



**ADMINISTRATIVE ARRANGEMENT**

*Energy WP2014/2015 B.2.9- Energy Policy Support on Unconventional Oil and Gas  
JRC N °33565*

**BETWEEN**

**DG RTD**

**AND**

**DG JOINT RESEARCH CENTRE (DG JRC)**

According to the Council conclusions of 26.04.1994 (J.O. C 126 of 7.05.1994 p.1) on the role of the JRC;

According to the offer supplied by the JRC to DG RTD on its request;

According to the action entitled “*Energy Policy support on unconventional gas and oil*” within the context of Horizon 2020 – the European Union Framework Programme for Research and Innovation, DG RTD, Directorate for Energy entrusts the JRC Institute for Energy Technologies (JRC-IET) with the execution of the above mentioned project and the provision of the related scientific and technical services;

- 1) The present Administrative Arrangement ('Arrangement') is established between DG RTD which is represented, for the purpose of signing this Arrangement, by the Director of Directorate G – Energy of the above-mentioned Directorate General, and the Joint Research Centre, hereinafter referred to as the 'JRC', represented for the purpose of signing this Arrangement by the Director of the Institute for Energy Technologies (JRC-IET), Petten, the Netherlands.
- 2) The purpose of this Arrangement is to support the development and implementation of an evidence base for energy policy and research and innovation policies in the field of unconventional gas and oil. It is therefore excluded from the delegation to the executive agencies and will be implemented by DG RTD.

The work to be realised under the execution of the above mentioned project “*Energy Policy support on unconventional gas and oil*” is described in Annex I (Technical Specifications) to the present Administrative Arrangement.

A handwritten signature in black ink, consisting of a large 'M' followed by a stylized 'S' and a horizontal line.

- 3) The JRC shall perform the work, defined in Annex I, within 24 months counted from the date on which the last party signs this Arrangement.
- 4) Any delay in the performance of the work must be immediately notified to the DG RTD services in charge of the monitoring of the project.
- 5) The JRC-IET shall make available the personnel and other resources necessary for the performance of the project.
- 6) The cost of the work performed by the JRC is estimated at EUR 1,976,386.80 (*one million, nine hundred seventy-six thousand, three hundred and six euro and eighty cents*). It shall be totally financed by the General Budget and transferred to the JRC, in accordance with point 7), for up to the maximum of EUR 1,976,386.80 (*one million, nine hundred seventy-six thousand, three hundred and six euro and eighty cents*) above mentioned.
- 7) The credits necessary to cover the expenditure related to the performance of this work shall be made available to the JRC for services rendered when these services have been performed to the satisfaction of the DG RTD according to the Commission's accounting rules on the internal invoicing. The sums shall be transferred from the budget line BGUE-B2014-08.020303-C1-RTD 838 G0 Direction G (*of DG RTD*) to the Legal Entity File (LEF) 6999999009 number (*of the JRC*) mentioning the Recovery Order (RO) number. The JRC will produce a debit note for each payment. Payments shall be made in accordance with the payment plan mentioned below and subject to any special provision (e.g. linked to approval of reports) as specified in Annex I:
- A first payment of 40% of the agreed cost (EUR 790,554.72 or *seven hundred ninety thousand, five hundred fifty four euro and seventy two cents*), on signature of the present Arrangement;
  - A second payment of 30% of the agreed cost (EUR 592,916.04 or *five hundred ninety two thousand, nine hundred sixteen euro and four cents*), upon acceptance of Deliverables A.1.1 – mid-term report and C.3 – first update report, as well as all prior deliverables;
  - A final payment of the balance (EUR 592,916.04 or *five hundred ninety two thousand, nine hundred sixteen euro and four cents*) upon acceptance of Deliverables A.1.1 – final report, A.1.2, C.2 and C.3 – second update report, as well as all prior deliverables.
- 8) If a portion of the work is to be subcontracted by the JRC then:
- The JRC shall seek prior written agreement from DG RTD before sub-contracting parts of the work not already foreseen in Annex I.
  - The request for agreement from DG RTD to the sub-contracting shall bear a detailed description of the services that will be tendered and of their estimated value.
  - The tender specifications for the work to be subcontracted shall be prepared by the JRC and submitted to DG RTD with the request for prior written agreement. For calls and invitations to tender related to subcontracting under the present Arrangement and that are above the



threshold of Art. 137 RAP, DG RTD will be given the option to participate in the (opening and) evaluation of tenders.

- 9) Any modification of the present Arrangement and its annexes shall be the subject of a written agreement having the same form of the present Arrangement.
- 10) The title of the project as quoted under point 2 and the number of the present Arrangement shall appear on any report, correspondence or cost statement concerning the same subject.
- 11) All the correspondence concerning the present Arrangement shall be in written form and shall be forwarded to the following addresses:

**For DG RTD**

- A. For administrative matters  
European Commission  
DG Research and Innovation  
Directorate G – Energy  
Attn: [REDACTED]  
Head of Unit G.7 – Administration and Finance  
CDMA 01/20
- B. For technical matters  
European Commission  
DG Research and Innovation  
Directorate G – Energy  
Attn: [REDACTED]  
Unit G.2 – Advanced Energy Production  
CDMA 00/32

**For the JRC**

- A. For administrative matters  
European Commission  
Joint Research Centre  
Attn: [REDACTED]  
JRC.B.10, Resource Management Petten  
PTT-P308 01/129
- B. For technical matters  
European Commission  
Joint Research Centre  
Attn: [REDACTED]  
JRC.F.3, Energy Security, Systems and Market  
PTT-P309 02/209



12) The following documents form an integral part of this Arrangement.

- Annex I – Technical Specifications
- Annex II – Breakdown of financial offer

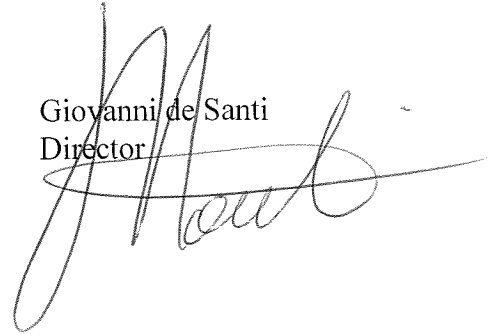
For the DG RTD  
Directorate G – Energy



Andras Siegler  
Director

Done in *Brussels on 4.2.2015*  
In duplicate in English.

For the JRC  
Institute for Energy and Transport



Giovanni de Santi  
Director

**TECHNICAL SPECIFICATIONS**  
**to the**  
**Administrative Arrangement between JRC and DG RTD on**  
**Energy Policy support on unconventional gas and oil**

**1. Background**

The EU is facing serious energy challenges with an increasing import dependency and related risks to security of supply, with impacts on energy prices, competitiveness and on the effective completion of the internal energy market. Unconventional fossil fuels are gaining interest as a possible new source of natural gas and oil.

The recent boom in natural gas and crude oil production from shale formations (shale gas and tight or shale oil) in the US has ignited a discussion on the European potential for shale gas extraction and its economic and environmental implications. The promise of shale gas to contribute to security of supply has spurred several Member States to allow for exploration of domestic shale gas on their territory. In addition, the exploration and exploitation of unconventional gas and oil has the potential to bring direct or indirect economic benefits to EU Member States, for instance through regional investments in infrastructure, taxes and royalties, or employment opportunities in the extraction industry or in related service industries.

The Commission published in January 2014 its communication "*On the exploration and production of hydrocarbons (such as shale gas) using high volume hydraulic fracturing in the EU*", COM(2014) 23 final. The Communication outlined the Commissions current knowledge regarding unconventional gas and oil, the shale gas potential in the EU as well as environmental risks and public concern. The European Energy Security Strategy (COM(2014)330 final) adopted on 28 May 2014 calls on Member States to assess the potential of unconventional hydrocarbons taking full account of Recommendation 2014/70/EU in order to ensure that the highest environmental standards are implemented. As announced in the European Energy Security Strategy, on 8 July 2014 the Commission launched a European Science and Technology Network on Unconventional Hydrocarbon Extraction which shall collect, analyse and review results from exploration projects as well as assess the development of technologies used in unconventional gas and oil projects.

It is within this framework the current Administrative Arrangement (hereafter referred to as *Arrangement*) shall support other Commission services with expertise and other services relevant for policy development in the area of unconventional gas and oil.

## 2. Subject

According to Council conclusions of 26.04.1994 (J.O. C 126 of 7.05.1994) on the role of the DG Joint Research Centre, the JRC activities include Institutional support activities such as scientific and technical support activities necessary for the formulation and implementation of Community policies and of the tasks allotted to the Commission pursuant to the Treaties, which necessitate the neutrality of the JRC.

The purpose of the work to be carried out under this *Arrangement* is for DG JRC-IET, located in Petten, The Netherlands, (hereafter referred to as *JRC*) to provide other services of the European Commission with "Energy Policy support on unconventional gas and oil", as provided for in the HORIZON 2020 work programme 2014-2015, part 10. Secure, clean and efficient energy, item B.2.9, (European Commission Decision C (2013)8631 of 10 December 2013).

The *Arrangement* shall be implemented according to the tasks described hereafter.

## 3. Tasks to be carried out

The main objective of the *Arrangement* is to carry out scientific activities in support to policy making on unconventional gas and oil, as specified in the Horizon 2020 work programme 2014-2015, part 10. *Secure, clean and efficient energy, item B.2.9*. Without prejudice to other issues that may acquire more importance or require immediate attention and action, the priority issues to be addressed are:

- A. Assessment of European unconventional gas and oil resources;
- B. Unconventional hydrocarbons and energy markets;
- C. Communication and dissemination, international knowledge sharing.

## 4. Activities and Deliverables

All deliverables and reporting shall be submitted to DG RTD. All information and intellectual property owned by the JRC ("Background") will remain the JRC's property. All information and intellectual property generated by the JRC in the course of the implementation of this Administrative Arrangement ("Foreground") shall be provided to DG RTD for its policy needs, and will be released to DG ENER.

JRC will submit each of the deliverables in draft format to RTD. RTD will review the draft deliverables and provide comments to the JRC within 15 working days. JRC will then make the necessary revisions within 20 working days, and submit the final deliverables to DG RTD. DG RTD will be responsible for approving deliverables within 10 working days. If DG RTD does not react within this period of time, the draft deliverable shall be deemed to have been approved.



The activities A.1, A.2, B.3, and C.1 will be subcontracted. The subcontracts for A.1, A.2 and B.3 will be awarded through open public procurement procedures. The subcontract for C.1 will be awarded making use of Framework Contracts of the EC/JRC, or in the impossibility of using them through an open public procurement procedure.

The long-term life of the website, including its maintenance after the end of the contract will depend upon the allocation of the required resources (both human and material) in the Work Programmes of the JRC (e.g. 2017 onwards), and its acceptance by the relevant bodies (including the other Commission services).

The activities B.1 and B.2 will be supported by experts, whose contribution will be Expert Contracts with fixed number of days, based on specific Terms of Reference and deliverables.

Without prejudice to other deliverables related to issues that may acquire more importance or require immediate attention and action in consultation with RTD and ENER, the following deliverables shall be produced and submitted:

#### **Task A. Assessment of European unconventional gas and oil resources**

<b>Activity</b>	<b>Deliverable</b>	<b>Timetable (T0 = contract signature)</b>
A.1.1 Resource Assessment	Technical report	First draft: T0 + 8 months Mid-term report: T0 + 12 months Final report (update): T0 + 24 months
A.1.2 Resource Assessment - web	Web-based interactive database and map application	T0 + 24 months
A.2 Development of methodology for resource assessment for unconventional gas and oil	Technical report	First draft: T0 + 6 months Final report: T0 + 14 months

Description:

**A.1 Technical report and Web-based application - resource assessment**

The Report shall provide an up-to date assessment of unconventional gas and oil resources based upon data and information currently available at the geological surveys of the EU, (including Switzerland and Ukraine) as well as other sources. These sources include the EuCoRes<sup>1</sup> database as far as coal bed methane (CBM) is concerned, to which currently further data is added in the context of the project EU TOPS<sup>2</sup>. Information on reserves of (conventional/tight) gas and (conventional) oil shall be included in the assessment if easily available. Information on mid-sized producing countries may be received via DG ENER's Market Observatory for Energy (MOE) and Energy Market Observatory System (EMOS) (cf. call for tenders ENER/A4/2014-37, [http://ec.europa.eu/dgs/energy/tenders/index\\_en.htm](http://ec.europa.eu/dgs/energy/tenders/index_en.htm)).

The resource assessments shall be performed at least at the level of basins. Data shall be aggregated at a suitable level (for public use); as far as possible homogenised so as to be expressed in a common framework; wherever possible, provided with uncertainty ranges (e.g. P10/P50/P90) on potential resource estimates. The assessment shall cover EU Member States.

This report will include:

1. An introductory overview of the current status of shale gas (and shale oil, where applicable) development in Europe. This overview will among others address exploration and production results, published assessments, known political/societal issues affecting shale gas and shale oil development.
2. A brief geological description of European shale gas plays (and shale oil plays, where applicable) including play concepts and associated risk components, geological basins and basin evolution, stratigraphy and cross-border correlations, characteristics and structural setting of intervals selected for shale gas and shale oil assessment.
3. Compiled geological maps covering the European onshore area (and off-shore areas, where applicable) including:
  - a. Extent of shale gas basins
  - b. Depth and thickness of selected shale gas and shale oil intervals
  - c. Overview of relevant structural elements and faults
  - d. Maturity and Total Organic Carbon (TOC) of selected shale gas/oil units
  - e. Locations of relevant source data used in the assessment

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<sup>1</sup> [http://ec.europa.eu/energy/coal/eucores/eucores\\_en.htm](http://ec.europa.eu/energy/coal/eucores/eucores_en.htm)

<sup>2</sup> Technology Options for Coupled Underground Coal Gasification and CO<sub>2</sub> Capture and Storage; [http://cordis.europa.eu/projects/rcn/109590\\_en.html](http://cordis.europa.eu/projects/rcn/109590_en.html) and <http://www.tops-ucgccs.eu>



4. An overview of relevant shale layer characteristics such as frequency distribution of the TOC content, porosity distributions, mineralogy and geochemical proxies for organic matter type and maturity.
5. Estimations of:
  - a. Total, per-basin and per-country onshore and - to the best extent possible - offshore gas-in place (GIP) (and oil-in-place, where applicable).
  - b. Total, per-basin and per-country onshore and - to the best extent possible - offshore technically recoverable resources (TRR).
6. A discussion of the results, including geological and scientific analyses of derived volumes and associated uncertainties, interdependencies, differences with estimations reported in previous studies, and observed trends.
7. A discussion on identified knowledge gaps and recommendations for future work that will refine, enhance or further complete the assessment compiled in the report and taking into account current innovative development in shale gas/shale oil exploration and production techniques.

The results will be made available through a Web-based interactive database and map application.

#### **A.2: Technical report – A common EU methodology**

A commonly agreed methodology for resource assessment of unconventional gas and oil shall be developed in cooperation with national geological surveys and other stakeholders (academia, industry....).

Relevant stakeholders will be consulted in a dedicated workshop on the proposed database and methodology in order to achieve a common acceptance.

The geographical database will be developed allowing for later updating and integration of data from other countries or on other uses of the underground like collected in the CO2Stop project on CO2 storage capacity or the planned project on energy storage mapping and planning (B.2.7 in Horizon 2020 Energy Work Programme). The database will be developed with a view to, in the longer term, the creation of an integrated geographical database and map of the European underground and its potential uses. The database will have technical specifications that meet the requirements for internal IT EC services so that it can be potentially hosted by DG DIGIT. Any decision in this respect will be discussed with DG RTD (and any other interested Commission service).

**Task B. Unconventional hydrocarbons and energy markets**

<b>Activity</b>	<b>Deliverable</b>	<b>Timetable (T0 = contract signature)</b>
B.1 Analyse the economic impacts on energy markets from the worldwide and potential European exploitation of unconventional gas and oil	Technical report	First draft: T0 + 8 months Final report: T0 + 10 months
B.2 Analyse wider economic impacts and framework conditions for potential unconventional gas and oil extraction in the EU (e.g. job creation and tax revenues) based on existing literature	Technical report	First draft: T0 + 16 months Final report: T0 + 18 months
B3. Evaluate technical and economic framework conditions for the development of a European shale gas industry	Technical report	First draft: T0 + 16 months Final report: T0 + 18 months

Description:**B.1 Technical report**

The technical report shall explore the medium and long-term implications of the worldwide increased development of unconventional gas and oil and their by-products on European and international energy markets. It will be similar to the JRC's 2012 report on unconventional gas, although with more emphasis on international markets (since oil and gas are globally traded commodities).

**B.2 Technical report**

The technical report shall be a literature study on the potential economic benefits (e.g. prospects for income from taxes and royalties and the job creation potential) from possible unconventional gas and oil production in relevant European countries. The results shall be derived from both European as well as international, especially U.S., evidences.

**B.3 Technical Report**

The technical report shall evaluate the technical and economic framework conditions for the development of a European shale gas industry e.g. availability of related service industries and of a skilled workforce, appropriateness of exploration and production technologies and methods including possible needs and scope for their improvement.




**Task C. Communication and dissemination, international knowledge sharing.**

<b>Activity</b>	<b>Deliverable</b>	<b>Timetable (T0 = contract signature)</b>
C.1. Set up and maintain (throughout the <i>Arrangement</i> ) a website presenting the work carried out under the <i>Arrangement</i> .	Website	T0 + 3 months
C.2. Support to the European Science and Technology Network on Unconventional Hydrocarbon Extraction	Contribution to the European S&T Network on Unconventional Hydrocarbon Extraction to ensure a balanced participation to the Network's activities (such as workshops)	T0 + 24 months
C.3 International knowledge sharing	Reports on international developments in the field of unconventional gas and oil, including on environmental and safety aspects	1 <sup>st</sup> update report: T0 + 12 months 2 <sup>nd</sup> update report: T0 + 24 months



**Detailed breakdown of costs and resources per activity**

<b>Deliverable</b>	<b>Type</b>	<b>Resources</b>	<b>JRC</b>
A.1.1 Resource Assessment	Subcontract	500K Euro	AD (██████████) - 0.75mm AD (██████████) - 1.5mm CA1 – geologist 12mm
A.1.2 Resource Assessment – web db	Subcontract	80K Euro	CA1 – geologist 3mm
A.2 Development of methodology for resource assessment for unconventional gas and oil	Subcontract	80K Euro	AD (██████████) - 0.75mm AD (██████████) - 1.5mm CA1 – geologist 9mm
B.1 Analyse the economic impacts on energy markets from the worldwide and potential European exploitation of unconventional gas and oil	Technical report	45K (expert support)	AD – techno-economist 10mm CA2 – techno-economic analysis 12mm
B.2 Analyse wider economic impacts and framework conditions for potential unconventional gas and oil extraction in the EU (e.g. job creation and tax revenues) based on existing literature	Technical report	45K (expert support)	AD – techno-economist 10mm CA2 – techno-economic analysis 12mm
B3. Evaluate technical and economic framework conditions for the development of a European shale gas industry	Subcontract	140K Euro	AD – techno-economist 4mm
C.1. Set up and maintain (throughout the Arrangement) a website presenting the work carried out under the Arrangement.	Subcontract	72K Euro	
C.2. Support to the European Science and Technology Network on Unconventional Hydrocarbon Extraction	Support	30K Euro (expenses for invited participants)	
C.3 International knowledge sharing	Technical Report	60K (international workshops)	AD (██████████) – 0.5mm AD (██████████) – 1mm



Breakdown price for Administrative Arrangement between JRC and DG RTD on Energy Policy support on unconventional gas and oil

ITEM	Unit	N. Units	Cost per unit	Amount (€)	Comment
<b>A. FEES</b>					
JRC/IET staff AD 12-14	Person-Month	1.50	€17,666.17	€26,499.26	1
JRC/IET staff AD 8-11	Person-Month	3.00	€12,244.17	€36,732.52	2
JRC/IET staff AD 8-11	Person-Month	24.00	€12,244.17	€293,860.12	3
CA GFIV (1)	Person-Month	24.00	€7,320.52	€175,692.45	4
CA GFIV (2)	Person-Month	24.00	€7,320.52	€175,692.45	5
<b>Total A</b>				708,476.80	
<b>B. Direct Expenses</b>					
<b>B1. Subcontracting</b>					
<b>Task A</b>					
A.1.1 Resource Assessment - Technical report				500,000.00	
A.1.2 Resource Assessment - Web-based database				80,000.00	
A.2 Development of methodology				80,000.00	
<b>Task B</b>					
B.3 Techno-economic framework - Technical report				140,000.00	
<b>Task C</b>					
C.1 Website				72,000.00	
<b>B.2 Others</b>					
Expert Contracts	180	500		90,000.00	6
<b>B.3 Workshops/Experts</b>					
Working Groups meetings & Conferences					
-- Expenses for invitees	40	750	30000	30,000.00	7
International Workshops					
-- Expenses for invitees	20	3000	60000	60,000.00	8
<b>Total B</b>				1,052,000.00	
<b>Total A + B</b>				1,760,476.80	
<b>C. Reimbursable Expenses</b>					
Missions	Mission	30.00	750	22,500.00	9
<b>Total C</b>				22,500.00	
<b>D. Overheads</b>					
<b>Overheads on B and C</b>				193,410.00	
<b>Total C</b>				193,410.00	
<b>Total A + B + C+D</b>				1,976,386.80	

NOTES

1	1+1 man-months	(including marginal overheads)
2	2+2 man-months	(including marginal overheads)
3	2+12 man-months	(including marginal overheads)
4	CA1 - Geologist: 12+12 man-months	(including marginal overheads)
5	CA2 - Techno-Economist: 12+12 man-months	(including marginal overheads)
6	4 x 30 working days (@500 euro per day), for expert review, specific advice, etc.	
7	1+1 (one conference per year x 4+4 (invited people per 2 working group meetings per year) 4 persons Each mission estimated at 750 Euro	40 missions
8	2+2 (workshops per annum) x 5 (invited people per workshop)  Each mission estimated at 3000 Euro (several invitees foreseen from North America)	20 missions
9	15 missions per annum Each mission estimated at 750 Euro	