Workshop in Krakow

Abandoned Mine Methane (AMM) recovery in Northern France

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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

- **Belgium – Wallonia region**
  - ANDERLUE
  - Over 100 Wellbores
  - 4 sites in operation so far

- **France – Hauts de France region**
  - Divion
  - Avion
  - Lens
  - Lourches
  - Over 100 Wellbores
  - > 100 000 kms of mine galleries

- **Gas**
- **Electricity**

- **Other data**
  - 20 Kms
  - 120 Kms

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Historical production of AMM in Northern France

Slide 6

Sources: Ineris 2019

Courtesy of Ray Pilcher

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## 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>
</tr>
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</table>

### Year of France’s gas imports Equivalent

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<tr>
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<th>3 years</th>
<th>26 years</th>
<th>n/a</th>
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*DMT certification – 2017-2018*

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

- Gas
- Green electricity
- Heat

Local municipalities

All options to locally commercialise the energy are considered
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 Nm$^3$/h
- Injection of 200 GWh of gas in the network in 2019
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)
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

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

Sources: Ineris 2019
Regulatory hurdles still 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 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
- No carbon offset mechanism
- Voluntary compensation market insignificant in France

**The Global Warming Potential of CH4 not fully recognized**
- 100 years horizon vs 20 years horizon
- Latest Assessment Report (AR 5) not used in official numbers
Helping the coal regions to transition towards a cleaner future

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