Insights on Energy Outlook: Disruptive Forces and Emerging Trends

Eighth IEA-IEF-OPEC Symposium on Energy Outlooks, Riyadh, Saudi Arabia

Abd Rahim Mahmood
Head – Strategic Research
PETRONAS

February 14, 2018
Oil & gas continue to feature prominently in energy mix, however, alternative energy is expected to gain traction ...

By 2040, fossil fuels are expected to account for more than two-thirds of global energy demand

**World primary energy demand by fuel**

Unit: Billion toe

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2016</th>
<th>2025</th>
<th>2040</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil</td>
<td>2.1</td>
<td>3.0</td>
<td>3.4</td>
<td>4.4</td>
</tr>
<tr>
<td>Natural gas</td>
<td>3.7</td>
<td>4.4</td>
<td>4.6</td>
<td>4.8</td>
</tr>
<tr>
<td>Coal</td>
<td>2</td>
<td>4</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Other RE</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bioenergy</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hydro</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nuclear</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sources: IEA, SR Analysis

© 2017 Petroliam Nasional Berhad (PETRONAS)
... driven by structural changes in the energy landscape brought about by disruptive forces and megatrends. Thus, forecasting future energy demand will be even more challenging ...
... while the impact of policy and regulatory changes, and technology breakthroughs are equally arduous to predict ...
... at the same time, in fast changing and tech-driven energy landscape, different business models are required if existing players are to remain in the business ...
today, O&G companies are no longer on the Top 5 list where top companies are technology-based and asset-light

Top 5 publicly traded companies by market capitalisation

2006

1. Exxon  US$446bn
2. GE  US$383bn
3. Total  US$372bn
4. Microsoft  US$293bn
5. Citi  US$273bn

November 2017

1. Apple  US$893bn
2. Google  US$717bn
3. Microsoft  US$647bn
4. Amazon  US$544bn
5. Facebook  US$519bn

© 2017 Petronium National Berhad (PETRONAS)
Key takeaway

- While oil and gas will continue to feature prominently in the global energy mix, new and alternative energy will gain traction.

- Forecasting energy demand is getting more challenging, arduous and unpredictable as disruptive forces and mega trends continue to shape the future energy landscape.

- Players need different business models to compete and create a niche in the new energy landscape that is premised on technology and innovation.

- The Future is Here as tech start ups and technology-based companies continue to drive innovations and breakthroughs that may alter our conventional view of the energy industry.
Thank you