How should we cope with the energy challenges?

Special Advisor to the Prime Minister
Eiichi HASEGAWA
June 10, 2016

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Agenda

0. To begin with

1. What has happened thereafter?

2. Parameters to be highlighted

3. Conclusions
To begin with  
“Conclusions” from 2014

- It is the case in a consumer country, particularly one with scarce indigenous natural resources, that once investments for energy efficiency are introduced, its energy saving effect will be long-lasting.

- Also, we must be careful of high volumes of money awash globally, as this can make the oil market highly sensitive to an unexpected event. Efficient energy consumption structures help a consuming country to be more independent and immune from the unpredictable and fluid environment.
To begin with “Conclusions and proposals” of 2015

(1) Possible decline of oil-supply
- Slowing down of development of new oil.
- Political turmoil in oil supplying countries.
- Increase of domestic oil consumption in oil supplying countries.

(2) Lessons from past oil cycles
- Sharp and protracted swings in oil prices do not last forever. The current down cycle is already the longest peak-to-trough (more than three hundred days).
- The opportunities and threats typically emerge quickly.

(3) Individual or corporate level
- Introduction of energy-conserving equipment
- Streamlining production line, minimizing inventory
- Relocating factories, minimizing transporting parts and semi-complete products, and upgrading logistics
To begin with “Conclusions and proposals” of 2015

(4) Societal level
- Re-engineering social structures, such as the introduction of a mass-transport system
- Upgrading the electricity supply chain and minimizing disruption, to say nothing of outages

(5) What could we gain?
- Reduction of the consumption of oil
- Reduction of wasted time
- Improvement of the quality of service
- Improvement of the macro-economic balance
- Reduction of the clout of oil-supplying countries
Agenda

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1. What has happened thereafter?

(1) Supply-side

- U.S. oil production has nearly doubled since 2008, and thus, its oil imports have dramatically reduced, which has had a significant impact on some countries in South America and Africa.

- OPEC, since it was agreed upon in November of 2014, does not look to reach consensus.

- Iran, with the fourth largest oil reserves, may step up production.

Quote: BP Statistical Review of World Energy 2014
1. What has happened thereafter?

(1) Supply-side

Oil price change and its consequences

- New projects have been suspended

Which countries have huge oil reserves?

<table>
<thead>
<tr>
<th>Country</th>
<th>Proven oil reserves (in billions of barrels)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Venezuela</td>
<td>298</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>266</td>
</tr>
<tr>
<td>Canada</td>
<td>174</td>
</tr>
<tr>
<td>Iran</td>
<td>157</td>
</tr>
<tr>
<td>Iraq</td>
<td>150</td>
</tr>
<tr>
<td>Kuwait</td>
<td>102</td>
</tr>
<tr>
<td>U.A.E</td>
<td>98</td>
</tr>
<tr>
<td>Russia</td>
<td>93</td>
</tr>
<tr>
<td>Libya</td>
<td>49</td>
</tr>
<tr>
<td>U.S.</td>
<td>44</td>
</tr>
</tbody>
</table>

Active Oil Rigs in US

- Max. 1,609 (Oct. 10, 2014)
- Min. 316 (May 27, 2016)

Source: Baker Hughes

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Source: The Wall Street Journal
1. What has happened thereafter?

(4) What happened to the oil price?

- Dramatically declined since the fall of 2014, and has slightly rebounded recently.

- Brent price was $50 /barrel on June 1, 2016, while its peak had been $114 /barrel in 2014.
1. What has happened thereafter?

(2) Demand-side

Oil Demand

Oil-demand growth forecast for major consuming countries

IEA medium-term oil demand growth forecasts, by year of report


Note: * Projection

Source: IEA, Medium-Term Oil Market Report

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1. What has happened thereafter?

(3) Oil-related industries

- M & A
  - An example is Royal Dutch Shell PLC’s purchasing of BG Group PLC.

- Due to the recent plummeting oil price, the asset value of oil-related companies has generally decreased, thus making the purchase of their stocks less costly.

<table>
<thead>
<tr>
<th>Company</th>
<th>Net Income as of 2015</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shell</td>
<td>$70.0 billion</td>
</tr>
<tr>
<td>BG</td>
<td>$1,697 mil.</td>
</tr>
<tr>
<td>Duvernay Oil(’08)</td>
<td>5.4</td>
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<tr>
<td>Enterprise Oil(’02)</td>
<td>5.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Net Income as of 1998</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exxon</td>
<td>82.0</td>
</tr>
<tr>
<td>Mobil(’99)</td>
<td>25.0</td>
</tr>
<tr>
<td>XTO Energy(’10)</td>
<td>3.1</td>
</tr>
<tr>
<td>Celtic Exploration(’13)</td>
<td></td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Net Income as of 1997</th>
</tr>
</thead>
<tbody>
<tr>
<td>BP</td>
<td>52.0</td>
</tr>
<tr>
<td>Amoco(’98)</td>
<td>25.5</td>
</tr>
<tr>
<td>Atlantic Richfield(’00)</td>
<td>4.7</td>
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<tr>
<td>Burmah Castrol(’00)</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Company</th>
<th>Net Income as of 1999</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chevron</td>
<td>38.0</td>
</tr>
<tr>
<td>Texaco(’01)</td>
<td>18.3</td>
</tr>
<tr>
<td>Unocal(’05)</td>
<td>4.5</td>
</tr>
<tr>
<td>Atlas Energy(’11)</td>
<td></td>
</tr>
</tbody>
</table>

Source: The Wall Street Journal (c) 2016, Eiichi Hasegawa
1. What has happened thereafter?

(3) Oil-related industries

- Petrostates need to sell oil at a certain price in order to balance their budgets.
- Based on current crude prices many could be facing deficits this year.


Note: Brent price. Projections for 2016
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2. Parameters to be highlighted

3. Conclusions
2. Parameters to be highlighted

(1) G7 Ise-Shima Summit

- Ensuring swift and successful implementation of the Paris Agreement including the long-term aims on mitigation, adaptation, and finance

- Investment in supporting innovation in energy technologies and encouraging clean energy and energy efficiency. Energy investments, in particular, investments in quality energy infrastructure and upstream development

- Is the low price of energy helpful to G7 countries, the majority of which are net energy importing countries, or not?
2. Parameters to be highlighted

(2) COP 21

- Commitment to reducing global warming gas emission by not only developed countries but also large developing countries such as China

- Energy conservation, and not only de-carbonization, but also innovating the social energy consuming structure
  --- Increasing renewable energy, natural gas, and safe nuclear energy
2. Parameters to be highlighted

(3) Dynamics within OPEC member countries

- New policy initiative of Saudi Arabia—reducing dependence on oil
- To what extent will Iran accommodate other member countries?
- Some financially strapped countries
2. Parameters to be highlighted

(4) To be noted in some countries

- China
  Reform Initiative vs. Slowing growth pace
  - Excess producing capacity such as steel
  - Surplus power generating capacity
  - Highly polluted atmosphere
  - Continuous demand in growth of transport

- India
  Brisk growth of economy
  - Highly polluted atmosphere
  - Accelerated construction of roads
  - Continuous demand in growth of transport

- Unanticipated production disruptions
  Such as militant attacks in Nigeria, wildfires in Canada, and political unrest in Libya
Agenda

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3. Conclusions

(1) **Raising energy efficiency**
- Infrastructure
- Innovation

Note 1: Energy consumption per GDP

(2) **Diversifying energy sources**
3. Conclusions

(3) Securing redundant supplies in some cases

- Sufficient electricity for critical usage such as medical care, financial and other IT networks, and public utilities (supply of water and etc.)

(4) Predicting mid-and long-term scenarios together with scenario B
3. Conclusions

Note 1: Energy consumption per GDP

- Energy consumption per GDP has generally improved.
- There is a significant gap in the pace of improvement among countries.

Source: IEA “Energy balances of OECD/NONE-OECD countries” (Consumption), IMF (GDP)
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3. Conclusions

Note 2: Forecast in Oil Demand

- Regardless of the oil-price trend, oil consumption in non-OECD countries keeps rising.


Note: Historical demand estimated, and forecast.