**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 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**
- **Pumping & compression stations 82**
- **Storage capacity 4.1 MCM (liquids)**
- **North trans 147 MTOE N. Gas: 82 BCM**

### 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
To 2040:

- 1,28 Million b/d of crude oil
- 450 Millions m$^3$/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

- Huge unconventional natural gas potential to develop
- Government support
- Cooperation agreement with NOC’s & IOC’s

Shale & Tight Gas

Offshore E&P

- Exploration program in the Algerian offshore
- Sonatrach has applied for two prospecting permits
- Processing of seismic acquisition in progress

Possible Fields of Cooperation

Equipment's production & engineering

- Huge potential with regards to the energy sector perspectives
- Government support in the context of integration policy
- Privileged partnership for those who want to invest in equipment’s production & engineering

Growing demand for refined products
New refining units under study
Development of Petrochemicals
## Hydrocarbon acreage

<table>
<thead>
<tr>
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<th>Prospecion</th>
<th>Exploration</th>
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<tbody>
<tr>
<td><strong>Territory Mining Domain</strong></td>
<td><strong>1 553 488 Km²</strong></td>
<td></td>
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<tr>
<td><strong>Domain covered by SH and IOC activities</strong></td>
<td><strong>71%</strong> Sonatrach and Partners</td>
<td><strong>32 % Research SH alone</strong></td>
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<tr>
<td></td>
<td></td>
<td><strong>35 % Prospecion SH alone</strong></td>
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<td><strong>4% IOC research</strong></td>
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<td></td>
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<td><strong>(71%) 1 098 175 Km²</strong></td>
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<tr>
<td><strong>Remain Mining Domain</strong></td>
<td><strong>(29%) 455 312 Km²</strong></td>
<td></td>
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<tr>
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<td><strong>Offshore 93 500 km² (6%)</strong></td>
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</tbody>
</table>

- **Prospection**: 545 178 (35%)
- **Research contracts**: 490 897 (32%)
- **IOC research**: 62 101 (4%)
- **Mining Domain**: 455 312 (29%)
- **Remaining**: Free
Gas Potential (GIP) in perspectives areas (Shale Gas)

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

<table>
<thead>
<tr>
<th>Total resources in 05 basins</th>
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<tbody>
<tr>
<td><strong>GAZ</strong> (Tcf)</td>
</tr>
<tr>
<td><strong>TOTAL (GIIP)</strong></td>
</tr>
<tr>
<td><strong>LIQUIDES</strong> (Bbbl)</td>
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<tr>
<td><strong>TOTAL (STOIIP)</strong></td>
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**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)

- Gas shale resources are large,
- Assessing gas shales: sciences and art,
- Gas shale development: Mix of technical, economic and environmental considerations.
**Conventional V Unconventional**

### CONVENTIONAL PROJECT
- 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 projet sanction
- Flow assurance
- Artificial lift
- Operations management
- Production analytics
- Improved & enhanced oil recovery

### UNCONVENTIONAL PROJECT
- 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

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**THE HYDROCARBON PATHWAY**

ALGERIA - ENERGY DAY - 04th May, 2016 - HOUSTON
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?
Thank you for your attention