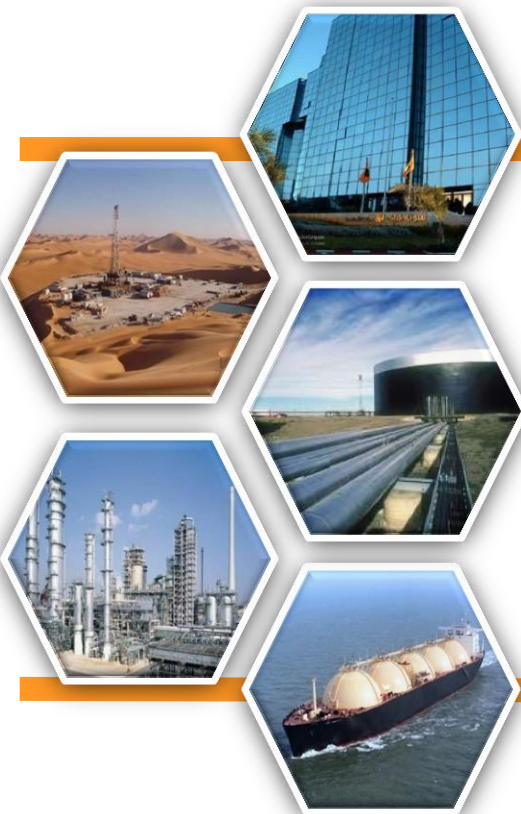




SONATRACH

ALGERIA



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Vision & Perspectives

ALGERIA - Energy Day 04th May, 2016

HOUSTON - TEXAS - USA

Sonatrach Corporate Profile : 2015 key figures

E&P



Discoveries (20)

18 by Sonatrach
02 in Partnership

Exploration wells (106)

94 by Sonatrach
12 in Partnership

Development Wells (145)

110 by Sonatrach
35 in Partnership

Seismic acquisition

2D : total 10 000 Km
by Sonatrach

3D: total 19 000 km²

18 400 Km² by Sonatrach

Primary Production

Total: 191 MTOE
Oil & Cond.: 60 MTOE
Natural Gas: 128 BCM
LPG: 10 MTOE

Midstream



32 pipelines of
20 000 km

North trans 147 MTOE
N. Gas: 82 BCM

Pumping & compression
stations 82

Storage capacity
4.1 MCM (liquids)

Downstream



Liquefaction Capacity
60 MCM

LNG Production
30 MCM

LPG Processing
10 Mt capacity – 8 Prod

Refining Capacity
25 Mt Oil
+ 5 Mt Condensate

Marketing



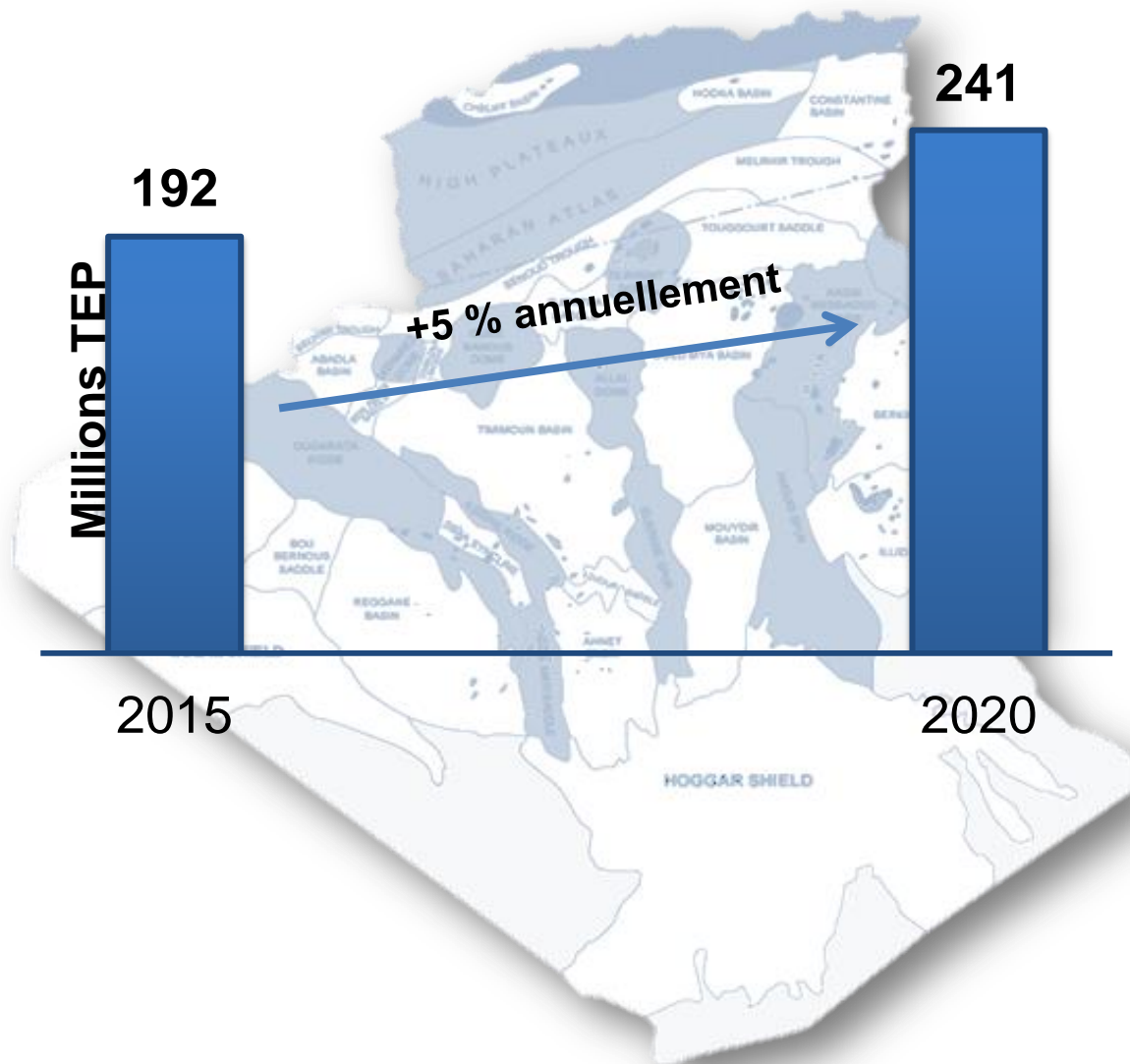
Exports 100 MTOE

Liquid: 56 MTOE
NG: 28 BCM
LNG: 29 MCM

Domestic Market 45 MTOE

Out of which
Natural Gas: 30 BCM

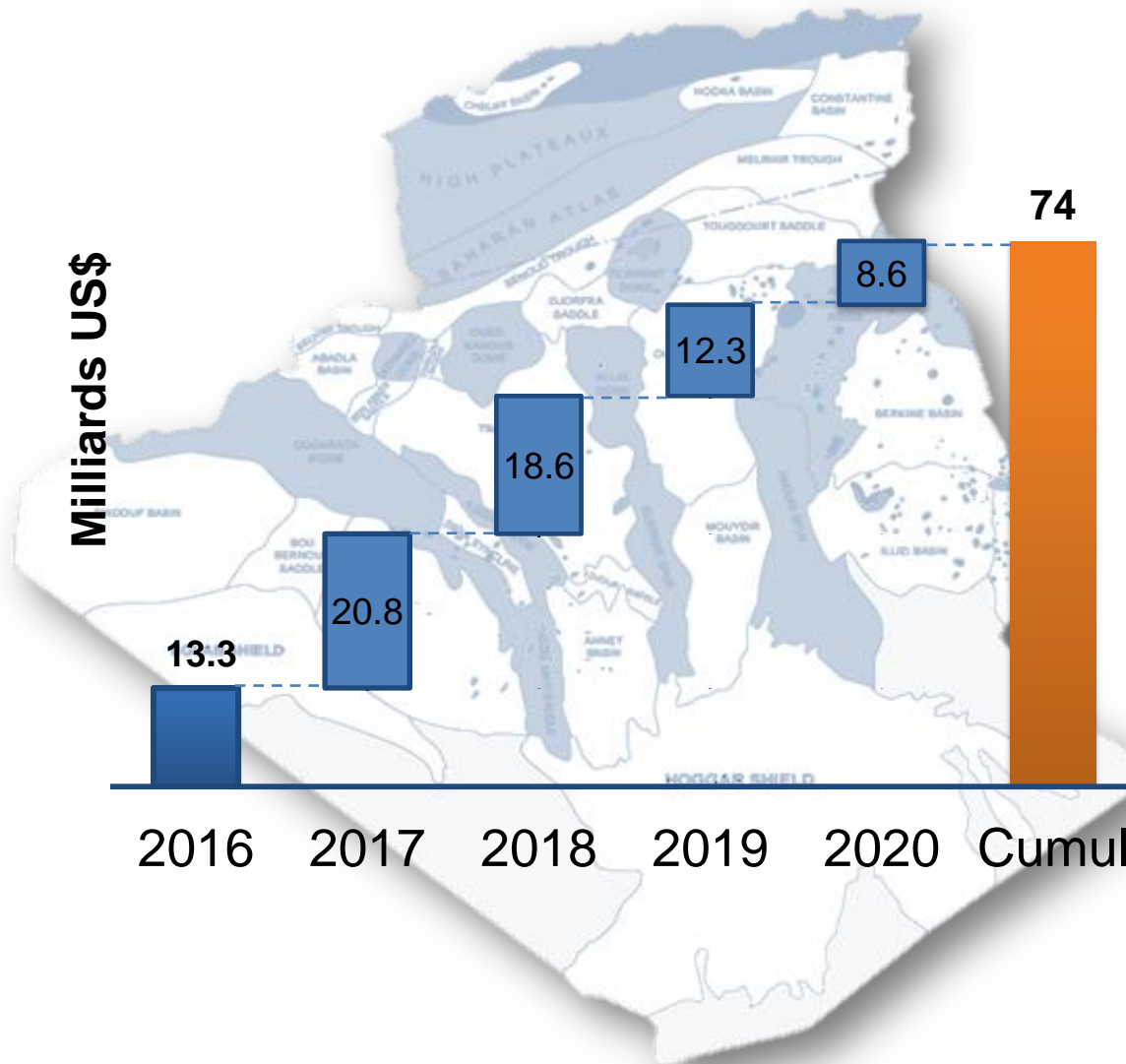
SONATRACH PERSPECTIVES



To 2040:

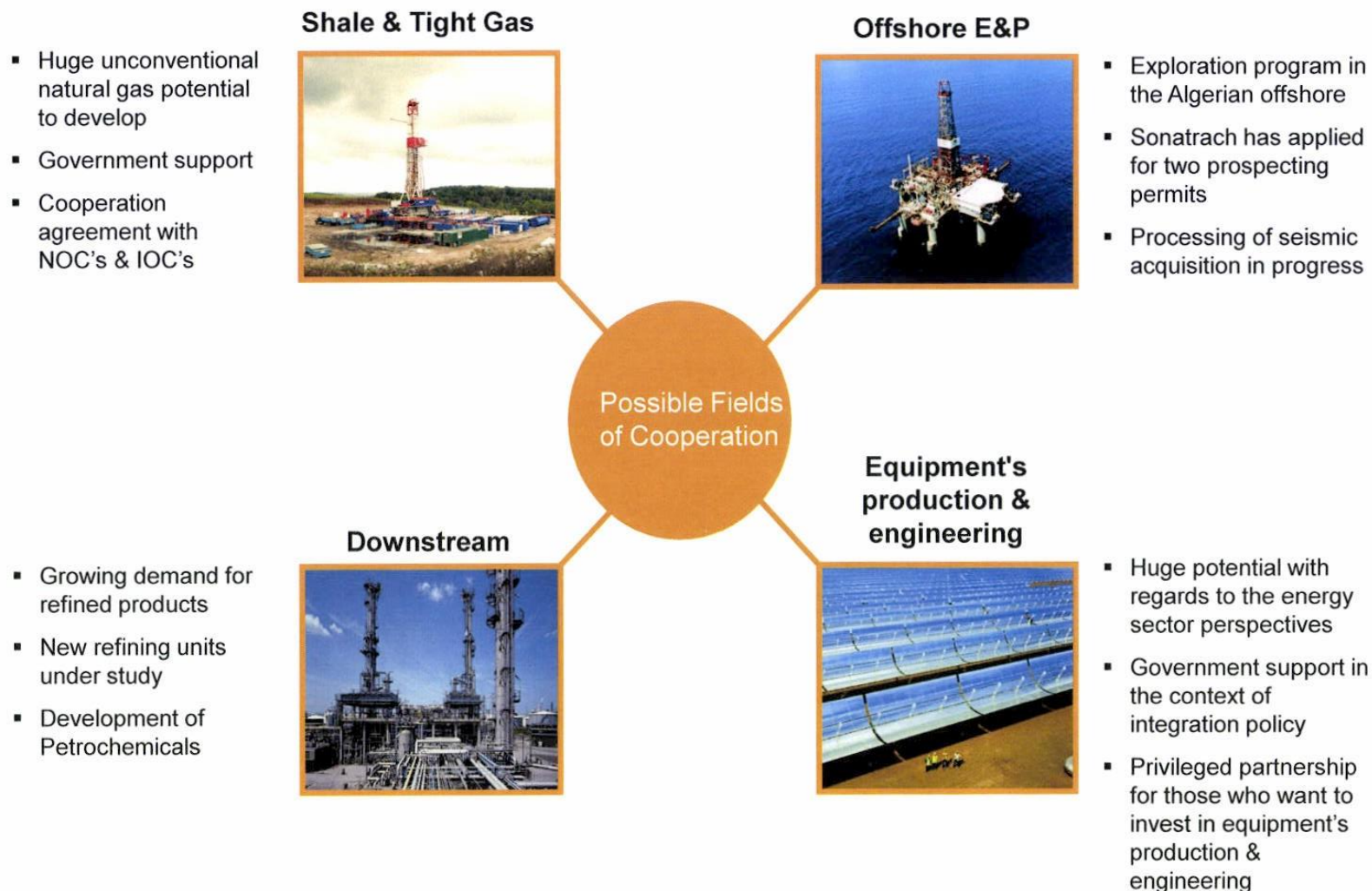
- 1,28 Million b/d of crude oil
- 450 Millions m³/d of NG
- 60 Milles Tonnes /d of condensat and LPG des GPL

SONATRACH INVESTMENT 2016-2020



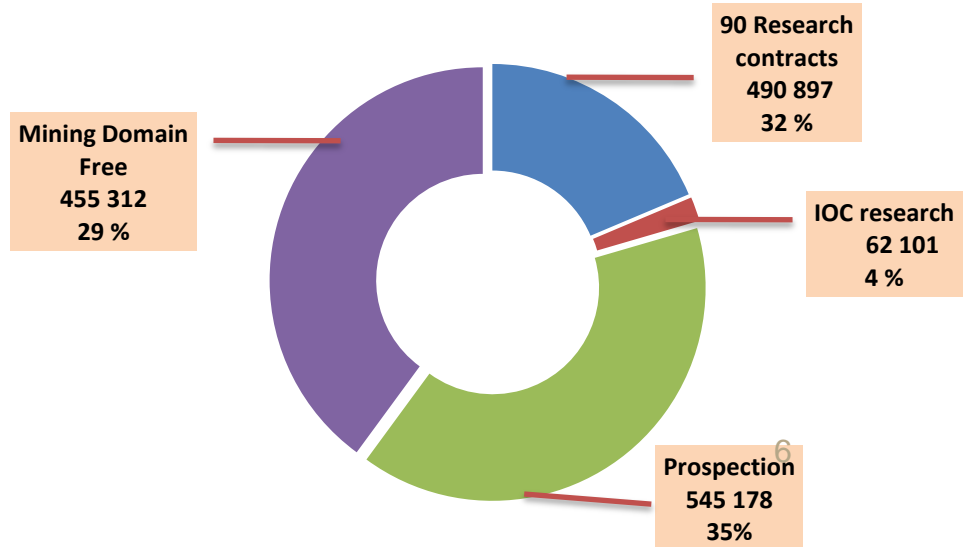
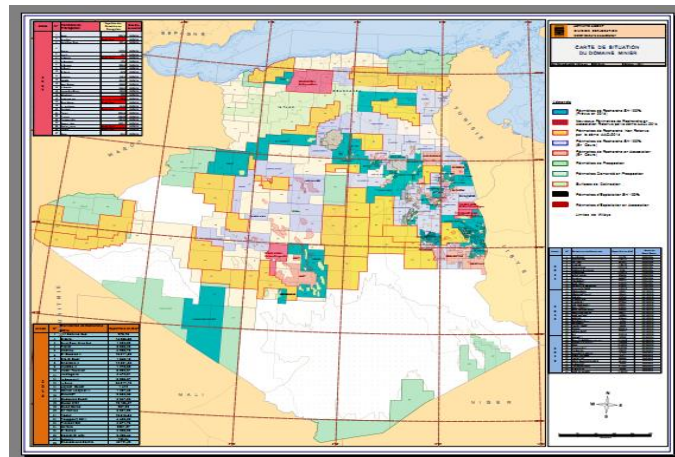
- Seismic 2D - 45 000 km,
- Seismic 3D - 120 000 km²,
- Wildcat - 500 wells,
- 1328 of development wells,
- 16 Projects Oil&Gas in progress & 08 on going,
- 02 new refineries capacity of 05 MTA for each one,
- 01 new project cracking of fuel oil, capacity of 04 MTA,
- 03 new petrochemical units,
- 02 GNL Revamping,
- 02 Old refinery Reavamping.

Further potential development in Partnership



Hydrocarbon acreage

	Prospection	Exploration
Territory Mining Domain	1 553 488 Km²	
Domain covered by SH and IOC activities	71% Sonatrach and Partners	32 % Research SH alone 35 % Prospection SH alone 4% IOC research
	(71%) 1 098 175 Km²	
Remain Mining Domain	(29%) 455 312 Km² Offshore 93 500 km2 (6%)	



Gas Potential (GIP) in perspectives areas (Shale Gas)

Sonatrach's country-wide view on shale gas potential is published and clear

Total resources in 05 basins

GAZ	(Tcf)	(10 ⁹ m ³)
TOTAL (GIIP)	4940	140 004
LIQUIDES	(Bbbl)	(10 ⁶ m ³)
TOTAL (STOIIP)	248	18 918

Technically recoverable Resources

(By using a recovery factor of 15%):

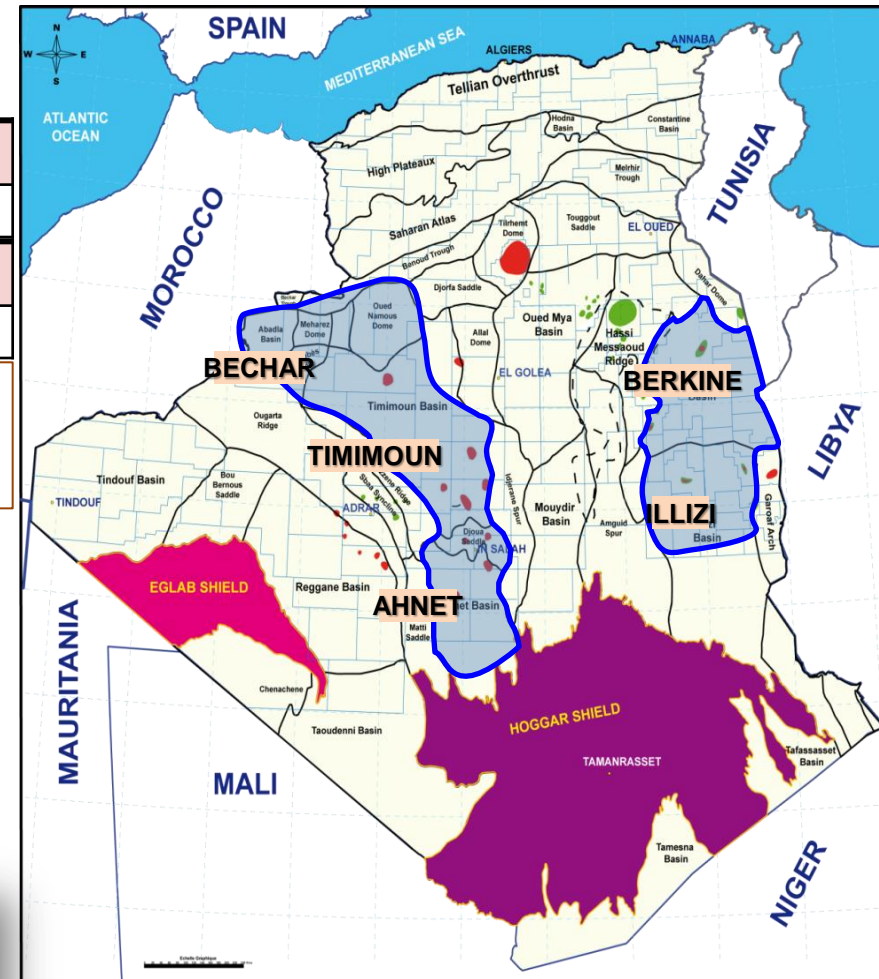
740 Tcf de Gaz (21 000 * 10⁹m³).

Compared to the mains play in USA:

- Barnett shale: 20 to 50%
- Haynesville shale: 30%,
- Marcellus shale: 20 to 40%.

AIE Report (June, 2013), ALGERIA
Ranking place
(TRR)

Technically Recoverable Shale Gas Resources (Tcf)	
1. U.S.	1,161
2. China	1,115
3. Argentina	802
4. Algeria	707
5. Canada	573



- Gas shale resources are large,
- Assessing gas shales: sciences and art,
- Gas shale development: Mix of technical, economic and

Conventional V Unconventional

CONVENTIONAL PROJECT SKILLS AND TECHNOLOGY

- 
- Data in context
 - Petroleum systems modeling
 - Imaging complex structures
 - Trap interpretation
 - Reservoir interpretation
 - Prospect assessment
 - Well placement
 - Relief well placement
 - Real time drilling
 - Well formation evaluation
 - Quantitative evaluation
 - Geological modeling
 - Multiscale simulation
 - Reservoir uncertainty evaluation
 - Reservoir geomechanics
 - Well & completion optimization
 - Network design
 - Integrated asset modeling project sanction
 - Flow assurance
 - Artificial lift
 - Operations management
 - Production analytics
 - Improved & enhanced oil recovery

UNCONVENTIONAL PROJECT SKILLS AND TECHNOLOGY

- 
- Data in context
 - Petroleum systems modeling
 - Risk assessment
 - Drill pilot well
 - Formation evaluation
 - Sweet Spot Identification
 - Heterogeneous rock analysis
 - Stress evaluation
 - Horizontal well design
 - Well integrity
 - Geosteering
 - Completion design
 - Hydraulic fracture design
 - Micro seismic modeling
 - Predictive simulation
 - Pad and well design
 - Network design
 - Flow assurance
 - Artificial lift
 - Operations management
 - Production analytics



• **THE HYDROCARBON PATHWAY**

Ahnet Shale Gas Project- Key Elements

Regional Studies conducted by Sonatrach and partners in major basins,

Data acquisition including two vertical wells in one of the selected areas,

Well data supported by rock analysis indicate High Potential from Frasnian :

- ✓ **100 meters in average Net Pay, 5% TOC value , 10% Porosity**
- ✓ **60% Clay Content Comparable with the major US Shale plays**

Two wells with 1000 meters of horizontal section was drilled , completed and stimulated without incident,

The Wells has produced during more than one year (the second still producing),

Production profiles are similar compared to the equivalent US Plays,

The Single EUR estimated is ranging between 8 and 10 Bscf.

Problematical and issues

- Presence of two good quality source rocks over the Saharan platform : the Silurian and Frasnian shales and possible potential in the Lias and Upper Cretaceous in the Atlas and South East Constantine regions.
- Confidence on the potentialities of the Algerian sub-soil,
- Availability / mobilization / transport & water management, need strict regulation, HSE,
- Some pilots, located in areas was successfully achieved,
- Is there any strategically reason for exploiting this resource,
- What is the urgency level?
- Drilling rigs (hundred rigs for achieving thousands of wells) ???
- Fracturing equipment's enough?
- Infrastructures for gas transport towards the consumption centers,
- Is it not more appropriate to wait till exploitation techniques will be more accessible and affordable?
- Will the costs be bearable and the produced gas economically viable ?
- Due to the remote localization of the potential areas, higher costs have to be considered or expected
- Uncertainties on the technical and financial means and capabilities for such an effort, in the short and medium terms.
- Would a success in this domain induce more pressure on the conventional gas price?

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Thank you for your attention