



IGU Committee Meeting (WOC1 and PGC A)
18-21 February 2013, Rio de Janeiro, Brazil
The Windsor Atlantica Hotel



Study Group 1.2 (SG1.2):

Assessment of Global Resources and Reserves.

Leader: Mohammed Kaced

Scope:

- In the middle of the so called unconventional gas revolution, one of the most important challenges to be faced by this study group is the development of reliable estimates for both conventional and unconventional gas reserves and resources.
- In this process, the group is expected to identify the most important projects under development, and their potential impact on the future availability of natural gas from both regional and global standpoints.
- Exploratory hotspots and new frontiers for natural gas will be highlighted, and the most important trends, uncertainties, opportunities and threats to be faced by the upstream segment of the gas industry will be listed and dealt with.
- The group will also examine the initiatives for associated gas flaring reduction as a means of sustainably enhancing gas supply.



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Tasks and objectives of the 2nd Meeting

18-21 February 2013, Rio de Janeiro, Brazil

- Structure for the report
- First estimate of global gas flaring
- Inventory of new plays, discoveries and frontier areas



STRUCTURE OF THE REPORT (Draft)



- Executive Summary: regional and global resource estimates
- Introduction
- Section 1: The global potential of Conventional gas
 - Definitions & characteristics
 - Regional trends,
 1. Middle East and North Africa
 2. North America
 3. Europe
 4. South America and Caribbean
 5. Asia Pacific and South Asia
 6. Sub-Sahara Africa
 7. Russia and Central Asia
- Section 2: The global potential of unconventional gas
 - shale gas
 - Definitions & methods for estimating the recoverable resources of shale gas
 - Regional trends: Argentina, Mexico, Poland, China, Saudi Arabia, India, Tunisia, etc.
 - Tight gas
 - Coal Bed Methane (CBM)
 - Methane hydrates
- Section 3: Assessment of gas flaring
- Section 4: Exploration and discovery trends, and new frontier and exploration areas.
- Conclusions
- References:

WOC 1 SG.1.2 Delegates 2012-2015

(Updated: 19/02/2013)

SG	Given names	Family names	Title	Affiliation	Mobile/Fax	E-mail	Country
1.2	Abdelouahad	Belmouloud	Technical Advisor, Production Operation	Sonatrach	+213 21 54 85 35	a.belmouloud@amt.sonatrach.dz	Algeria
1.2	Mohamed	Kaced	Project Manager of Unconventional Resources	Sonatrach	+213 61 65 02 49	mohamed.kaced@ep.sonatrach.dz	Algeria
1.2	Said	Chelbeb	Head of Department, Southeast	Sonatrach	+213 560 248 885	said.chelbeb@sonatrach.dz	Algeria
1.2	Denis	Krambeck Dinelli		PETROBRAS	55 21 2144-1529	dkdinelli@petrobras.com.br	Brazil
1.2	Daojiang	Long	Senior Engineer	PetroChina RIPED, Langfang		longdj@petrochina.com.cn	China
1.2	Lilit	Cota		INA d.d., Zagreb		lilit.cota@ina.hr	Croatia
1.2	Peter	Westhof	Dr.	Wintershall Holding GmbH	+49 561 3011675	peter.westhof@wintershall.com	Germany
1.2	Shariq	Hashmi	Chief Reservoir Engineer	Pakistan Petroleum Ltd	+9221 35680005	h_shariq@ppl.com.pk	Pakistan
1.2	Zafeer Hasan	Khan	Senior Production Engineering Manager	Pakistan Petroleum Ltd	+9221 35680005	k_zafeer@ppl.com.pk	Pakistan
1.2	Khazisyed	Ahmedjeelani	Unconventional Gas Development Strategy	Saudi Aramco	+966 50 411 4871	khazisyed.ahmedjeelani@aramco.com	Saudi Arabia
1.2	David	Parkinson*	Vice President, Upstream Consulting	Wood Mackenzie	+65 6518 0801	david.parkinson@woodmac.com	Singapore
1.2	Ladislav	Goryl	Underground Storage Division Director	NAFTA AS	+421 34 697 4646	ladislav.goryl@nafta.sk	Slovakia
1.2	Krit	Limbanyen	Planner	PTT	+662 537 4863	KritL@pttep.com	Thailand
1.2	Fernando	Jorge Bado	Energy team - Researcher	Tenaris	+54 11 4018 8957	fbado@tenaris.com	Argentina



Focus Groups and Deliverables:



- **Conventional Gas:** Remaining reserve and resource assessment;
(Team leader: Fernando Jorge Bado _ Tenaris, Argentina)
- **Unconventional gases** (tight, shale gas, CBM, hydrates): reserve and resource assessment;
(Team leader: Kaced Mohammed_ Sonatrach, Algeria)
- **Assessment of gas flaring:** initiatives for reduction and enhancing supply;
(Bent Svensson and his team of GGFR)
- **Exploration and discovery trends,** and new frontier and exploration areas.
(Team leader: Denis Krambeck Dinelli_Petrobras, Brazil.)

Tasks and objectives for the 3rd Meeting, Malaysia

- Refine the structure of the report
- Definitions & characteristics of the reservoirs, methods for estimating the reserves and resources, etc.
- Boundaries of the study
- Sources to use
- Assignment of the participants to sub-groups according to their choice and expertise
- Ask GGFR to send the last updated report on gas flaring and invite them to present it in Malaysia.



Studies use different methodologies for the resource estimates



- use of the terms '**discovered**' and '**undiscovered**'.
- **URR**: The ultimately recoverable resource of a field or region is the sum of all gas that is expected to be recovered from that field or region over all time.
- **EUR**: is the 'Estimated Ultimate Recovery' (EUR) from an individual well. EUR is essentially identical to URR,
- **TRR**: technically recoverable resources is the fraction of the gas in place that is estimated to be recoverable only with current technology.
- **RTRR**: remaining technically recoverable resources

however ambiguity remains over whether sources include undiscovered volumes of gas from their definitions, and what they mean by the term 'undiscovered' when its included

Confusion can occur over whether these recoverable resources should be interpreted as the ultimately recoverable or the technically recoverable.



Algeria Shale Gas



Wood McKenzie (2009) : Over 529 Tcf of gas in place (GIIP) in the hot shale of the Silurian

DeGolyer & MacNaughton (2010) : 3400 Tcf of gas in place in the hot shale of the Silurian across the whole Saharan platform from which over 600 Tcf would be technically recoverable

PETRENEL (2010) : 3954 Tcf of unrisks shale gas in place in the hot shale of the Silurian and Frasnian.

EIA (2011) annual report :

231 Tcf of technically recoverable gas in the hot shale of Berkine, Illizi and Tindouf basins.
(the most prospective basins such as Ahnet and Gourara are not included)

SONATRACH (2011) : 2650 Tcf de residual Gas in the source rock which represente 10% of the

A variety of sources

Around 40 sources provide original country or regional-level estimates of shale gas resources

Author/organisation	Date of report	Countries/regions covered	Resource estimate
Mohr & Evans [27]	Sep-11	Continental regions	URR
USGS ¹	Aug-11	United States	'Potential additions to reserves'
Medlock <i>et al.</i> [28]	Jul-11	9 North American, European and Pacific countries	TRR ²
INTEK (for EIA) [18]	Jul-11	United States	'Unproved, discovered TRR' ³
ICF (Petak) [29]	May-11	United States, Canada	ERR ⁴
ARI (Kuuskraa) [30]	May-11	United States	TRR
EIA (AEO) [25]	Various ⁵	United States	TRR (2010 – 1999) ERR (1998 & 1997)
Potential Gas Committee [31]	Apr-11	United States	TRR
ARI (for EIA) [32]	Apr-11	32 individual countries	OGIP and TRR
ICF (Henning) [33]	Mar-11	United States, Canada	ERR ⁴
ARI (Kuuskraa) [34]	Jan-11	United States	TRR
Caineng <i>et al.</i> [35]	Dec-10	China	OGIP
Medlock & Hartley [36]	Oct-10	United States, Canada	TRR
ARI (Kuuskraa) [37]	Oct-10	United States	TRR
World Energy Council [38]	Sep-10	Nine continental regions	OGIP
Mohr & Evans [39]	Jul-10	United States, Canada	URR
MIT (Moniz) [40]	Jun-10	United States	TRR
Dawson [41]	May-10	Canada	ERR
Skipper [42]	Mar-10	United States, Canada	TRR
Hennings [43]	Mar-10	United States	OGIP and TRR
ARI (Kuuskraa) [44]	Mar-10	United States, Canada	TRR
Petrel Robertson Consulting [45]	Mar-10	Canada	OGIP
IHS CERA (Downey) [46]	Jan-10	United States, Canada	TRR
DECC (Harvey and Gray) [47]	Jan-10	UK	TRR
ARI (Kuuskraa) [48]	Dec-09	United States, Canada, Poland, Sweden, Austria, South Africa	'Recoverable resources'
Potential Gas Committee [49]	Jun-09	United States	TRR
Theal [50]	May-09	United States, Canada	OGIP and TRR
ICF (reported by [8])	Mar-09	United States	ERR ⁴
IHS CERA [51]	Feb-09	Europe	TRR
Wood Mackenzie [52]	Jan-09	Europe	TRR
ICF (Vidas & Hugman) [53]	Nov-08	United States, Canada	OGIP and TRR
Navigant Consulting [54]	Jul-08	United States	TRR
ARI (Kuuskraa) [55]	Jul-07	United States	URR
Sandrea [56]	Dec-05	United States, Global	'Recoverable reserves'
Laherrere [57]	Jun-04	Global	URR
Kuuskraa [58]	Jan-04	United States	TRR and URR
Rogner [59]	Jan-97	Continental regions	OGIP
Kuuskraa & Meyers [60]	Jan-83	United States, Canada, ROW	TRR

Table 2-2: Shale gas reports providing original country level estimates by date, countries or regions covered and type of resource estimate, UK ERC, 2012