery, denomination of the certificates, role of auctioning and banking and analysis of potential interactions with the CDM in the short term, and the longer term feasibility of linking the PAT scheme to global carbon markets.
- Support to industry and state level bodies to implement the PAT scheme. This included a targeted technology focussed workshop for the industries to help them meet PAT scheme targets, meetings and conversations with key industry players to building their understanding of the scheme and identify their concerns and developing training modules for State Designated Agencies and for measurement and verification.

Results/ Impact

With support from the project BEE and delivered training modules to State Designated Agencies on the measurement and verification of energy savings. The project has also exposed the industries covered by the PAT scheme to state-of-the-art technologies and systems for achieving energy efficiency in their operations, and assisted companies in meeting PAT Scheme targets.

United Kingdom

Sustainable Production

Sustainable Textiles for Sustainable Development in India

The overall objective of the project is to reduce poverty and improve the quality of life among artisans in the crafts and textile industry in India.

Project Background

The growth of small and medium enterprises (SMEs) has a positive impact on economic development. However, this growth has brought with it a range of environmental and health problems resulting in a threat to ecosystems and to the livelihoods of several thousand people. The project seeks to promote sustainable production and sustainable consumption patterns in the crafts and textile industries in India. To this purpose, the project is establishing a model eco-friendly textile park that would serve as an example for the other 29 approved textile parks across India.

Project Activities

- Establishment of a model eco-friendly textile park in Bagru, Rajasthan with green technology for effluent treatment, water harvesting, water re-cycling and conservation.
- Setting up of low-cost Secondary Effluent Treatment Plants (SETPs) in selected clusters of small scale textile units at Gujarat and Rajasthan.
- Development and dissemination of a toolkit on Sustainable Textile Production for 30 textile clusters across the country.
- Developing models of low-cost technologies for effluent treatment relating to small-scale textile production developed based on technical research.
- Policy research on environmental issues relating to handloom and crafts production.
- Market research and product development activities at selected clusters to develop new eco-friendly product ranges and designs.

Results/Impact

- New sector-wide best practice standards for environmental compliances and improvements in health and safety for crafts and textile workers.
- Establishment of pilot effluent treatment facilities and training of 25,000 workers in 500 block printing SMEs in Rajasthan.
- 14 other textile clusters will benefit from research on low cost technology, sharing of learning and opportunities for replication.
- 30 textile parks that have been approved by the Government of India will benefit from project learning.
- 200 Artisans will be trained in Block Printing.

Partners

Traidcraft Exchange, UK;

All India Artisans & Craftworkers Welfare Association (AIACA), New Delhi;

Consortium of Textile Exporters (COTEX), Jaipur

Jaipur Integrated Texcraft Park Private Ltd. (JITPPL),

Jaipur Infrastructure Leasing & Financial Services (IL&FS), New Delhi

Facts and Figures

Budget:

€ 2 million (European Commission contribution: 80%)

Duration: 48 Months

Start Date: January 2009

For further information:

Mrs Maveen Pareira
maveenp@traidcraft.org

European Union

Sustainable Production

Capacity building for emission measurements in India

The objective in this project is to improve emission monitoring status in India. The project focuses on strengthening the competences of emission measurements of Central Pollution Control Board, CPCB, and State Pollution Control Boards (SPCB´s).

Partners

VTT Technical Research Centre of Finland

Central Pollution Control Board, CPCB, India

Facts and Figures

Budget:

€ 500 000

Funded by Ministry for Foreign Affairs of Finland

Duration:

November 2011 – May 2014

For further information:

E-mail: Tuula.Pellikka@vtt.fi

www.vtt.fi

Finland

Project Background

Poor air quality is one of the most serious environmental problems in urban areas around the world. In India air pollution in major cities and especially in metro cities is severe causing the death of many inhabitants yearly. Pollution is mainly created by industrial activities (thermal power plants, chemical enterprises etc), by small-scale industry and by traffic.

There is inadequate prevention of polluting air emissions in many industrial enterprises in India. Furthermore, the continuous emission monitoring systems (CEM) are lacking in many enterprises. As a consequence, the most efficient measures to combat pollution cannot be applied since the sources of emissions or the quantity of emissions are not clearly known.

There is a need for standardised methods for several polluting components, such as volatile organic components (VOC) and odours.

Project Activities

The project will be carried out in the form of study visits of Indian experts to Finland, several workshops in India, visits of Indian experts to Finland and hands-on-training (practical training) sessions in India. It is estimated that about 50-70 experts will take part in the different training sessions, for efficient dissemination of skills and information.

Results/Impact

The project is expected to have four main results:

- Improved institutional capacities to support effective emission measurements.
- Improved capacities in odour measurement technologies.
- Improved capacities in the measurement of fugitive emissions, especially VOCs, from organic chemical industry.
- Improved capacities in emission measurements.

It is anticipated that with the help of this capacity building project, the access to emission measurements in India in various chemical industry sectors and the power sector will improve.

It is expected that due to more reliable and traceable emission measurement results the measures and resources needed for the protection of clean air can be applied in the most efficient way in India.

Sustainable Production

Making climate change part of doing business in India

The Carbon Disclosure Project (CDP) 2010 - India 200 Report presents the strategies adopted by Indian businesses in response to climate change. The report illustrates how market leaders have positioned themselves to effectively deal with climate change, integrating long term value and costs of climate change impacts into their business decisions.

Project Background:

The Carbon Disclosure Project is a London-based global project supported by the world's largest investors that encourages companies and industries to voluntarily measure, manage and mitigate emissions. Over time, such disclosures have the potential to inform and influence the investors over their investment choices. The CDP India 2011 report was the fifth in the series.

Project Activities

The project has led to three CDP India reports -2009, 2010 and 2011. This project is implemented by a powerful local partnership of CII, the WWF and CDP.

Results/Impact

The Carbon Disclosure Project in India has, on the one hand illustrated how market leaders have positioned themselves to effectively deal with climate change, integrating long term value and costs of climate change impacts into their business decisions. On the other hand the project has enhanced the capacity of representatives of companies and Financial Institutions on GHG accounting and incorporating climate change in business strategy and operations.

The project has created an environment for voluntary disclosure of GHG emissions by businesses, increasing investments in low-carbon technologies/ resources in energy-intensive sectors, and creating favourable markets that support demand-supply balance of such technologies/ resources.

In 2011-12, 57 of the top 200 Indian companies responded to the CDP, a 12% increase over the 2010 response rate. TCS and Wipro topped the Carbon Disclosure Leadership Index (CDLI) which shows a diverse mix of sectors indicating widespread awareness of the issues. Over the last five years the number of companies reporting their GHG emissions has been rising.

Nearly 96% of the top India companies responding to CDP see opportunities arising out of corporate action to address climate change. In addition, 87% of the respondents see avenues for growth from regulatory changes affecting companies in emerging economies.

Partners

Confederation of Indian Industries, New Delhi, India

WWF India

Carbon Disclosure Project, London, UK

Facts and Figures

Budget:

€ 193,530

Duration: 2009 – 2012

For further information:

www.cdproject.net

United Kingdom

Climate Change Adaptation

Increased Water Harvesting and Diminished Desertification in Tamil Nadu, India

Through rehabilitation of traditional water harvesting structures to adapt to climate change, the project seeks to contribute to increased food and environmental security in drought prone coastal areas in South India.

Project Background

The coastal areas of South India face frequent droughts due to non-availability of adequate water storage facilities. Farmers incur heavy losses due to withering of crops for lack of adequate rainfall, while the villagers encounter difficulties in obtaining water for drinking and domestic use.

Project Activities

- To revive, conserve and develop traditional water harvesting structures in five selected districts.
- To establish community based tank management associations to effectively manage the water harvesting structures.
- To increase the income of small landholders in the five selected districts through better agricultural land use and additional income-generating activities.
- To document best practices and disseminate to other stakeholders and interested parties in India and South Asia.

Results/Impact

- Dhan Foundation has revived 83 irrigation tanks, 40 village ponds and enabled farmers to construct 1025 farm ponds (in situ water harvesting structure) in the target villages benefitting nearly 25,000 farm families.
- 150 farmer associations and 80 community-level tank management associations have been organized since 2008 to rehabilitate village tanks.
- 8,000 acres of adequate irrigation support ensured in 250 villages in the five target districts. The total irrigated area has increased by more than 10%.
- 12,000 households are assured of water for drinking and domestic use.
- Water is available to 10,000 livestock population.

Partners

Oxfam Novib, The Hague, The Netherlands

DHAN Foundation, Madurai, Tamil Nadu, India

Facts and Figures

Total Budget:

€ 1,051,000

(European Commission contribution: 80%)

Duration: 3 years

January 2009 to December 2011

For further information:

Website:

www.oxfamnovib.nl; www.dhan.org

Email: Robert.van.der.Wolff@oxfamnovib.nl

European Union

Climate Change Adaptation

Reducing the Impact of Water-Intensive and Polluting Crops in the Godavari Basin, India

The project aims to provide sustainable sources of clean freshwater to support the livelihoods of poor communities and the ecosystem functions and services upon which they depend in the Godavari Basin, India.

Project Background

The project focuses on the Godavari basin which extends over an area of 312,812 sq. km. In this area, water is now the most precious natural resource and communities are struggling to meet the current economic, livelihood and environmental needs for freshwater. Water shortages particularly impact on poor rural communities and, besides drought, are largely due to highly inefficient and polluting agricultural systems. Irrigation for agriculture now accounts for 91% of the water abstracted from the Godavari River. Chemical pesticides and fertilisers play an important role in polluting water courses and causing serious health issues.

Project Activities

- Better Management Practice (BMP) application.
- Develop policy solutions.
- Encourage sugar mill incentives.
- Facilitate business support.

Results/Impact

- 2500 sugar, cotton and rice farmers are being trained in Better Management Practices (BMPs).
- 15,000 farmers are aware of the benefits of better practices leading to at least 60% adoption amongst these groups.
- Socio-economic and environmental benefits of BMPs are proven in target project areas.
- Farmers experience substantial livelihood benefits by working collaboratively.
- Government extension services disseminate the opportunities and approaches of Better Management Practices (BMP) adoption.
- Solutions for increasing the availability of freshwater are demonstrated to state-level decision-makers and inform policy reform.
- Sugar mills offer incentives to farmers for the adoption of Better Management Practices (BMP).
- Sugar and cotton businesses and investors support commodity specific BMPs.

Partners

WWF UK and India

Facts and Figures

Total Budget:

€ 1,200,000

(European Commission contribution: 62%)

Duration: 4 years

April 2007 to March 2012

For further information:

Website: www.wwf.org.uk

Email: RMay@wwf.org.uk

European Union

Climate Change Adaptation

Climate Change Adaptation in Rural Areas of India (CCA RAI)

The project's objective is to support central and state governments to integrate adaptation to climate change in sectoral policy decisions and rural development programmes in order to reduce the risks of the most vulnerable sectors and groups in India from climate change.

Project Background

The most vulnerable group in Indian society are the rural poor as they often depend on natural resources for their livelihoods, for instance from agriculture, fisheries and forestry. The country's natural resources are already under tremendous pressure as a result of various human activities. Scientific knowledge of the impacts of climate change needs to be enhanced, combined with best practices from different sectors, and linked to proven coping strategies, local knowledge, and innovative ideas.

Project Activities

- **State Action Plans on Climate Change**- 15 states and two Union Territories (UT) are being supported in formulating State Action Plans on Climate Change (SAPCC).
- **Vulnerability and risk assessment**- A structured and robust approach to vulnerability and risk assessment is being developed and tested in Madhya Pradesh, Rajasthan and West Bengal.
- **Technical adaptation measures**- Ways of dealing with climate variability and change are being developed and tested in the four partner states. Initiatives have already started in Madhya Pradesh, Tamil Nadu and West Bengal.
- **Climate Proofing Government Schemes**- Recommendations are being developed for possible adjustment and reorientation of policy interventions.
- **Market-based financial instruments for adaptation**- Close links are being developed with international and national players in the public and private sphere.

Results/Impact

- Ten out of the fifteen states and two UTs supported through the project have submitted their draft State Action Plan on Climate Change (SAPCC) to the Ministry of Environment and Forests (MoEF) based on the framework developed by MoEF with assistance from GIZ, UNDP, World Bank, and DFID.
- First insights into the risks of climate change to and adaptive capacities created through the Government Scheme "Joint Forest Management" have been gained. Thus first steps of Climate Proofing a Government Scheme have been completed.
- The role and the limitations of market-based financial instruments as mechanisms for adaptation to climate change in India are much better understood by the partner states.
- A training of trainers course "Integrating Adaptation to Climate Change into Development Planning" resulted in raising the interest of various partners in similar courses.

Partners

Ministry of Environment and Forests (MoEF) Government of India

Rajasthan State Pollution Control Board (RPCB) Jaipur

Environment Planning and Coordination Department (EPCO) Bhopal, Madhya Pradesh

West Bengal Environment Department Kolkata

Environment Directorate Chennai, Tamil Nadu.

Facts and figures

Budget:

€ 6.5 million

Duration: 5 years

For further information:

www.giz.de, www.ccarai.org

Germany

Climate Change Adaptation

Strengthening Adaptation Capacities and Minimizing Risks of Vulnerable Coastal Communities in India

The project aims at reducing the vulnerabilities of coastal communities to climate change risk through adaptation (CCA) and mitigation (CCM) by strengthening their local authorities' capacities to assess, plan and respond to these challenges

Project Background

India has a 7500 km long densely populated coast line, which is vulnerable to coastal floods, erosion, hurricanes, cyclones, and tsunamis. The coastal states of India are increasingly facing environmental and socio-economic pressures exacerbated by global climate change and climate variability. Coastal communities lack the appropriate institutions and processes to effectively confront these challenges. These communities are also located within one kilometre of the Indian Ocean and are extremely vulnerable to the risks due to climate change which could exacerbate extreme weather events.

Project Activities

- Creating, Adapting and Implementing Concepts and Approaches for Adaptation and Mitigation of Vulnerabilities in Coastal Communities.
- Pilot Initiatives to Adapt and Mitigate vulnerabilities of the communities through multi-sector cooperation and technology transfer.
- Capacity Building of the CBOs, NGOs and local authorities.
- Public Awareness Campaigns, Visibility and Networking.

Results/Impact

- Coastal communities implement well-directed and locally adapted concepts and approaches for adaptation and mitigation of climate change and disaster risk reduction in six coastal districts of Tamil Nadu and Andhra Pradesh.
- Suitable CCM/CCA technology and methodology are applied to the infrastructure of coastal communities in 18 village and 6 municipalities benefitting 3000 people.
- Technical and management capacities of local constituents to respond to climate change are strengthened by using CCA, CCM and DRM measures.
- Local public awareness is created, and national, regional and international experience exchanged on coastal community CCA, CCM and DRM.

Partners

Deutsche Gesellschaft Fur Internationale Zusammenarbeit (Giz) Gmbh, Germany – project leader

Academy of Gandhian Studies (AGS), India

AVVAI Village Welfare Society, India

ICLEI (International Council for Local Environmental Initiatives) – Local Governments for Sustainability – South Asia

Adelphi Research, Germany

Facts and Figures

Total Budget:

€ 1.09 million

(European Commission Contribution: 80%)

Duration: 3 years

December 2010 to December 2013

For further information:

Website: http: www.giz.de, www.asemindia.com

Email: dieter.mutz@giz.de

European Union

Sustainable Habitat

Umbrella Programme on Natural Resource Management (UPNRM)

The project's aim is to develop and employ flexible financial instruments such as loans cum grants and public-private partnerships to implement projects that ensure the sustainable use of natural resources while improving the livelihood of marginalised rural populations.

Project Background

UPNRM designs and implements a credit-plus facility that supports partnerships in linking natural resource management and livelihood improvements. UPNRM has supported over 100,000 beneficiaries increase their income considerably by more effectively utilizing, replenishing or conserving natural resources. This encouraging experience from 14 states and union territories in India has the potential of being replicated countrywide.

Project Activities

- The diverse portfolio under UPNRM includes medicinal plant cultivation, eco-tourism, promotion of the system of rice intensification, coir-based value addition project, introduction of drip irrigation and integrated dairy projects. These projects generate income for the participants while ensuring that natural resources are used sustainably.
- As a development-oriented bank, NABARD offers supplementary services such as grants for skill and capacity building in addition to flexible loans. To be able to receive financing under UPNRM, projects have to be pro-poor, ensure environmental sustainability, empower the local community through participation, strengthen decentralised governance, and integrate disciplinary approaches that are responsive to the needs of the local community.
- To attract sustainable private investments, new forms of collaboration between the public sector, the corporate sector and civil society are being explored and developed. For example, UPNRM has facilitated and financed a PPP project between Waterlife, a private sector company that manufactures custom designed water purification plants, and the local government in Mathura in Uttar Pradesh for the provision of clean drinking water to five villages.

Results/Impacts

- UPNRM has funded 88 projects by October 2011 out of which 44 were analyzed for an initial impact assessment. The results of the assessment show that linking sustainable livelihoods with natural resource management can increase the income of project participants while effectively managing natural resources through sustainable agricultural and forestry practices.
- 83,632 project participants, of whom approximately 36% are women and 44% are from scheduled casts and scheduled tribes, are involved in projects that save 30.4 million cubic metres of water per year. Furthermore, they have planted over 1.3 million trees on private wasteland, saved 163,000 trees from felling, and improved soil quality through increasing organic matter and moisture-holding capacity in over 21,000 acres of land.

Partners

National Bank for Agriculture and Rural Development (NABARD)

Facts and figures:

Budget:

€ 8.5 million

Duration:

Nov 2008 to Oct 2013

For further information:

www.giz.de;

http://www.nabard.org/farm_sector/nrm_upnrm.asp

Germany

Sustainable Habitat

Sustainable Community-based Approaches to Livelihood Enhancement (SCALE)

SCALE develops and promotes sustainable, community-based approaches to natural resource management to improve rural livelihoods at the local, state and national levels.

Project Background

SCALE focuses on the semi-arid regions of India and is implemented through programme partners in the States of Gujarat, Madhya Pradesh, Andhra Pradesh and Rajasthan. The programme areas are among the most resource-stressed and are occupied by some of India's poorest people. By improving the agricultural productivity and non-farm income, SCALE improves the quality and sustainability of their lives.

Project Activities

- Establishment and strengthening of community institutions, helping to identify, plan and implement solutions to development problems.
- Construction of low-cost structures for soil and water conservation to conserve soil moisture and fertility.
- Setting up of community-based water management to improve availability and reliability of water for agriculture and domestic use.
- Establishment of Cluster Livelihood Resource Centres at district level to provide capacity building support and information on rural livelihood improvement through self help groups.

Results/Impact

- SCALE today supports activities in 1000 villages in 11 districts of Gujarat and 5 districts of Madhya Pradesh, benefiting over 111,500 households directly.
- By mid 2011, 3600 village institutions, 30 community federations had been established to prepare development plans addressing NRM issues.
- Soil and water conservation measures were implemented across 20,000 hectares of private and public land. Irrigation facilities were extended to over 13,000 hectares of farmland across 625 villages.
- Interventions have raised agricultural productivity, increasing agricultural income by almost 50 percent.
- Access to adequate and safe drinking water was facilitated in over 150 villages.
- Over 4000 ultra poor households were engaged in income generating activities.
- A national resource centre for livelihoods has been established which is playing an active role in policy dialogue and in dissemination of best practices.

Partners

Aga Khan Foundation, Project Leader

Aga Khan Rural Support Programme (India)

Development Support Centre (DSC)

Association for Rural Advancement through Voluntary Action and Local Involvement (ARAVALI)

Andhra Pradesh Mahila Abhivruddhi Society (APMAS)

Professional Assistance for Development Action (PRADAN)

Facts and Figures

Budget:

€ 35.4 million

(European Commission contribution: 72%)

Duration:

January 2002 to December 2012

For further information:

Aga Khan Foundation India

Email: suneel.padale@akdn.org

European Union

Sustainable Habitat

Poverty reduction of desert communities in the dry lands of Western Rajasthan through integrated community based water resource management

The project aims at reducing the vulnerability of the poor desert population by creating an enabling environment for Integrated Water Resource Management (IWRM) through demonstrating participatory approaches, generating knowledge and advocating policy reforms.

Partners

Jal Bhagirathi Foundation

Facts and Figures

Total Budget:

€ 1.1 million

(European Commission Contribution: 90%)

Duration: 4 years

January 2011 to December 2014

For further information:

Website: http: www. jalbhagirathi.org

Email: jal@jalbhagirathi.org

Project Background

The Marwar region of the Thar Desert in Western Rajasthan is the most densely populated arid zone in the world. It constitutes nearly 40 percent of the total geographical area of the State, 22 percent of its population and 34% of its livestock. The economy of the Marwar region has traditionally revolved around animal husbandry and subsistence agriculture and its primary ecological resources have been water bodies, pastures, grazing lands and sacred groves. Severe ecological degradation and increasing desertification has led to scarcity in water for drinking especially for poor communities.

Project Activities

- Setting up and capacitating Water Resource Outreach Centres in the project villages and supporting CBO's for undertaking integrated water resource management.
- Construction, maintenance and restoration of traditional water harvesting structures and catchment area development in the project villages for improved availability of drinking water.
- Awareness creation and capacity building of communities to address safe drinking water as well as for the adoption of sanitation and hygiene practices.
- Technical, financial and project management support for the construction of sanitation infrastructure in five villages to create models of sanitation practices for replication.

Results/Impact

- Community Based Organisations (CBOs) are being created and capacitated through Water Resource Outreach Centres in 20 project villages resulting in community owned water conservation structures and their efficient and sustainable management.
- Replicable models of decentralized water management that integrate key issues such as livelihood, sanitation, health and women empowerment are being developed and demonstrated in 20 villages benefitting 20,000 people.
- Field learning of the project is being documented and disseminated for wider adoption of Integrated Water Resource Management beyond the region by other NGOs and CBOs and the Government.

European Union

Sustainable Habitat

Enhanced Sustainable Sanitation Provision in Flooded Areas of India/Bihar

The project aims to identify sustainable sanitation solutions in flooded rural areas and urban slums in Bihar.

Project Background

With less than 25% sanitation coverage in the Indian state of Bihar, a region that is annually flooded, there is an urgent need for sustainable sanitation solutions. Sustainable sanitation is economically viable, socially acceptable, technically and institutionally appropriate, and protects human health, the environment and natural resources. The project will provide sustainable sanitation solutions and options through a series of targeted activities. Research will result in enhanced ecological sanitation knowledge and promotion. Even though the research will be focused on the State of Bihar in India, the results will be of global relevance, since there is limited knowledge on how to provide sustainable sanitation services in flooded rural areas and urban slums.

Project Activities

- Conduct action research for enhanced understanding of requirements for sanitation services of people living in flood affected areas and provide skill sets for wider implementation with an aim for enhanced livelihoods.
- Promote capacity development and knowledge-sharing on a state, national, regional and world-wide basis in collaboration with government, NGOs, INGOs, academia, business and the United Nations.

Expected Results

- Develop cost-effective, sustainable and acceptable sanitation solutions.
- Fill knowledge gaps and generate needed scientifically-based knowledge and synthesis that offers acceptable sanitation solutions to individuals and communities in line with prevailing policies.

Partners

Stockholm Environment Institute – SEI

WASH Institute

Facts and Figures

Budget:

€ 441,000

(funded by the Swedish International Development Cooperation Agency – Sida)

Duration : 3 years

2010 to 2013

Sweden

Partners

Centre international en recherche agronomique pour le développement, France

International Crops Research Institute for Semi Arid Tropics, India

Centro Nacional de Milho e Sorgo, Brazil

KWS SAAT AG, Germany

Institut für Energie - und Umweltforschung Heidelberg GmbH, Germany

Alma Mater Studiorum - Università di Bologna, Italy

Università Cattolica del Sacro Cuore, Italy

Agricultural Research Council, South Africa

Universidad Autonoma de Nuevo Leon, Mexico

Wirtschaft und Infrastruktur GmbH & Co Planungs KG, Germany

Facts and Figures

Budget:

€ 3 965 200

Duration: 60 months

Start Date:1 January 2009

For further information:

www.sweetfuel-project.eu

European Union

Research and Technology

Sweet Sorghum: an alternative energy crop (SWEETFUEL)

Sweet sorghum is an alternative energy crop for biofuel production in semi-arid and temperate regions. The main objective of SWEETFUEL is to optimize yields in temperate, semi-arid and sub-tropical regions by genetic enhancement and improvement of agricultural practices.

Project Background

Increasing world market prices for fossil fuels, driven by limited reserves, growing demand and instability in producing regions now render renewable fuels economical. Such fuels are also a pathway to reducing GHG emissions and mitigating climate change.

Sweet sorghum is a C4 plant with the following interesting characteristics: (i) its growth cycle is short (about four months) facilitating double cropping, (ii) it can be easily grown from seeds, (iii) its production can be completely mechanized, (iv) it can produce sugar in the stalk and starch in the grain, (v) it has a high water and nutrient use efficiency, (vi) the bagasse produced from sweet sorghum has high biological value when used as forage and (vii) it has a wide adaptability to different environments.

However, unlike sugarcane and maize, sweet sorghum has little breeding history. The potential of yield improvement through genetic enhancement is thus very high.

Project Activities

- Breed sweet sorghum ideotypes specially adapted to temperate climates, drought prone environments and poor soils.
- Improve knowledge on the relationships among traits for sugar accumulation, plant phenology, stay-green and terminal drought tolerance.
- Understand the agronomic determinants of optimized yield and recommend cultivation and harvest techniques.
- Identify and monitor ethical risks resulting from ethanol production from sweet sorghum and to propose guidelines for policy makers.

Results/Impact

The SWEETFUEL project will breed improved cultivars and hybrids of sorghum for temperate, tropical semi-arid and tropical acid-soil environments by pyramiding in various combinations, depending on region and ideotype, tolerance to cold, drought and acid soils; and for high production of stalk sugars, easily digestible biomass and grain.

Research and Technology

Optimised Fuels for Sustainable Transport (OPTFUEL)

OPTFUEL is expected to pave the way for the large-scale production of 2nd-generation biofuels for transportation based on wood and forestry residues.

Project Background

"Biomass to Liquid" (BtL) products can be used in vehicles, either as neat fuels or by blending with conventional fossil fuels. The OPTFUEL project will establish the technical basis for large-scale production of BtL from biomass via gasification and fuel synthesis to the final fuel in the consumer's car. All production chain components from biomass provision up to market introduction of consumer fuels containing BtL will be optimized and demonstrated.

Project Activities

- Cultivation of 200 hectares of fast-growing willow, poplar, and robinia.
- Modelling of performance data from the Freiberg pilot plant to identify improvement opportunities compared to the current production processes and to create the technical basis for a large-scale BtL production facility.
- Blending of the BtL liquids, evaluation of their exhaust emissions and exploration of their potential in current and future engine technologies.
- Evaluation of the economic aspects and the potential to reduce energy and greenhouse emissions from all parts of the BtL production process.

Results/Impact

- The results of this project are expected to form the basis for a (large scale) BtL production unit in Europe.

Partners

Volkswagen AG, Germany
CHOREN Industries GmbH, Germany

Ford Research Centre GmbH, Germany

Renault SA, France Certh, Greece

IFP, France

CONCAWE, Belgium

Invensys Systems GmbH, Germany

SYNCOM F&E Beratung GmbH, Germany

Indian Institute of Technology, Delhi, India

Facts and Figures

Budget:

€ 13.6 million

(European Commission contribution € 7.8 million)

Duration: 42 months

Start Date: January 2009

For further information:

www.optfuel.eu/

European Union

Project Partners

Centro Interuniversitario di Ricerca per lo Sviluppo Sostenibile, Italy

Central Salt and Marine Chemicals Research Institute, India

Danish Technological Institute, Denmark

Hashemite Universirty, Faculty of Natural Resources and Environment, Jordan

National Environmental Research Institute, Aarhus University, Denmark

RTU - Institute of Energy Systems and Environment, Latvia

NGVA, Spain

AquaAgri Processing Private Limited, India

ECOIL, Italy

Scandinavian GtS AB, Sweden

Consorzio Nazionale Interuniversitario per le Scienze del Mare, Italy

Power Ventures, Italy

Facts and Figures

EU Contribution:

€ 2 902 500

Duration: 48 months

Start Date:1 April 2010

For further information:

http://www.biowalk4biofuels.eu

European Union

Research and Technology

Bio-waste and Algae Knowledge for the Production of 2nd Generation Biofuels (BioWALK4Biofuels)

The BioWALK4Biofuels Project aims to develop an alternative and innovative system for the treatment of bio-waste and use of GHG emissions to produce biofuels, using macroalgae as a catalyser, in a multidisciplinary approach.

Project Background

The objectives of the project are:

- Production of a cost-efficient biogas without using cereal crops.
- Optimisation of the production of biogas per amount of bio-waste and CO_2 used.
- Increasing and facilitating the types of bio-wastes that can be utilised for biogas production.

Activities

- Research activities are to be carried out on the selection of adequate macroalgae species that can reach high output biomass yields and high carbohydrate content.
- Pre-cultivation of protoplasts, accelerating cell-growth rate, is to be carried out to increase productivity.
- The relationship between growth and energy potential of selected species with the amounts of GHG emissions and bio-waste introduced in the cultivation medium is to be studied to obtain higher biomass yields of macroalgae. After fermenting the algal biomass, the cycle is closed by producing biogas to be used for electricity and heat generation and as a transport fuel.
- A high quality product is expected, hence a purification step will precede the final product. Furthermore, organic residues from the biodigestor are to be used as a combustible biomass, after drying and pelletising. The need for external inputs is eliminated (no other biomass for fermentation is required) and the use of all feedstock is achieved.

Results/Impact

The expected impact is to produce a cost-efficient, low energy-intensive, purified biogas, to reduce negative environmental impacts from industry (GHG emissions) and bio-waste. The multidisciplinary approach solution gives the possibility to reduce GHG emissions and process bio-waste, while producing energy, seeking for future replications in other locations.

Research and Technology

Adaptation to Changing Water Resources Availability in Northern India with Himalayan Glacier Retreat and Changing Monsoon Pattern (HighNoon)

HighNoon will assess the impact of Himalayan glacier retreat, explore possible changes of the monsoon on water resources and recommend appropriate response strategies for adapting to hydrological extreme events, such as floods and droughts.

Project Background

The hydrological system of Northern India is based on two phenomena, the monsoon precipitation in summer and the growth and melt of the snow and ice cover in the Himalayas. Increasing greenhouse gases are expected to change these phenomena and, in particular, will have a profound impact on snow cover, glaciers and water resources availability. The HighNoon project aims to assess the impact of these changes and recommend response strategies for adapting to hydrological extreme events.

Activities

- Regional climate modelling and forecasting of snow melt and monsoon patterns.
- Prioritization of water resources allocation and adaptation measures.
- Participative development of adaptation measures.

Results/Impact

- Integration of available climate and hydrological data.
- Study of the changes under various climate change scenarios and consequential impacts on changes in snow, glacier melting and changed spatio-temporal monsoon patterns.
- Analysis of socioeconomic scenarios and reliable boundary conditions per physical or administrative unit for planning of adaptation measures.
- Development of a stakeholder driven and crosssectoral plan of action for adaptation measures in the field of water supply, agriculture, energy and health.
- Estimation of the cost effectiveness of the various measures proposed.
- Analysis of the cross sector interaction of measures and their cross category impact on water quantity, water quality and socio economy, and adaptive capacity.

Partners

Alterra b.v. The Netherlands

The Energy and Resources Institute, India

Met Office, UK

University of Salford, UK

University of Fribourg, Department of Geosciences, Switzerland

Max-Planck-Gesellschaft zur Förderung der Wissenschaften e.V., Germany

Indian Institute of Technology, Kharagpur India

Nagoya University, Japan

Facts and Figures

EU contribution:

€ 3.3 million

Duration: 36 Months

Start Date: May 2009

For further information:

www.eu-highnoon.org

European Union

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65 Golf Links,
New Delhi - 110003
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Fax: +91-11-49496555
eeas.europa.eu/delegations/india

Brussels - European flags in front of the Berlaymont building

Embassy of Ireland
230 Jor Bagh,
New Delhi - 110003
Phone: +91-11-24626733, 24626741
Fax: +91-11-24697053

Dublin – The Trinity College

Embassy of Belgium
50-N Shantipath,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-42428000
Fax: +91-11-42428002

Brussels - The Town Hall at the Grand-Place

Embassy of Greece
EP-32,
Dr. S Radhakrishnan Marg,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-26880700,
Fax:+91-11-26888010

Athens – The Parliament

Embassy of the Republic of Bulgaria
EP 16-17, Chandragupta Marg,
Chanakyapuri, New Delhi- 21
Phone: +91-11-26115549/51
Fax: +91-11-26876190

Sofia - The Alexander Nevski Cathedral

Embassy of Spain
12, Prithviraj Road,
New Delhi - 110011
Phone: +91-11-41293000,
Fax: +91-11-41293020

Madrid - The Plaza Mayor

Embassy of the Czech Republic
50-M, Niti Marg, Chanakyapuri
New Delhi - 110021
Phone: +91-11-26110205
Fax: +91-11-26886221

Prague - View of the St Charles Bridge

Embassy of France
2/50 E Shantipath,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-43196107
Fax: +91-11-43196109

Paris – The Arc de Triomphe

Royal Danish Embassy
11 Golf Links,
New Delhi - 110003
Phone: +91-11- 42090700
Fax: +91-11-23792019

Copenhagen - The Little Mermaid

Embassy of Italy
50-E, Chandragupta Marg,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-26114355
Fax: +91-11-26873889

Rome - The Colosseum

Embassy of the Federal Republic of Germany
6/50 G, Shantipath,
Chanakyapuri, New Delhi - 21
Phone: +91-11- 44199199
Fax: +91-11-26873117

Berlin - The Berliner Dom

High Commission for the Republic of Cyprus
67, Jorbagh,
New Delhi - 110003
Phone: +91-11- 24697503
Fax: +91-11-24628828

Nicosia - The residency of the President of the Republic

Consulate of Estonia
A-11 Kailash Colony
New Delhi - 110 048
Phone: +91-11-26449808
Fax:+91-11-26444642

Tallinn - The Alexander Nevxky Cathedral

Consultate of Latvia
48/11 Malcha Marg
Chanakyapuri
New Delhi - 110021
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Fax: +91-112-6113753

Riga - View of the city of Riga

Vilnius - The Cathedral of St Stanislas

Embassy of the Republic of Lithuania
D-129, Anand Niketan
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Phone: +91-11- 43132200
Fax: +91-11-43132222

Lisbon - The Tower of Belem

Embassy of Portugal
4, Panchsheel Marg,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-46071001-5
Fax: +91-11-46071003

Luxembourg - The Philarmony

Embassy of the Grand Duchy of Luxembourg
730, Gadaipur Road,
Branch Post Office Gadaipur,
New Delhi - 110030
Phone: +91-11-26801954
Fax: +91-11-26801971

Bucharest - The House of the Free Press

Embassy of Romania
A-47, Vasant Marg,
Vasant Vihar,
New Delhi - 110057
Phone: +91-11-26140700
Fax: +91-11-26140611

Budapest - The Hungarian Parliament

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Chanakyapuri,
New Delhi - 110021
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Ljubljana - The Town Hall and the Cathedral of St Nicolas

Embassy of the Republic of Slovenia
A5/4, Vasant Vihar,
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Fax: +91-11-41662895

Valletta - The marina of Valletta

High Commission for Malta
N-60 Panchsheel Park,
New Delhi - 110017
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Fax: +91-11-26494966

Bratislava - The Grassalkovich Palace

Embassy of the Slovak Republic
50 M, Niti Marg,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-26494967
Fax: +91-11- 26877941

The Hague - The Parliament

Royal Netherlands Embassy
6/50F, Shantipath,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-24197600/612
Fax: +91-11-24197710

Helsinki - The Lutheran Cathedral

Embassy of Finland
E-3, Nyaya Marg,
Chanakyapuri,
New Delhi - 110021
Phone: +91-11-41497500
Fax: +91-11-41497555

Viena - The Parliament with the Athena Fountain

Austrian Embassy
EP-13, Chandergupta Marg,
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Fax: +91-11-26886929

Stockholm - View of Stockholm

Embassy of Sweden
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New Delhi - 110021
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Fax: +91-11-26885401

Warsaw - The Royal Castle

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Chanakyapuri,
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Fax: +91-11-26871914

London - The Tower of London

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