The challenge of achieving energy security and sustainability in a rapidly changing global energy landscape

Dr. Magdy Rady, Assistant Minister of Foreign Affairs, Egypt
The world we live in

Source: BP – Energy Outlook 2012
Energy SECURITY

- Continuity
- Stability
- Sustainability
- Affordability

Geo Politics
Environment
Economics
TOTAL PRIMARY ENERGY SUPPLY

TPES 2011 (13 113 Mtoe)

TPES 1973 (6 109 Mtoe)
WORLD CRUDE OIL PRODUCTION

1973 (2869 Mt)
- Middle East: 36.7
- OECD: 23.9
- Europe (non-OECD): 15.7
- Africa: 10.1
- Americas (non-OECD): 8.5
- Asia: 3.2
- China: 2.0

2012 (4142 Mt)
- Middle East: 32.5
- OECD: 21.7
- Europe (non-OECD): 16.2
- Africa: 10.9
- Americas (non-OECD): 9.6
- Asia: 5.0
- China: 4.0
Meeting the Energy Demand

Fossil fuels remain the principal source of energy worldwide and likely will still play a significant part in meeting demand for several decades to come.

Fossil fuels still dominate energy consumption.

Renewable energy continues to gain but today accounts for only 2% of energy consumption globally.

Source: World Energy outlook 2012
Geopolitics of supply for Oil and Natural Gas

Energy security represents a challenge in its own.

80% Oil Reserves
More than 80% of global Oil reserves are in nine countries.

60% Natural Gas
More than 60% of the world’s known reserves of natural gas are in just four countries.

Today’s challenge is to manage and meet growing demand for secure, affordable energy while addressing climate change and other environmental and social issues.

Source: BP – Statistical review of the world 2012 - Source: CIA Factsheet Book
Energy decouples from GDP and fuel mix evolves

Source: Energy Outlook 2035 - BP 2014
GEOPOLITICAL CONSIDERATIONS

BASICS:

• Energy demand will double by 2050

• Emissions should be halved by 2050 (-80% on OECD)

• 1.4 Billion people with no access to electricity

FURTHER:

• Europe 2020: 20% renewable, 20% Efficiency, 20% saving emission

• US Tight oil and Shale gas impact

• Asian effect: China, India

• Arab Spring

• Africa (challenge and solution)
Conclusion

Meeting the global energy challenge

- Sufficient and available?
  - Yes – new energy sources and efficiency improvements

- Secure and reliable?
  - Mixed – improving for some, a concern for others

- Sustainable?
  - Room for improvement
Issues to be addressed

- Technological innovation
- Efficient Markets
- Connectivity and off grid solutions
- Energy Efficiency
- Carbon pricing and transitional incentives for low carbon energy
The Egyptian Energy Scene
In Egypt, oil and gas are the major source of energy accounting for almost 96% of primary energy.
ENERGY MIX IN EGYPT

World

- Oil and gas: 61%
- Coal: 20%
- Nuclear: 10%
- Other: 9%

Egypt

- Coal: 1%
- Hydro: 3%
- Oil and gas: 96%

Power generation

World

- Nuclear: 13%
- Hydro: 16%
- Other: 3%
- Oil and gas: 27%

Egypt

- Hydro/Ren: 9%

Primary Energy
Satisfying increasing local demand on petroleum products and natural gas

Local Production of Oil and Gas

<table>
<thead>
<tr>
<th>Year</th>
<th>Oil</th>
<th>Condensate</th>
<th>LPG</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/05</td>
<td>70.6</td>
<td>4.3</td>
<td>5.6</td>
<td>20.5</td>
</tr>
<tr>
<td>07/06</td>
<td>73.3</td>
<td>4.6</td>
<td>4.7</td>
<td>18.6</td>
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<tr>
<td>08/07</td>
<td>75.8</td>
<td>3.8</td>
<td>5.6</td>
<td>19.8</td>
</tr>
<tr>
<td>09/08</td>
<td>80.5</td>
<td>3.5</td>
<td>5.6</td>
<td>20.6</td>
</tr>
<tr>
<td>10/09</td>
<td>80.6</td>
<td>3.6</td>
<td>5.6</td>
<td>20.7</td>
</tr>
<tr>
<td>11/10</td>
<td>81.0</td>
<td>3.7</td>
<td>5.6</td>
<td>20.8</td>
</tr>
<tr>
<td>12/11</td>
<td>81.2</td>
<td>3.8</td>
<td>5.6</td>
<td>20.9</td>
</tr>
</tbody>
</table>
Satisfying increasing local demand on petroleum products and natural gas

Local **Demand** on Petroleum Products and Natural Gas

<table>
<thead>
<tr>
<th>Year</th>
<th>Petroleum Products</th>
<th>Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>05/06</td>
<td>51.7</td>
<td></td>
</tr>
<tr>
<td>06/07</td>
<td>55.7</td>
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<tr>
<td>07/08</td>
<td>59.6</td>
<td></td>
</tr>
<tr>
<td>08/09</td>
<td>62.8</td>
<td></td>
</tr>
<tr>
<td>09/10</td>
<td>66.6</td>
<td></td>
</tr>
<tr>
<td>10/11</td>
<td>68.3</td>
<td></td>
</tr>
<tr>
<td>11/12</td>
<td>71.4</td>
<td></td>
</tr>
</tbody>
</table>

MM Tons
OIL & GAS Local Demand

- High Energy Intensity
- Low Efficiency

Average Annual Growth Rate 5.3%
605 Million Tons

Average Annual Growth Rate 5.8%
348 Million Tons

Million Tons

<table>
<thead>
<tr>
<th>Year</th>
<th>Petroleum Products</th>
<th>Natural Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td>94/93</td>
<td>26.6</td>
<td></td>
</tr>
<tr>
<td>95/94</td>
<td>28.0</td>
<td></td>
</tr>
<tr>
<td>96/95</td>
<td>30.1</td>
<td></td>
</tr>
<tr>
<td>97/96</td>
<td>30.9</td>
<td></td>
</tr>
<tr>
<td>98/97</td>
<td>33.6</td>
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</tr>
<tr>
<td>99/98</td>
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<tr>
<td>01/00</td>
<td>40.6</td>
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<tr>
<td>02/01</td>
<td>41.1</td>
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<tr>
<td>03/02</td>
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<td>05/04</td>
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<tr>
<td>06/05</td>
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</tr>
<tr>
<td>12/11</td>
<td>72.1</td>
<td></td>
</tr>
<tr>
<td>13/12</td>
<td>73.2</td>
<td></td>
</tr>
</tbody>
</table>

Petroleum Products | Natural Gas
Satisfying increasing local demand on petroleum products and natural gas

Local Demand on oil and gas by sector
2001/2012

- Industry: 24%
- Electricity: 37%
- Residential: 8%
- Transport: 15%
- Petroleum: 6%
- Agriculture: 3%
- Roads & Construction: 3%
- Tourism: 4%

Total: 71.6 MM tons

Satisfying increasing local demand on petroleum products and natural gas.
## Primary Energy Comparison

<table>
<thead>
<tr>
<th>Country</th>
<th>Oil</th>
<th>Gas</th>
<th>Coal</th>
<th>Renewable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Germany</td>
<td>36%</td>
<td>21%</td>
<td>25%</td>
<td>17%</td>
</tr>
<tr>
<td>Iran</td>
<td>38%</td>
<td>60%</td>
<td>0%</td>
<td>2%</td>
</tr>
<tr>
<td>Egypt</td>
<td>49%</td>
<td>47%</td>
<td>1%</td>
<td>2%</td>
</tr>
<tr>
<td>South Korea</td>
<td>21%</td>
<td>3%</td>
<td>74%</td>
<td>3%</td>
</tr>
<tr>
<td>China</td>
<td>18%</td>
<td>5%</td>
<td>70%</td>
<td>7%</td>
</tr>
</tbody>
</table>

Source: BP – Statistical review of the world 2012
Thank you