14th Session of the Group of Experts on Coal Mine Methane

Abandoned Mine Methane (AMM) recovery in Northern France

8th of November 2019
Our group: La Francaise de l’Energie

Green gas, electricity & heat production in the former coal mining regions

Producing and commercialising local abandoned mine methane (AMM) and coal bed methane (CBM)

A stronghold in 3 areas:
- Hauts-de-France, France (2 concessions valid until 2042)
- Grand Est, France (ongoing application for a concession until 2040)
- Anderlues, Wallonie, Belgium (concession valid until 2038)

“Young innovative company” label granted by BPI France

Ecologically and economically competitive energy producer
Focus on AMM in Northern France
History of the mining and AMM activity

1720
First documented coal extraction

1946
Nationalisation of all the coal mines

1979
First AMM production site set up

1988
Set up of Gazonor to handle the AMM activity

1990
End of coal mining in the Region

2016
Creation of a support mechanism for AMM with dedicated Feed in Tarif

A second life for the former coal basin

Sources: Ineris 2018 (étude en cours de finalisation)
Focus on Abandoned Mine Methane operations

France - Hauts de France region
- > 100 000 kms of mine galeries
- Over 100 Wellbores
- 4 sites in operation so far

Belgium – Wallonia region
- ANDERLUE
- Gas
- Electricity
- 20 Kms
- 120 Kms
Historical production of AMM in Northern France

Sources: Ineris 2019

Courtesy of Ray Pilcher
Large inventory of gas relatively easy to produce

<table>
<thead>
<tr>
<th>Millions of m³</th>
<th>Certified gas reserves (2P)</th>
<th>Contingent gas resources</th>
<th>Current production</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hauts de France</td>
<td>9 191</td>
<td>81 468</td>
<td>72</td>
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Year of France’s gas imports Equivalent

|                     | 3 years | 26 years | n/a   |

DMT certification – 2017-2018

A significant supply of energy readily available
How do we monetize the AMM?

- Gas
- Green electricity
- Heat

All options to locally commercialise the energy are considered

Local municipalities
New regulatory framework for AMM created in 2016

Green label awarded for electricity and heat produced from AMM with a 15 years Feed-in-Tarif

- €76 / MWh
  For installed capacity per site of 1.5MW or less

- 57,6€/MWh
  For installed capacity per site of 4.8MW or more

VAT reduction from 20.6% to 5.5% for heat produced from AMM

Decree signed in November 2016 by former Ministry of Energy and Industry, Emmanuel Macron

Source: Direction de l'Energie et du climat (DGEC)
Injection of gas in the network

- Siemens electric engines associated to DRESSER compressors
- 4 stages of compression to inject at 60 bar in the transportation network
- Maximum flow that each engine can handle: 3600 Nm³/h
- Injection of 200 GWh of gas in the network in 2018

Siemens engine

Avion site gas process
Electricity + heat generation => efficient containered solutions

Latest generation of gas engines installed on 4 sites for a total installed capacity of 9MW.

- 9MW installed capacity on 4 sites
- 36 wind turbines

=> Covering the electricity needs of a city of 40,000 people
Bethune City: an exemple of a successfull new development

First strategic partnership with Bethune city
Supply of locally produced green energy to the municipality of Béthune

- Guaranteed supply to local users for 22 years
- Energy invoice to be reduced by 20%
- CO2 footprint of energy used to be reduced by 35%
- Dalkia is the manager of the district heating network

Long term commitment to the local communities
Main contributor to the reduction of CO$_2$ emissions in the Region

**A GREEN ENERGY FOR THE PLANET**

602,000 tonnes of CO$_2$ emissions prevented per year

CO$_2$ emissions of a town of 131,000 inhabitants or 2% of the population of Haut-de-France region

From our 4 current sites

*French average: 4.6 tonnes of CO2/resident/year, source: World Bank*

Sources: Ineris 2019
Examples of regulatory hurdles to overcome

**Green gas label**
- No recognition of AMM as a green gas in the energy law
- No certificate of origin differentiating AMM from imported gas

**No economic incentive**
- No mechanism of support for cleaning/upgrading AMM to inject this gas in local distribution networks

**Difficult to obtain autorisation to access the wellbores**
- Post mining department opposes access to the wellbores despite pollution being measured

**No recognition nor monetisation of the CO2eq emissions prevented by AMM activity**
- AMM related CO2eq emissions not specifically recorded in France’s UNCC inventories
- No access to EUTS
- Voluntary compensation market insignificant in France
Helping the coal regions to transition towards a cleaner future

Contact - Julien Moulin - Chairman Francaise de l’Energie
+33 (0)3 87 04 32 11
jmoulin@francaisedelenergie.fr
www.francaisedelenergie.fr