

## Climate Change

The environment is becoming an increasingly important factor in the evolution of energy systems, with predictable impact on the mix of primary sources and on the quality of end-use energy products as well as on the development of conversion technologies and energy use. Climate Change is a major challenge for Petrom. In the last 4 years we actively participated in climate change protection measures, by

exploring new technologies like zero-emission power plants (ZEP) and CO<sub>2</sub> capture combined with Enhanced Oil Recovery (EOR), producing biofuels as well as implementing methods for reductions in GHG and CO<sub>2</sub> emissions (e.g. CO<sub>2</sub>-free energy sources; more efficient energy technologies for conversion and end use; emission trading; projects for acquiring carbon credits).

### Near Zero Emission Power Plant project

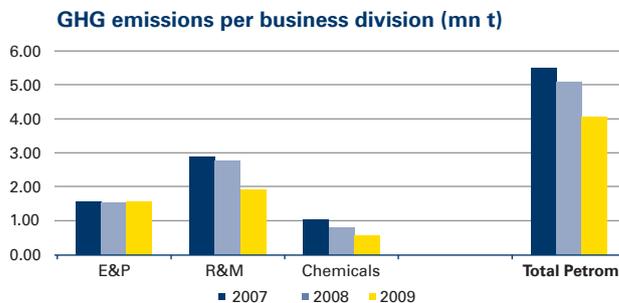
Petrom runs a study on a Zero Emission Power Plant as part of the OMV Group's efforts to reduce carbon emissions. The objective of this project is to apply a new combustion technology to gas with a special composition and produce CO<sub>2</sub> free electricity. In 2009 a contract with AE&E Austria was signed to provide sufficient technological and economic information for a decision on the investment into a Zero Emission Power Plant in Romania for mixed gas with high CO<sub>2</sub> content with a net power output of approximately 15 MWe (megawatt electrical).

The plant will be supplied with CO<sub>2</sub> rich gas from one of Petrom's fields. The electrical output of the Zero Emission Plant will be used for the energy demand of Petrom operations or fed into the Romanian electrical grid. The captured CO<sub>2</sub> of the Zero Emission Power Plant shall be compressed and reinjected into an oil reservoir to enhance oil production (EOR). This Zero Emission Power Plant could be one of the first plants of this kind in Europe given the size and natural gas fuel feed. The high CO<sub>2</sub> content of the natural gas used is especially suited for this technology. These ZEP/EOR projects could bring a major contribution to reduce carbon emissions from fossil fuels within the next years.

### Addressing climate change

#### Greenhouse Gas Accounting

Petrom's direct emissions of carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>), and nitrous oxide (N<sub>2</sub>O) were 4.1 mn tonnes in 2009 (2008: 5 mn t).



#### Emissions Trading

19 installations of Petrom were included in the European Union Emission Trading Scheme (EU ETS) on January 1, 2007. In 2009, one installation was shut down and pulled out from the scheme. Thus, Petrom has 18 participating installations at

the end of 2009. As a consequence of emissions reduction, as well as supplementary allocations and unplanned stoppages, a surplus of 1.6 mn certificates was recorded for Petrom at the end of 2009.

#### Reduction of Direct Greenhouse gas emissions

Several crucial aspects for the reduction of direct GHG emissions include:

- **Energy efficiency:** All measures taken to improve energy efficiency contribute directly to the reduction of GHGs;
- **Process optimization:** In the Petrobrazi refinery, the adaptation of the gasholder operation and therefore the optimization of flare gas utilization results in 73,000 t CO<sub>2</sub> savings per year. In Petrom refineries, the specific CO<sub>2</sub> emissions have been significantly reduced since 2005 by structural changes (especially the closure of petrochemicals activities), energy efficiency

measures (resulting in reduction of specific fuel consumption), and increased use of gaseous fuels;

► **Flaring and venting:** The reduction of flaring and venting is also a key element in the Exploration and Production HSE strategy.

### Carbon Strategy

Following OMV Group's Carbon Strategy and targets, Petrom is committed to promote projects that secure both energy supply and reduce the environmental impact, caused by climate change. Such projects cover renewable energy, energy efficiency and innovative solutions for reduction of greenhouse gases emissions during production and industrial processes.

## Sustainable Resource Management

### Water Management

We use water from many sources for cooling, steam generation and industrial processing. Surface water consumption was about 29.52 mn cubic meters in 2009, and groundwater consumption was about 11.79 mn cubic meters. Waste water (in total 27.72 mn cubic meters) is discharged after appropriate treatments on site or off site in Petrom-owned or communal water-treatment facilities.

Our goal is to use water more efficiently, reducing the impact on local communities and the environment. We take an integrated approach to water management, where other environmental effects are considered and emphasis is placed on preventing pollution and minimizing impacts at source.

Total water consumption in Petrom Refining was reduced by 35% between 2005 and 2009, mainly due to activity restructuring. Waste water is discharged after appropriate treatments on site in wastewater treatment plants. At Arpechim refinery, investments into the wastewater management system led to improvements of waste water quality indicators: reduction by 50% in Chemical Oxygen Demand, by 40% in Biochemical Oxygen Demand, by 90% in phenols and by 70% in ammonia. At the Petrobrazi refinery, a EUR 34 mn project started

in 2009 included measures such as cleaning and refurbishment of API (American Petroleum Institute) separators, reorganization of the biological treatment through a denitrification stage, new measurement equipment and the rehabilitation of the sewerage system.

Large amounts of formation waters have to be managed in E&P operations – 42 mn cubic meters in 2009. In oil and gas production, the proportion of produced water can exceed 90%. Petrom E&P reinjects approximately 95% of produced water. The remaining quantities are treated appropriately and discharged.

### Waste Management

Our activities generate a variety of solid and liquid wastes, including oil sludge, waste chemicals, spent catalysts and construction debris. Our goal is to manage waste in a manner that will not pose harmful risks to the workforce, local communities or the environment.

The large amounts of hazardous waste accumulated over a long period of time (sludge pits in E&P and refineries) will be subject to specific waste management programs in the next few years. However, as the financial crisis also hit our company, the planned waste infrastructure construction projects for 2009 were postponed to 2010.

While in 2008 the basic construction of five bioremediation plants was realized, the year 2009 has been used to install office buildings, garages, weigh bridges and laboratories. A consultancy tender for the design, engineering, permitting and supervision of another ten bioremediation plants and eight landfills was developed and launched. After finalization, the waste infrastructure will allow Petrom to start the clean up and abandonment works for more than 10,000 old wells and several hundred production facilities. This will result in Petrom becoming the largest private owner and operator of waste infrastructure in Romania. In addition, Petrom Refining has set up specific waste management contracts with specialized companies. Petrom's fertilizer plant in Doljchim covers an area of around 220 hectares of land with a lot of closed plants. Clean-up of this site, removal of waste and demolishing of closed plants has

### Mitigating waste impact