Agencia Nacional de Hidrocarburos

Diana Barrios

October 2012
1. The Oil industry in Colombia

2. Institutional framework

3. The National Data Repositories of Colombia
   - EPI S
   - Production
Content

1. The Oil industry in Colombia
2. Institutional framework
3. National Data Repository of Colombia
Colombia has strong fundamentals on which to build prosperity

Source: Ministry of Mines and Energy - Colombia
Equivalent oil production in Colombia

Kboed

<table>
<thead>
<tr>
<th>Year</th>
<th>Crude oil</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>525</td>
<td>114</td>
</tr>
<tr>
<td>2006</td>
<td>529</td>
<td>119</td>
</tr>
<tr>
<td>2007</td>
<td>531</td>
<td>128</td>
</tr>
<tr>
<td>2008</td>
<td>588</td>
<td>153</td>
</tr>
<tr>
<td>2009</td>
<td>671</td>
<td>178</td>
</tr>
<tr>
<td>2010</td>
<td>785</td>
<td>191</td>
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<tr>
<td>2011</td>
<td>915</td>
<td>186</td>
</tr>
<tr>
<td>2012</td>
<td>932</td>
<td>194</td>
</tr>
</tbody>
</table>

AGENCIA NACIONAL DE HIDROCARBUROS
## Executed Contracts

<table>
<thead>
<tr>
<th>Year</th>
<th>TEA</th>
<th>E&amp;P</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>28</td>
<td>31</td>
<td>59</td>
</tr>
<tr>
<td>2006</td>
<td>12</td>
<td>32</td>
<td>44</td>
</tr>
<tr>
<td>2007</td>
<td>10</td>
<td>44</td>
<td>54</td>
</tr>
<tr>
<td>2008</td>
<td>16</td>
<td>43</td>
<td>59</td>
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<tr>
<td>2009</td>
<td>6</td>
<td>58</td>
<td>64</td>
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<td>2010</td>
<td>1</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>2011</td>
<td>9</td>
<td>67</td>
<td>76</td>
</tr>
<tr>
<td>2012</td>
<td>0</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

TEA: Technical Evaluation Agreement  
E&P: Exploration and Production contract
Perception of Attractiveness in LATAM

AGENCIA NACIONAL DE HIDROCARBUROS
1. The Oil industry in Colombia
2. Institutional framework
3. EPIS - The National Data Repository of Colombia
<table>
<thead>
<tr>
<th>Ministry of Mines and Energy</th>
<th>Policy-making and control</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANH</td>
<td>Administration and promotion of the hydrocarbons resources (Since 2003)</td>
</tr>
<tr>
<td>ecopetrol</td>
<td>Explores, produces, refines, transports and markets</td>
</tr>
</tbody>
</table>
The new role of Ecopetrol and the ANH

**Association Contract**

**ECOPETROL Judge and Jury (1974 - 2003)**

**New Contract**

**ECOPETROL S.A. E&P Company**

**ANH Regulator (2003 - Now)**

Activities:
- E&P activity (association contracts and ANH contracts)
- Refining
- Marketing and Trading

Activities:
- Manage E&P contracts from 2003.
- Supporting the Ministry in the development of the policy.
- Manage technical information and promote the areas.
- Calculate and Collect royalties.
Content

1. The Oil industry in Colombia

2. Institutional framework

3. The National Data Repositories of Colombia (EPI S and Production)
<table>
<thead>
<tr>
<th>Name</th>
<th>EPIS (E&amp;P Information Services)</th>
<th>Production Monitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Status</td>
<td>Mature - Sustainable</td>
<td>Under construction to include production data of all the fields and wells.</td>
</tr>
<tr>
<td>Size</td>
<td>Large (Digital storage 72TB)</td>
<td>Small - 500 GB</td>
</tr>
<tr>
<td>Run by ..</td>
<td>Operated by Geoconsult – IT outsourcing Colsof. SW KADME</td>
<td>Operated by Schlumberger</td>
</tr>
<tr>
<td>Main contacts</td>
<td><a href="mailto:Martha.zamudio@anh.gov.co">Martha.zamudio@anh.gov.co</a> <a href="mailto:admin-epis@anh.gov.co">admin-epis@anh.gov.co</a></td>
<td><a href="mailto:Edilsa.Aguilar@anh.gov.co">Edilsa.Aguilar@anh.gov.co</a> <a href="mailto:Diana.barrios@anh.gov.co">Diana.barrios@anh.gov.co</a></td>
</tr>
</tbody>
</table>


# Exploration & Production Exploration Service (EPI S)

## Data Types and Volumes

<table>
<thead>
<tr>
<th>Data Type</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wells</td>
<td>14.557</td>
</tr>
<tr>
<td>Well Log Curves</td>
<td>4,491,712</td>
</tr>
<tr>
<td>Well Reports</td>
<td>122,498</td>
</tr>
<tr>
<td>Cores &amp; Samples</td>
<td>180,590</td>
</tr>
<tr>
<td>Seismic Surveys</td>
<td>1,541 2D/3D</td>
</tr>
<tr>
<td>Post-stack Seismic</td>
<td>102,893</td>
</tr>
<tr>
<td>Field data/tapes</td>
<td>153,715</td>
</tr>
<tr>
<td>Seismic Reports</td>
<td>5,151</td>
</tr>
<tr>
<td>Production Data</td>
<td>Manage by other application</td>
</tr>
<tr>
<td>Other significant Data Types:</td>
<td>Magnetic and Gravimetric</td>
</tr>
<tr>
<td>Estimated total NDR size</td>
<td>72 TB</td>
</tr>
</tbody>
</table>
Exploration & Production Exploration Service (EPLS)
The NDR is growing
Exploration & Production Exploration Service (EPI S)

... and the cost is diminishing
PRODUCTION MONITOR & RESERVES SYSTEM

Ingeniero Líder Producción
- Revisión de información recibida en el IDP
- Solicitudes de cambio de operadores (envío de correos)
- Carga de información AVM
- Revisión AVM vs IDP
- Distribución de producción
- Elaboración de informes
- Seguimiento y control de indicadores de gestión
- Generación y validación de información oficial formas ministeriales vs AVM
- Análisis y configuración de las solicitudes de las compañías
- Presentación informes mensuales de seguimiento
- Revisión de correos para las compañías
- Atender requerimientos de la ANH definidos en el alcance del servicio.

AVM Merak (Peep OFM AS)

CLIENTES INTERNOS
Ing. Fiscalización
Ing. Seguimiento a la Producción

CLIENTES EXTERNOS
MinMinas, UFME, DINE, DNP, MINHACIENDA, etc

Requerimientos de cambio a operadores

Visualización información AS

IDP

Servidor bases de datos

Servidor Web

Información de operadores

Entrega vía satélite

CAMPO CABO

CAMPO CANTEL

CAMPO ROJABLANCA

CAMPO CHICO

CAMPO BARBARO

CAMPO VIRREY

CAMPO CHATO
NDRs - ISSUES AND CHALLENGES

- Repositories and teams working in silos. There are 3 different systems that should be interconnected to correlate and verify information of Exploration, Production and Royalties.

- A new coordinate systems was introduced in Colombia and we should update some legacy spatial data.

- Legacy systems received as part of new functions delegated to the ANH such as: Production Regulation and Royalties calculation in 2012.
  - ANH will develop a new royalty application based on the Monitor production System. Data Migration will be part of this project.
  - ANH will configure in the Production system the fields and wells for the E&P contracts issue before 2003.

- New Core Storage building and a new project to capture high resolution photos of cores. Estimated size: 300 TB.

- Legacy data and new data require more quality assurance. The data quality may affect the bank fees.
FUTURE OF NDR

New Regulation of Measurement

Automated Measurement

Only E&P contracts issued by ANH

303 fields
280 facilities
8000 wells

Control all Colombia Production

Royalties Calculation

Production Balance Adjustments

3,000 / 1,620
700 / 567
500 / 405
300 / 150
250 / 125
200 / 100
100 / 50

Estimado / Ajustado

600 / 540
250 / 225
150 / 135
80 / 65
30 / 25
20 / 16
10 / 8

113 fields
134 facilities
646 wells
COLOMBIA - PROSPERITY FOR ALL.
Thank you! = Terima kasih!

www.anh.gov.co

Diana.Barrios@ahn.gov.co
Reserves

Oil

<table>
<thead>
<tr>
<th>Year</th>
<th>Proven (Million barrels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>1.542</td>
</tr>
<tr>
<td>2005</td>
<td>1.478</td>
</tr>
<tr>
<td>2007</td>
<td>1.510</td>
</tr>
<tr>
<td>2009</td>
<td>1.668</td>
</tr>
<tr>
<td>2011</td>
<td>2.259</td>
</tr>
</tbody>
</table>

Gas

<table>
<thead>
<tr>
<th>Year</th>
<th>Proven (Tera cubic feet)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>6.7</td>
</tr>
<tr>
<td>2005</td>
<td>7.2</td>
</tr>
<tr>
<td>2007</td>
<td>7.5</td>
</tr>
<tr>
<td>2009</td>
<td>7.3</td>
</tr>
<tr>
<td>2011</td>
<td>8.5</td>
</tr>
</tbody>
</table>
Foreign Direct Investment

Source: Banco de la República

Million USD

2005 2006 2007 2008 2009 2010 2011 2012
1.125 1.995 3.333 3.405 2.428 2.781 5.125 1.049

1st quarter

Source: Banco de la República
**Concession Contract**
The state gives an area to a private for a period of time between 23-50 years for exploration and production. Royalties between 6-15%.

**E&P (Exploration and Production Contract)**
TEA (Technical Evaluation Agreement)
The ANH is the agency responsible for promoting the optimal and sustainable exploitation of the country’s hydrocarbons resources; The contractor has operational autonomy, responsibility and freedom to market production. Ecopetrol is another player within new operators under the regulation of the ANH.

**Association Contract**
Ecopetrol is operator and the regulator. Ecopetrol is partner of another company who takes the exploration risk and investment for this period. Royalties and Ecopetrol’s participation in these contracts are changing with different settings: (50-50, Participation staggered factor R, stepped royalties).
The maximum contract duration is 28 years (6 exploration and 22 production).
Before 2003

- Before the creation of ANH, the technical information was reported to Ecopetrol and managed by Schlumberger.

2003 - 2007

- The ANH was created in 2003 and it received the database and tapes/documents from Ecopetrol. The EPIS was managed in all its components by Schlumberger between 2003 and 2007.

2007 - 2008

- During 2007 & 2008 an IT service company was managing the EPIS hardware platform, while Schlumberger was still operating and providing the software.

2009 - 2012

- At the end of 2009, the NDR data was migrated from the Schlumberger applications to a new EPIS system, based on the Whereoil platform from KADME. The system is operated by a local company (Geoconsult), and the IT infrastructure is operated by a local IT provider (Colsoft).
EPI S - Exploration & Production Exploration Service

Purpose

✓ To preserve all the exploration & production information for the country.

✓ To support the exploration & production licensing activities with the delivery of technical information.

✓ To monitor the commitments made by the oil companies when they entered into a licensing contract.

✓ To promote the exploration opportunities to attract more investments for the hydrocarbons sector.
Seismic acquisition

Seismic: km of 2D equivalent

<table>
<thead>
<tr>
<th>Year</th>
<th>Onshore</th>
<th>Offshore</th>
<th>ANH Goal</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>11.896</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>16.286</td>
<td>9.970</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>20.117</td>
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<tr>
<td>2008</td>
<td>25.965</td>
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<tr>
<td>2009</td>
<td>23.963</td>
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<td>2010</td>
<td>26.491</td>
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<td>2011</td>
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<td>14.548</td>
</tr>
<tr>
<td>2012</td>
<td>25.965</td>
<td></td>
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</tr>
</tbody>
</table>

Goal: ~18,000 km

Investment in seismic acquisition (2012) | 560 USD million

AGENCIA NACIONAL DE HIDROCARBUROS
Exploratory wells drilled

Investment in drilling (2012)  560 USD million

Number of exploratory wells drilled

<table>
<thead>
<tr>
<th>Year</th>
<th>Exploratory wells drilled</th>
<th>ANH Goal</th>
</tr>
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<tbody>
<tr>
<td>2005</td>
<td>35</td>
<td></td>
</tr>
<tr>
<td>2006</td>
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<td>2007</td>
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<td>2012</td>
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<td>2013</td>
<td>93</td>
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</tr>
<tr>
<td>2014</td>
<td>173</td>
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AGENCIA NACIONAL DE HIDROCARBUROS