



Project Acronym and Title:
**M4ShaleGas - Measuring, monitoring, mitigating and managing the
environmental impact of shale gas**

MINUTES OF THE KICK-OFF MEETING

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Project deliverable number: D22.2
Status: definitive

Disclaimer

This report is part of a project that has received funding by the *European Union's Horizon 2020 research and innovation programme* under grant agreement number 640715.

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Public introduction

M4ShaleGas stands for *Measuring, monitoring, mitigating and managing the environmental impact of shale gas* and is funded by the *European Union's Horizon 2020 Research and Innovation Programme*. The main goal of the M4ShaleGas project is to study and evaluate potential risks and impacts of shale gas exploration and exploitation. The focus lies on four main areas of potential impact: the subsurface, the surface, the atmosphere, and social impacts.

The European Commission's Energy Roadmap 2050 identifies gas as a critical fuel for the transformation of the energy system in the direction of lower CO₂ emissions and more renewable energy. Shale gas may contribute to this transformation.

Shale gas is – by definition – a natural gas found trapped in shale, a fine grained sedimentary rock composed of mud. There are several concerns related to shale gas exploration and production, many of them being associated with hydraulic fracturing operations that are performed to stimulate gas flow in the shales. Potential risks and concerns include for example the fate of chemical compounds in the used hydraulic fracturing and drilling fluids and their potential impact on shallow ground water. The fracturing process may also induce small magnitude earthquakes. There is also an ongoing debate on greenhouse gas emissions of shale gas (CO₂ and methane) and its energy efficiency compared to other energy sources. There is a strong need for a better European knowledge base on shale gas operations and their environmental impacts particularly, if shale gas shall play a role in Europe's energy mix in the coming decennia. M4ShaleGas' main goal is to build such a knowledge base, including an inventory of best practices that minimise risks and impacts of shale gas exploration and production in Europe, as well as best practices for public engagement.

The M4ShaleGas project is carried out by 18 European research institutions and is coordinated by TNO-Netherlands Organization for Applied Scientific Research.

Executive Report Summary

This report summarizes the kick-off meeting of Horizon 2020 project M4ShaleGas (*Measuring, monitoring, mitigating managing the environmental impact of shale gas*). The meeting was held at IFP Energies nouvelles office in Rueil-Malmaison, France. A total of 33 participants represented the 18 partners from 10 European countries in the M4ShaleGas collaboration project. The European Commission was represented by the Project Officer being responsible for M4ShaleGas. Two guest speakers were invited from North America: Douglas Duncan from the U.S. Geological Survey gave an overview on the shale gas situation and challenges in the United States and Louise Laverdure from the Geological Survey of Canada presented a paper entitled 'Shale gas geoscience and engineering in Canada'. The afternoon session was reserved for group discussions of sub-programs SP1, SP2, SP3, and SP4, facilitated by the appointed SP leaders. In these group sessions, research strategy, activities, and deliverables of the first project year were discussed and planned. The kick-off meeting was closed with a dinner in a closeby restaurant.



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1 INTRODUCTION

1.1 Context of M4ShaleGas

Shale gas source rocks are widely distributed around the world and many countries have now started to investigate their shale gas potential. Some argue that shale gas has already proved to be a game changer in the U.S. energy market (EIA 2015¹). The European Commission's Energy Roadmap 2050 identifies gas as a critical energy source for the transformation of the energy system to a system with lower CO₂ emissions that combines gas with increasing contributions of renewable energy and increasing energy efficiency. It may be argued that in Europe, natural gas replacing coal and oil will contribute to emissions reduction on the short and medium terms.

There are, however, several concerns related to shale gas exploration and production, many of them being associated with the process of hydraulic fracturing. There is also a debate on the greenhouse gas emissions of shale gas (CO₂ and methane) and its energy return on investment compared to other energy sources. Questions are raised about the specific environmental footprint of shale gas in Europe as a whole as well as in individual Member States. Shale gas basins are unevenly distributed among the European Member States and are not restricted within national borders, which makes close cooperation between the involved Member States essential. There is relatively little knowledge on the footprint in regions with a variety of geological and geopolitical settings as are present in Europe. Concerns and risks are clustered in the following four areas: subsurface, surface, atmosphere and society. As the European continent is densely populated, it is most certainly of vital importance to understand public perceptions of shale gas and for European publics to be fully engaged in the debate about its potential development.

Accordingly, Europe has a strong need for a comprehensive knowledge base on potential environmental, societal and economic consequences of shale gas exploration and exploitation. Knowledge needs to be science-based, needs to be developed by research institutes with a strong track record in shale gas studies, and needs to cover the different attitudes and approaches to shale gas exploration and exploitation in Europe. The M4ShaleGas project is seeking to provide such a scientific knowledge base, integrating the scientific outcome of 18 research institutes across Europe. It addresses the issues raised in the Horizon 2020 call LCE 16 – 2014 on *Understanding, preventing and mitigating the potential environmental risks and impacts of shale gas exploration and exploitation*.

¹ EIA (2015). Annual Energy Outlook 2015 with projections to 2040. U.S. Energy Information Administration (www.eia.gov).



1.2 Aims of this report

This report summarizes the kick-off meeting of the Horizon 2020 project M4ShaleGas which officially started on 1 June 2015. The kick-off meeting was held at IFP Energie nouvelles office at Rueil-Malmaison, France.



2 THE KICK-OFF MINUTES

2.1 Agenda

This is the agenda of the kick-off meeting held on 2 June 2015 at IFPEN offices in Rueil-Malmaison.

Time	Duration	Title	Presenter
9:30	0:30	Registration & coffee	
10:00	0:30	Welcome & recapitulation on the M4ShaleGas project	Holger CREMER, Yvonne SCHAVEMAKER (TNO)
10:30	0:30	Context of M4ShaleGas and key legal and financial issues (incl. questions)	Bernardo Luis ABELLO GARCIA (European Commission)
11:00	0:30	Coffee break	
11:30	1:00	Shale gas development in Canada	Louise LAVERDURE (Geol. Survey of Canada)
12:30	1:30	Network Lunch	
14:00	1:00	Shale gas development in the U.S.A.	Douglas DUNCAN (U.S. Geological Survey)
15:00	0:30	Refreshments	
15:30	0:15	Introduction SP working group sessions	Jan TER HEEGE (TNO)
15:45	2:00	SP working group discussions	Facilitated by SP leads of SP1, 2, 3, 4
17:45	0:15	Closing remarks	Yvonne SCHAVEMAKER (TNO)
19:00		Dinner (Optional)	



2.2 Participants

The following colleagues participated in the kick-off meeting:

#	Name	Institute
1	Bernardo Luis ABELLO GARCIA	EC
2	Louise LAVERDURE	GSC-NRC
3	Douglas DUNCAN	USGS
4	Yvonne SCHAVEMAKER	TNO
5	Rene PETERS	TNO
6	Holger CREMER	TNO
7	Edward HOUGH	BGS
8	Malin TORSÆTER	SINTEF
9	Marco BOHNHOFF	GFZ
10	Bruno GARCIA	IFPEN
11	Jean-Pierre DEFLANDRE	IFPEN
12	Jan TER HEEGE	TNO
13	Monika KONIECZYNSKA	PGI-NRI
14	Neil THORPE	Newcastle University
15	Olga LIPINSKA	PGI-NRI
16	Andrea VIETH-HILLEBRAND	GFZ Potsdam
17	Julio CÉSAR GONZALEZ	IGME
18	Virginia RODRIGUEZ	IGME
19	Marta DOBRZAŃSKA	INiG
20	Barbara NOCON	INiG
21	Ewa KUKULSKA	INiG
22	Hugo DENIER VAN DER GON	TNO
23	Ana PICADO	LNEG
24	Paula COSTA	LNEG
25	Aleksandra LIS	AMU
26	Jessanne MASTOP	ECN
27	Jamilja VAN DER MEULEN	ECN
28	Michael BRADSHAW	Warwick Business School
29	Virgile ROUCHON	IFPEN
30	Anders JOHNSEN	GEUS
31	Torsten FLEISCHER	KIT-ITAS
32	Ole Stig JACOBSEN	GEUS
33	Fred WORRALL	Univ. Durham



2.3 Meeting report

2.3.1 Welcome and recapitulation of the M4ShaleGas project

Yvonne SCHAVEMAKER welcomed the participants and opened the kick-off meeting by introducing the special guests: Bernardo ALBELLO representing the European Commission, Douglas DUNCAN from the United States Geological Survey and Louise LAVERDURE from the Geological Survey of Canada.

Holger CREMER – the overall responsible project manager of M4ShaleGas at TNO as coordinating institution – gave a brief recapitulation of M4ShaleGas. How is M4ShaleGas embedded in the EC's research policy? What is M4ShaleGas' research vision and strategy? What are the main challenges of the project? What are the main results and goals M4ShaleGas seeks to deliver?

2.3.2 Context of M4ShaleGas and key legal and financial issues

Bernardo ALBELLO – representing INEA (Innovation and Networks Executive Agency) – gave first a brief overview on the position of M4ShaleGas in the EC's research program. The project is located in Horizon 2020's LCE – fossil fuel and CCS program area. Apart from M4ShaleGas, three other projects are funded in the Horizon 2020 Topic LCE-16-2014: *Understanding, preventing and mitigating the potential environmental impacts and risks of shale gas exploration and exploitation*: SHEER, FracRisk, and ShaleXenvironmentT.

2.3.3 Experience with shale gas exploration in Canada

Louise LAVERDURE from Geological Survey of Canada- Natural Resources Canada (GSC-NRC) was invited to the kick-off meeting in order to give an overview on the unconventional gas markets in Canada. Her presentation – *Shale gas geoscience and engineering in Canada: defining the R&D priorities and stakeholder engagement* – offered an interesting and informative journey through the shale gas resources and industries in Canada. Louise focused on a number of challenges including the economic competitiveness and environmental impacts of shale gas, and on public confidence in activities related to shale gas exploration. Louise then extensively reported on the current R&D activities and initiatives of NRC which focus on three fields: resources knowledge, environmental issues, and economic benefits. The talk made clear that developing unconventional gas will only be successful if policy, science and communication people closely work together and take their responsibilities.

2.3.4 Experience with shale gas exploration in the U.S.A.

Following lunch, Douglas Duncan from the United States Geological Survey (USGS) gave an extended summary on the unconventional oil and gas development and challenges in the U.S.A. The USGS is involved in unconventional gas development and research by producing estimates of undiscovered, technically recoverable resources, and by delivering robust and statistically sound geological models. Douglas started his talk with a historical overview on unconventional gas discoveries since the 1940's and the growing role of shale gas in the past decade. Douglas then paid particular attention to environmental impacts of unconventional gas exploration: water availability and



quality, air quality, human health, ecological impacts, and induced seismicity. Like Louise LAVERDURE from GSC, Douglas DUNCAN made clear that multiagency collaboration (public authorities, research institutions, society) and agreements are essential for responsible risk assessments of unconventional hydrocarbon development.

2.3.5 Sub-program (SP) working group sessions

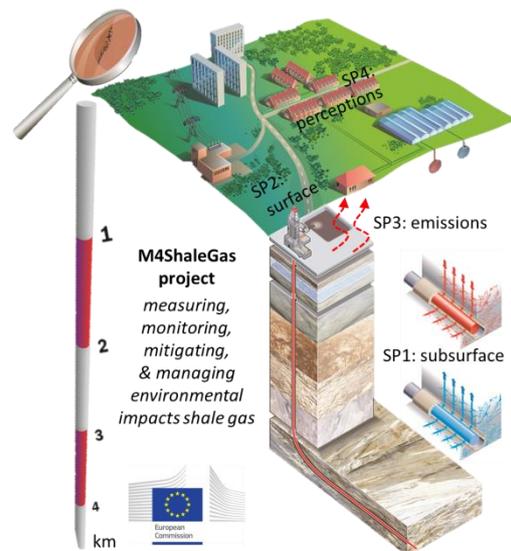
The afternoon session of the kick-off meeting was dedicated to group work of SP 1-4:

SP1: Subsurface impacts
[Jan TER HEEGE, TNO]

SP2: Surface impacts
[Ewa KUKULSKA, INiG]

SP3: Air quality impacts
[Paula COSTA, LNEG]

SP4: Public perceptions
[Mike BRADSHAW, U Warwick]



The working sessions of ca. 1.5 hours aimed at:

- a recap and coordination of SP and WP research questions and goals
- identification of potential challenges and issues
- agreeing on activities in the first project months in order to achieve first deliverables at the end of month 6 (Nov 2015)
- identification of cross-links between SPs and national research programs
- identification of joint SP aims and contributions to SP5 (integration of project results and public dissemination)

At the end of the SP working group sessions, session leaders briefly informed the entire kick-off meeting on the outcome of their session.



3 CONCLUSIONS

The one-day kick-off meeting offered two quality presentations on the shale gas situation and experience in Canada and the U.S.A. Both presented valuable information for the M4ShaleGas consortium as learning from experiences and best practices of shale gas development in North America is a key topic in M4ShaleGas.

Working groups of SP 1-4 discussed goals and projected results of the various work packages within each SP and agreed on a strategy of getting activities in M4ShaleGas started.

Beside these activities there was plenty of networking time for the consortium members during coffee breaks, a good French lunch and during the kick-off dinner in a cosy garden restaurant in Rueil-Malmaison.



4 REFERENCES

PDF documents of the presentations are available [here](https://ecity.tno.nl/sites/horizon2020_shalegas/SitePages/Home.aspx) on the [M4ShaleGas Sharepoint site](https://ecity.tno.nl/sites/horizon2020_shalegas/SitePages/Home.aspx) [https://ecity.tno.nl/sites/horizon2020_shalegas/SitePages/Home.aspx].