Methane to Markets – Oil & Gas Subcommittee
Villahermosa, Mexico – April 27, 2006

ITALY'S GOALS IN THE SHORT, MEDIUM AND LONG TERM

1. Background

In Italy, as for other developed countries, the methane emissions generated in the Oil & Gas operations, are quite marginal in terms of contribution to the overall GHG emissions.
A recent OGP (Oil and Gas Producers) survey, to which Italy (Eni) participated, has shown that "the methane emissions for the EU-25 were at approximately 19.3 Mt in 2003 and that Oil and Gas producers emitted some 112,000 tonnes of methane in Europe in 2003, i.e. 0,58 % of total EU emissions".
With only 0,58% the contribution of emissions from oil and gas production to the total methane emissions in the EU is relatively low. So is the abatement potential, owing to considerable reductions reached since the mid-1990s. Further significant reductions could only be achieved at a high cost/low benefit ratio and the risk of compromising on safety.
Although the OGP survey considers only the Oil & Gas production, the addition of gas transportation, storage and distribution does not change the above conclusions.
With reference to the year 2003 (to compare with the OGP data), the methane emissions in Italy were:

Oil & Gas Production	29,000	t CH_4
Gas Transportation	23,300	"
Total	52,300	"

Taking into account the global warming potential of methane (21), the methane emissions are about 1.1 $MtCO_2e$, corresponding to 0,2 % of the national GHG emissions.
Most of the methane emissions are "fugitive emissions" and they are calculated on the basis of conservative emission factors.
The measures to abate the methane emissions were implemented in the early 90s, so that the potential for further abatement is considered to be marginal.
On the other hand, looking for significant GHG reductions in the Oil & Gas sector it is possible to identify areas which are much more relevant.

A) **Flaring**, and to a minor extent venting, of the gas associated to oil production still occurs in many producing countries where no commercial outlets, in the local or international markets, exist.
The volume of gas flaring and venting is estimated to be about 100 Bm^3/year (World Bank – Global Gas Flaring Reduction) but there are reasons to believe that it is an underestimate. Considering that to a flare a 98 % efficiency is conventionally attributed, the total GHG emissions generated from flaring/venting are around 300 $MtCO_2e$/year.
With the assumed 98 % efficiency of the flare, and ignoring venting (which tends to be eliminated, at least as routine venting), the methane emissions are 2 Bm^3/year, equivalent to some 1,3 $MtCH_4$/year and, consequently with the 21 global warming potential of methane, 27,3 $MtCO_2$/year. This is an order of magnitude higher than the fugitive emissions, even not considering the remaining CO_2 emissions from the gas oxidation in the flare.
The assumption of a 98% efficiency for the flare not necessarily materialize in field operations, since many factors tend to reduce it (maintenance, wind conditions, rain).

Therefore methane emissions linked to flaring are greatly important.

B) The **advanced gas compression stations** of today have a 37% efficiency, but they are not commonly used in the existing pipelines, especially in the oldest ones.
In Italy the substitution of all the compression stations with the most efficient turbocompressors has been completed years ago, but it is likely that a lot remains to do in other countries with consequent high potential for GHG reductions. The old compressors may also suffer higher fugitive emissions.

C) **CO_2 geological storage**. In the gas centres, where natural gas is treated to meet pipeline specifications, CO_2 removal may be necessary. Where it occurs, generally CO_2 is just vented but it could be permanently stored in geological formations or used for enhanced oil recovery.
As an example, the Eni gas treatments in one country separate about 6 $MtCO_2$/year.
The inventory of the CO_2 separated from natural gas is far from being known, but it would be very useful in order to assess and promote the early deployment of carbon storage, at relatively low cost since the separation cost, which is about 60 % of the overall carbon capture and storage, is already charged to the natural gas treatment.

2. Italy's Goals

The previous considerations have led Italy to concentrate on the areas which are more effective in terms of GHG reductions. This choice is also dictated by the Italian commitment to the Kyoto reduction target (-6.5 % with respect to the baseline year 1990). Due to the high present gap versus the target, the acquisition of carbon credits through CDM and JI projects is needed.
The following goals are pursued, mainly through Eni which is the major national Oil & Gas company.

Short-medium term

- Development and field demonstration of a remote sensing technique to measure the CH_4 emissions from a flare, allowing to measure the flare efficiency. The technique has been already calibrated in collaboration with Canmet (Canada), using the Canmet flare test facility. The field testing is now underway. The technique can also be used in campaigns aimed to assess fugitive emissions.

- Gradual elimination of the gas flaring of associated gas in the producing countries where it still occurs. One project was completed last year in Nigeria, with the construction of a 450 MWe power plant, based on an advanced combined cycle. The GHG reductions are estimated to be 1.5 $MtCO_2$/year. The project has been submitted to the Clean Development Mechanism Executive Board and the decision on validation is expected next June.
  Beside power generations other options are available to eliminate flaring: gas injection, LNG, conversion to liquids (methanol, Fischer-Tropsch distillates). The optimal choice is site specific.

- Revamping of the less efficient compression stations in the existing pipelines, with modern turbocompressors. It entails the double benefit of reducing GHG emissions and gas saving.
  Also these projects are candidates for carbon credits from either Clean Development Mechanism or Joint Implementation.

Medium – long term

- Geological storage of CO_2 obtained from natural gas decarbonisation. A global inventory of the CO_2 availability would be required.

- High pressure and high volume (140 bar; high grade steel X80-X100) pipelines for long distance transportation of otherwise stranded gas. HP pipelines drastically increase the distance between compression stations (from 150 to 500 km) and reduce the energy consumption for pumping (few percentage points of the energy transported over a distance of 5,000 km).

The fulfilment of these goals would allow to expand the scope of the Methane to Markets, with a much greater potential for direct and indirect GHG reductions.