The 31st JCCP International Symposium
“Communication and Cooperation: For Sustainable Future of Oil Industry”

The 31st JCCP International Symposium was held over two days, from January 30 to 31, 2013, under the auspices of the Ministry of Economy, Trade and Industry, and with the attendance of approximately 350 people from inside and outside of Japan.

1. Theme

The theme of this year’s symposium was “Communication and Cooperation: For Sustainable Future of Oil Industry.” It was explored in detail in two discussion sessions held on the second day, with a focus on “Change of Business Environment in Oil Downstream and Human Resources Development” in the morning and “Change of Business Environment in Oil Downstream and Innovation of Technology” in the afternoon.

Global demand for oil is on the rise. Therefore, measures for securing a stable supply of oil need to be considered not only from the perspective of emergency preparedness, but also from the perspective of achieving sustainable utilization of oil far into the future. Based on this awareness, members from oil-producing and consuming countries exchanged views on the medium- to long-term outlook of oil demand, issues for securing a stable supply of oil, and the development of human resources and technologies to address those issues in the two-day symposium, with the objective of creating opportunities for producer-consumer cooperation toward sustainable development of the oil industry.

2. Overview

(1) First Day (January 30): Opening Ceremony

An opening ceremony was held at 2:00 p.m. on January 30, featuring an opening address by Mr. Keizo Morikawa, President of JCCP, followed by a greeting from the guest of honor, Mr. Hisayoshi Ando, Director-General of the National Resources and Fuel Department at METI.

In his speech, Mr. Morikawa spoke as follows: The global energy outlook is facing a major turning point today. Japan experienced an unprecedented nuclear crisis in March 2011, which prompted many countries to review their energy policy. Dramatic developments have also been made in the new energy sources of shale gas and shale oil. At the same time, however, both oil-producing and consuming countries have the responsibility to prevent further global warming and be conscious of their use of oil so we may hand this precious resource to future generations. In the face
of such changes, we must strengthen the industry’s foundation and fulfill our responsibility of supplying sufficient energy to people in our societies by acquiring a good grasp of developments in global energy supply and demand and doing our best to address the challenges that come our way, keeping our eyes open to the latest technological developments, and developing excellent human resources for the future of the oil industry. Lastly, Mr. Morikawa expressed his hope that the two-day symposium will be fruitful to everyone in the audience, and that they will gain fresh perspectives on the themes presented in the speeches and discussion sessions.

Next, Mr. Ando spoke as follows: Almost two years have passed since the 3/11 disaster. During this time, oil-producing countries have been of tremendous help in allowing us to provide fuels to people in disaster-stricken areas. I would like to express my greatest appreciation to you all. Through this experience, we recognized anew the good relations that exist between Japan and oil-producing countries, and strengthened our resolve to continue these relationships over the long term. The theme of this year’s symposium is “Communication and Cooperation for Sustainable Future of Oil Industry.” It tells us that both oil-producing and consuming countries share the same view of the importance of maintaining a stable supply of resources. I hope we can strengthen our cooperative relationship through this symposium.

(2) Keynote Speech

Following the opening greetings, Dr. Fatih Birol, Chief Economist, International Energy Agency (IEA), gave a keynote speech on “World Energy Outlook,” and summarized the important message of the IEA publication World Energy Outlook 2012 released last November, as follows: “The key message I would like to share with you today is the very fact that the foundations of the global energy system are shifting, and shifting rather rapidly. Players who are able to understand the shift will be able to position themselves, their countries, their companies, and their family budget, and those who cannot understand what is happening will be the losers. Therefore, it is important to understand those shifts.

I believe there are three drivers of this shift. The first is the resurgence of oil and gas production in selected countries, namely the United States, Canada and Iraq. The development of non-conventional oil and gas resources such as shale gas, tight oil and Canadian oil sands by the United States and Canada, and the large-scale development of oil resources in Iraq, are particularly important.

“The second driver is on the nuclear front. After Fukushima, we saw some countries changing their nuclear policies toward a lower share of nuclear power in their energy mix. If nuclear power goes down, something has to go up in order to fill the gap, and this will have implications on the global energy picture.

“The third driver of the shift is energy efficiency. Energy efficiency has been talked about for many years, but for the first time I can personally observe a growing momentum on energy efficiency in terms of legislation—not in terms of words, but in terms of legislation and legal steps.”

In view of these three drivers, Dr. Birol said it should be clear to anyone’s eyes that the global energy system will be changing dynamically in the future, and went on to discuss the various elements of change. A detailed summary of Dr. Birol’s speech is provided on pages 10 to 13 in this issue of JCCP NEWS.

(3) Special Lectures

Dr. Birol’s keynote speech was followed by four special lectures.

1) Oil Sustainability in Carbon Constrained World—The Doha Climate Gateway: Challenges Beyond 2012

Mr. Abdullah Al Sarhan
Energy and Environment Advisor, Office of the Assistant Minister for Petroleum Affairs, Ministry of Petroleum and Mineral Resources, Kingdom of Saudi Arabia

Mr. Al Sarhan based his lecture on the Doha Climate Gateway that was adopted by the COP18 conference held in December 2012, and discussed Saudi Arabia’s resolve to do its part in mitigating climate change as a member

Special lecture: Mr. Abdullah Al Sarhan, Energy and Environment Advisor, Ministry of Petroleum and Mineral Resources, Kingdom of Saudi Arabia
of the Framework Convention on Climate Change. He also noted that oil and natural gas will continue to be an important part of the global energy mix, and that sustainability of those energy resources is a vital issue to both oil producers and consumers. Furthermore, Mr. Al Sarhan stressed the importance of technology innovation in mitigating climate change, and described Saudi Arabia’s technological development initiatives.

2) Strategic Shifts in the Global Oil Equation
Dr. Fereidun Fesharaki
Chairman, FACTS Global Energy, Inc.

Dr. Fesharaki explained that in the oil upstream sector, the increased production of non-conventional oil resources such as shale gas and tight oil is changing the global oil supply-demand balance, as well as the balance of power between oil-producing and consuming countries, and that in the oil downstream sector, the active construction of large-scale refineries in oil-producing countries is shifting the center of global oil downstream operations from oil-consuming countries to oil-producing countries. As a result, Dr. Fesharaki said there will be a clear distinction between those who will survive and those who will not, according to the law of the survival of the fittest, and predicted the future of the oil industry.

3) Kuwait National Petroleum Company $40 Billion Mega Investment Plan
Mr. Hatem Ibrahim Al-Awadhi
Deputy Managing Director – Projects, Kuwait National Petroleum Company (KNPC)

Mr. Al-Awadhi spoke about KNPC’s $40 billion mega-investment plan that includes a clean fuel project consisting of the construction of new refineries and clean fuel production processes by 2020, and the company’s vision to establish a presence as a leader in the global oil industry. To bring the project to success, Mr. Al-Awadhi said human resources are the most important element, and explained how KNPC is making company-wide efforts for their development.

4) Saudi Aramco—Technology in Human Resource Development
Mr. Jamil F. Al Dandany
Director of Education Partnerships, Saudi Aramco

Mr. Al Dandany explained Saudi Aramco’s strategic goal of becoming the world’s leading oil company, and introduced the company’s efforts to achieve that goal. According to Mr. Al Dandany, Saudi Aramco is expanding both its oil upstream and downstream operations on a global scale, and is developing pragmatic personnel through training programs that adopt the latest technologies, based on the awareness that the key to success lies in the development of outstanding human resources to support those operations.

The four special lectures provided the understanding that the world’s oil industry is undergoing major changes, and that the development of outstanding human resources capable of taking charge of these changes is a priority strategic issue to triumph as winners.
(4) Reception
A reception was held after the keynote speech and special lectures. Mr. Ken Watanabe, Director, Petroleum Refining and Reserve Division, National Resources and Fuel Department, METI, gave a welcome speech, followed by Mr. Andrew Laah Yakubu, Group Managing Director, Nigerian National Petroleum Corporation (NNPC), who led a toast after giving a brief greeting.

(5) Second Day (January 31): Discussion Sessions
The program for the second day consisted of Discussion Session 1 in the morning and Discussion Session 2 in the afternoon.

1) Session 1
(9:30 – 12:00; Chaired by: Mr. Morihiro Yoshida, Managing Director of JCCP)
In Session 1, four panelists gave presentations on the theme of “Change of Business Environment in Oil Downstream and Human Resources Development,” and discussed their company’s initiatives to develop next-generation leaders with an eye to creating a new era for the oil industry.

The panelists were: Mr. Husain Ali Sanasiri, Team Leader, Executive Performance Management, Kuwait Petroleum Corporation (KPC); Ms. Raiha Azni Abdul Rahman, Vice President, Human Resource Management Division, Petronas Nasional Berhad (PETRONAS); Mr. Ali bin Abdullah Al-Riyami, Director General of Oil and Gas Marketing, Ministry of Oil and Gas (MOG), Oman; and Mr. Andrew Laah Yakubu, Group Managing Director, Nigerian National Petroleum Corporation (NNPC).

As chairman of Session 1, Mr. Yoshida summarized the session as follows: In this session, representatives from four companies gave presentations on the theme of "Change of Business Environment in Oil Downstream and Human Resources Development.” All four companies have a large social responsibility in their respective countries to provide a stable supply of oil and gas, and are making bold corporate changes with a clear agenda to fulfill their responsibilities into the future.

To achieve future growth, it is essential to make sincere efforts to introduce new technologies that respond to changes in the business environment and to develop human resources who can deal with those changes. Each of the four companies represented in this session places emphasis on human resource development and endeavors to develop people by actively introducing effective training methods.

Outstanding personnel form the foundation of competitive companies. The development of human resources therefore has high priority in achieving continuous growth in any company. Moreover, while the development, improvement and steady implementation of educational programs is important to developing human resources, it is important above all else to generate greater consciousness in each employee and guide them so they can pursue their own potentials through personal development.

Since each country has its own history, culture and unique circumstances, personnel development strategies must be based on distinct values in each country and company. However, at the same time, it is also important to interact with those in other countries who face similar issues and mutually learn from each other’s experiences.

Much was learned from the four presentations today. It would be wonderful if Japan and oil-producing countries can continue to hold exchanges and mutually cooperate in building strong companies.

2) Session 2
(13:30 – 16:00; Chaired by: Mr. Hideto Matsumura, Director, Senior Executive Officer, Cosmo Oil Co., Ltd.)
In Session 2, five panelists gave presentations on the theme of “Change of Business Environment in Oil Downstream and Innovation of Technology,” and introduced new technological challenges made in their companies.

The panelists were: Mr. Ardhyn Mokobombang, Vice President, Strategic Planning, Business Development & Operational Risk – Refining Directorate, PT Pertamina (Persero); Mr. Sultan Abdul Rahman Al Bigishi, Vice President, Operations Division, Ruwais Refinery, Abu
As chairman of Session 2, Mr. Matsumura summarized the session as follows: Today, five panelists gave presentations that focused on the advancement of oil refining, collaboration with the petrochemical industry, pipeline and tank yard development plans, research frameworks for the above and the demonstration of new technologies. Indonesia is addressing its growing domestic demand for oil by pursuing a new vision for the refining business to be achieved by 2025. In Abu Dhabi, a technical development center has been established for the development of refinery assistance technologies and human resources. In Iraq, a large-scale infrastructure construction project has been launched with the aim of increasing its crude oil export capacity. In Saudi Arabia, a new project initiative has been launched with the aim of improving the quality of oil products and establishing a cooperative relationship with the petrochemical industry. The Japanese presentation introduced the flare gas recovery technology that Cosmo Oil has commercialized in cooperation with TAKREER. All of the presentations offered important themes pertaining to future oil supply-demand trends and environmental countermeasures. They also illustrated worldwide technical trends in energy conservation and environmental technologies and the diversification of products in collaboration with the petrochemical industry as a means for strengthening refinery competitiveness.

Today’s panelists all emphasized the necessity of making national efforts to develop technologies in cooperation with domestic and foreign partners, instead of outsourcing technical development to external licensors and other such foreign institutions, as has been done up to now. Behind this understanding lies an evolving environment in which companies can no longer expect to survive international competition without tackling new challenges. Moreover, tackling new challenges requires pragmatic human resource development at all stages of operation, through onsite experience in refining, storage and transportation operations, and not by studying books.

Cosmo Oil cultivated the flare gas recovery system as its own technology developed jointly with Toyo Engineering, and succeeded in its practical application to the Ruwais Refinery in cooperation with TAKREER. That this successful experience provided a rare opportunity for personal development to young engineers in UAE and Japan is a source of pride and honor to Cosmo Oil.

The oil industries in oil-producing countries and Japan alike have accumulated vast experience and technologies through refinery operations. To continue to survive in the coming era, oil-producing countries and Japan need to mutually exchange and share their technologies and expertise. We can expect to see the rise of new, competitive refineries from such cooperation between oil-producing countries and Japan. On a closing note, I therefore ask that greater efforts than ever before be made to deepen mutual exchanges among our countries.

3. Closing Statement

After the discussion sessions, Mr. Masataka Sase, Executive Director of JCCP, took the podium to deliver the closing message. He first noted that events of significant bearing on the energy supply-demand balance are occurring one after another in today’s world, including the large increases in global demand for energy, uncertainties in the future of nuclear power generation, the potentials of shale oil and gas development, and full-scale reconstruction and increased oil production capacity in Iraq. Mr. Sase said that these topics have been addressed from various angles by the panelists of this year’s international symposium, who presented a direction for dealing with them through human resource development and technical innovation initiatives over an information-filled, fruitful two days. Reiterating the objectives of the JCCP International Symposium, which are to create an opportunity for exchanges among energy experts from oil-producing countries and Japan and contribute to the stable supply and demand of energy by deepening mutual understanding, Mr. Sase stated that the objectives have again been met this year owing to the participation of a large number of people from inside and outside of Japan, and thanked everyone on behalf of JCCP.

* Presentation materials from the symposium are available on JCCP’s website (http://www.jccp.or.jp) for your reference.

(by Hisayoshi Tanda, Administration Dept.)
The 31st JCCP International Symposium Program
“Communication and Cooperation: For Sustainable Future of Oil Industry”

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Proceedings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jan. 30 (Wed)</td>
<td>14:00 – 17:35</td>
<td>Opening ceremony</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Opening address</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Keizo Morikawa, President of JCCP</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Guest-of-honor speech</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Hisayoshi Ando, Director-General, Natural Resources and Fuel Department, Agency for Natural Resources and Energy, METI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Keynote speeches</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Faith Birol, International Energy Agency (IEA)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Special lectures</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mr. Abdullah Al Sarhan, Ministry of Petroleum and Mineral Resources, Kingdom of Saudi Arabia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Dr. Fereidun Fesharaki, FACTS Global Energy Inc.</td>
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<tr>
<td></td>
<td></td>
<td>Mr. Hatem Ibrahim Al-Awadhi, Kuwait National Petroleum Company (KNPC)</td>
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<tr>
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<td></td>
<td>Mr. Jamil F. Al Dandany, Saudi Aramco (on behalf of Mr. Nasser Al-Nafisee)</td>
</tr>
<tr>
<td></td>
<td>18:00 – 20:00</td>
<td>Reception</td>
</tr>
<tr>
<td>Jan. 31 (Thu)</td>
<td>9:30 – 12:00</td>
<td>Session 1 “Change of Business Environment in Oil Downstream and Human Resources Development”</td>
</tr>
<tr>
<td></td>
<td>13:30 – 16:00</td>
<td>Session 2 “Change of Business Environment in Oil Downstream and Innovation of Technology”</td>
</tr>
<tr>
<td></td>
<td>16:00 – 16:10</td>
<td>Closing address: Mr. Masataka Sase, Executive Director of JCCP</td>
</tr>
</tbody>
</table>

Keynote Speech

<table>
<thead>
<tr>
<th>Country</th>
<th>Speaker</th>
<th>Speech Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>France</td>
<td>Dr. Faith Birol</td>
<td>World Energy Outlook</td>
</tr>
<tr>
<td></td>
<td>Chief Economist, International Energy Agency (IEA)</td>
<td></td>
</tr>
</tbody>
</table>

Special Lectures

<table>
<thead>
<tr>
<th>Country</th>
<th>Speaker</th>
<th>Speech Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>Mr. Abdullah Al Sarhan</td>
<td>Oil Sustainability in Carbon Constrained World</td>
</tr>
<tr>
<td></td>
<td>Energy and Environment Advisor, Office of the Assistant Minister for Petroleum Affairs, Ministry of Petroleum and Mineral Resources, Kingdom of Saudi Arabia</td>
<td>The Doha Climate Gateway: Challenges Beyond 2012</td>
</tr>
<tr>
<td>USA</td>
<td>Dr. Fereidun Fesharaki</td>
<td>Strategic Shifts in the Global Oil Equation</td>
</tr>
<tr>
<td></td>
<td>Chairman, FACTS Global Energy, Inc.</td>
<td></td>
</tr>
<tr>
<td>Kuwait</td>
<td>Mr. Hatem Ibrahim Al-Awadhi</td>
<td>Kuwait National Petroleum Company $40 Billion Mega Investment Plan</td>
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<td>Deputy Managing Director – Projects, Kuwait National Petroleum Company (KNPC)</td>
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<tr>
<td>Saudi Arabia</td>
<td>Mr. Jamil F. Al Dandany</td>
<td>Saudi Aramco – Technology in Human Resource Development</td>
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<td>Director of Education Partnerships, Saudi Aramco</td>
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### Session 1: Change of Business Environment in Oil Downstream and Human Resources Development

**Chairman:** Mr. Morihiro Yoshida  
Managing Director, Japan Cooperation Center, Petroleum (JCCP)

<table>
<thead>
<tr>
<th>Country</th>
<th>Speaker</th>
<th>Speech Title</th>
</tr>
</thead>
</table>
| Kuwait   | Mr. Husain Ali Sanasiri  
Team Leader, Executive Performance Management,  
Kuwait Petroleum Corporation (KPC) | K-LEAD – Journey to the Corporate Academy         |
| Malaysia | Ms. Raiha Azni Abdul Rahman  
Vice President, Human Resource Management Division,  
Petroleum Nasional Berhad (PETRONAS) | Building a Sustainable Human Capital Strategy  
– Building Own Timber                             |
| Japan    | Mr. Nobutaka Nohara  
Associate Executive Officer, General Manager,  
Corporate Administrative & Financial Affairs Division, JGC Corporation | Development of Globally Competitive Human Resources |
| (canceled) | Mr. Ali bin Abdullah Al-Riyami  
Director General of Oil and Gas Marketing,  
Ministry of Oil and Gas (MOG) | Oman’s Future Oil and Gas Industry               |
| Oman     | Mr. Andrew Lah Yakubu  
Group Managing Director, Nigerian National Petroleum Corporation (NNPC) | Change of Business Environment in Oil  
Downstream and Human Resources Development        |

### Session 2: Change of Business Environment in Oil Downstream and Innovation of Technology

**Chairman:** Mr. Hideto Matsumura  
Director, Senior Executive Officer, Cosmo Oil Co., Ltd.

<table>
<thead>
<tr>
<th>Country</th>
<th>Speaker</th>
<th>Speech Title</th>
</tr>
</thead>
</table>
| Indonesia | Mr. Ardhy N. Mokobombang  
Vice President, Strategic Planning, Business Development & Operational Risk – Refining  
Directorate, PT Pertamina (Persero) | Meeting the Energy Challenge in the World’s Largest Archipelago |
| UAE      | Mr. Sultan Abdul Rahman Al Bigishi  
Vice President, Operations Division, Ruwais Refinery,  
Abu Dhabi Oil Refining Company (TAKREER) | Strategy of TAKREER on R&D for Sustainable Future of Refining Industry |
| Iraq     | Ms. Nihad Ahmed Moosa  
Director General, State Company for Oil Projects (SCOP), Ministry of Oil-Iraq | Blueprint for Iraqi Oil & Gas Infrastructure Development and Plans for Pipeline Network and Storage in Oil Industry |
| Saudi Arabia | Mr. Uthman A. Al-Ghamdi  
Manager, Operations Department, Ras Tanura Refinery,  
Saudi Aramco | Ras Tanura Refinery Clean Fuel Project Fosters Technology to Gain Efficiency |
| Japan    | Mr. Yukinori Kawashima  
Assistant General Manager – Production Control,  
Yokkaichi Refinery, Cosmo Oil Co., Ltd. | Flare Gas Recovery Project at TAKREER Ruwais Refinery |

*Session 1 panelists*  
*Session 2 panelists*
Keynote Speech

World Energy Outlook

Dr. Faith Birol
Chief Economist
International Energy Agency (IEA)

IEA published World Energy Outlook 2012 last November, presenting projections for global energy demand-supply balance through to 2035 and measures for achieving an energy-efficient world. Today, I wish to explain what types of issues IEA deems necessary to address in order to stabilize the global energy balance between now and 2035.

1. Message of World Energy Outlook 2012

Let me start by telling you a bit about where we are in the global energy picture today. The key message I would like to share with you based on our World Energy Outlook 2012 is the very fact that the foundations of the global energy system are shifting, and are shifting rather rapidly.

Players who are able to understand the shift will be able to position themselves, their countries, their companies, and their family budget, while those who cannot understand what is happening will be losers. Therefore, we think it is important to understand the shift.

I believe there are three dimensions of this shift, or three drivers. The first is the resurgence of oil and gas production in selected countries. There are three that are especially crucial here: the United States, Canada and Iraq. We see strong growth and further growth potential in these countries, which will change major dynamics.

The second driver is on the nuclear front. After Fukushima, we saw some countries changing their nuclear policies. Germany, Switzerland, and Italy have closed the doors on nuclear power. France says it would like to see a lower share of nuclear power in the French energy mix. These changes in policies will have implications on the global energy mix and CO₂ emissions. At the same time, if nuclear power goes down, something has to go up in order to fill the gap, so there will be implications on the global energy picture.

The third driver of the shift in the global energy system comes from an unexpected corner. Energy efficiency has been talked about for many years, but for the first time I personally observe a growing momentum on energy efficiency in terms of legislation—not in terms of words, but in terms of legislation and legal steps.

In the current 5-year plan, China has set a very ambitious energy efficiency target. If China reaches that target, there will be implications for all of us in terms of the global energy picture. The United States recently set fuel efficiency standards for cars. This is also very important for the global oil markets in the coming years. Europe, as well, issued a European energy efficiency directive, a legal basis for efficiency improvement. Thus we see a growing momentum on energy efficiency, not only in terms of words, but also in terms of legal steps.

2. Future Trend in Global Energy Demand

From here, let me turn to the future and see what is happening. When we look at the global energy demand in the coming years, we see that the countries I am representing here today—the OECD countries and the IEA countries—used an amount of energy corresponding to about two-thirds of the global energy demand in the mid-1970s when IEA was founded. However, soon the share of our member countries will decrease to one-third. Then where will demand growth come from? It will come from China, India and the Middle East countries themselves. So the message is clear. The center of gravity of global energy use is moving to the East slowly but surely, which means that investments, attention and policies need to be geared toward the East as well, together with the use of energy.

Conventional oil production in the United States has been declining year by year, but as a result of new technologies, we are now seeing a reversal of that trend. It is showing a V-trend, namely owing to unconventional oil. According to our projections, in a few years’ time the United States will be the number-one oil producer in the world. Note, however, that I said “producer.” Saudi Arabia will remain, for many years to come, the number one oil exporter in the world. Producers and exporters differ from each other.

On the natural gas front, again conventional gas in the United States has been declining for many years, but as a result of the shale gas revolution we see an increase in total gas production in the United States. Very soon the United States will be the number one natural gas producer in the world, overtaking Russia.

Within 10 years’ time, the United States will be the number one oil producer in the world as well as the number one natural gas producer in the world. This will have major implications on the economy, energy policy, and maybe even on foreign policy.

4. Changes in the Relationship between the Middle East Oil-producing Countries and Europe, the United States, and Asia

One of the implications of the changing status of the United States will be on the Middle East. Until recently, the United States was importing a significant amount of oil from the Middle East countries. As a result of these developments, therefore, U.S. imports from the Middle East may well be reduced to a minimum, if not to zero. At the same time, the pattern of Middle East exports will change as well. Until recently, 50% of Middle East exports went to the West and 50% to the East, but about 90% may now go to Asia.

There will also be an ever-growing oil-trade link between the Gulf countries and Asian economies. I am sure this oil-trade link will be multiplied or added to by different links ranging from trade of other commodities, investment patterns, foreign policy, and various other issues.

5. Implications on Energy Security

Changes in the oil and gas markets have implications on energy security. Energy security is a very crucial topic for many countries. In China, India and Europe, we see a growing reliance on oil and gas imports, and energy security is becoming a major concern.

There is one exception: the United States, which
is going completely in the opposite direction, toward improving energy security. In terms of gas, we expect the United States will be a gas exporter very soon, and its oil imports will decrease to a minimum.

The United States has made large steps toward energy self-sufficiency, owing not only to the growth in domestic oil production, but also to the improvement in the energy efficiency of cars and trucks, which put downward pressure on domestic oil demand. Increasing domestic oil production and decreasing domestic oil consumption translated into the success story of the United States making great strides toward self-sufficiency.

This success story is thus not only attributable to North Dakota, but also to Detroit, the home of many car manufacturers. It is a joint effort between production growth and decline in consumption as a result of efficiency.

6. Global Implications of Oil Resource Development in Iraq

In our World Energy Outlook 2012, one country we looked at in depth is Iraq. We studied Iraq from A to Z, from oil and gas to electricity and water. As a result, our projections show that there is strong potential for Iraq to contribute to global oil markets.

In just the last two years, we have seen growth in Iraq of about 800,000 b/d. We believe Iraq will have a production of around 6 million b/d by 2020, with potential for further growth thereafter.

When we look at trade, 50% of Iraqi oil exports go to Asia and 50% to the rest of the world at present. However, this will change drastically, so that about 80% of Iraqi oil will go to Asia. A country that I wish to highlight here is China. According to our analysis, more than 30% of the growth in Iraqi oil production will come from oil fields that are either owned by Chinese companies or by a consortium that includes Chinese companies. Iraqi oil will go to Beijing, and from Beijing a significant amount of investment will go into Iraq’s oil, electricity, and other sectors. We call this the B-to-B trade (Baghdad-to-Beijing trade). It is growing stronger, as both countries need and complement each other.

7. Foreign Cooperation for Oil Development in Iraq

We are witnessing very impressive growth in Iraq. This growth, which is very important for the global oil markets, should not be taken for granted, however. There are at least two major challenges for that picture to be realized.

One is the lack of governance. The oil sector in Iraq does not have a hydrocarbon law that all stakeholders agree on. There are differences between the central government and regional governments that should be resolved as soon as possible so that badly needed investment can come into the country and allow production export revenues to grow.

If our central scenario is to be realized, our numbers show that in 20 years’ time Iraqi GDP will reach the current GDP level of Saudi Arabia. The country has the potentials to prosper rapidly if the oil revenues are there. In order to secure oil revenues, there is a need to establish, as soon as possible, a hydrocarbon law that everyone agrees on. This is the first challenge before production growth can be achieved.

Second, there are infrastructure problems. The bulk of oil growth in Iraq will come from four super giant fields.
around Basra in the South. These four super giant fields are at the heart of the growth in Iraqi oil production. However, there is a problem with the availability of injection water that is needed for production. The availability of natural water, the aquifer, is limited in Iraq, so what is needed is to pump seawater into the fields. To this end, there are plans for seawater projects in Iraq, which we hope will be implemented quickly to maximize oil production. There are also challenges in increasing the capacity of oil export terminals.

These are the two major problems that stand in the way of the central scenario: governance in the oil sector in Iraq and technical challenges. If these challenges are not overcome, we may see much lower production growth, or what we call delayed growth. This is neither good for Iraq, nor for consumers. Therefore, we must hope that these two challenges in Iraq—governance in the oil sector and technical problems—are resolved as soon as possible.

One more point about Iraq. Today in Iraq, there are shortages of electricity. According to our analysis, an Iraqi citizen receives only 8 hours of electricity per day. This is a serious issue, and the Iraqi government is making huge efforts to bring new power to the system. As we have recommended to the Iraqi government, we hope to see less oil and more natural gas in electricity generation. Many fields in Iraq have a major flaring problem, and a project is therefore being implemented to address the issue. We hope to see the flaring fixed and more natural gas used in Iraq.

8. Summary

Today, governments have an extremely difficult job in terms of the energy sector, because they need to reconcile different priorities: energy, environment and economy. Certain things that may be good news for energy may be bad news for the economy or environment, or something that looks interesting from an environmental point of view may not work well for the energy sector or have negative implications for the economy. Therefore, energy decisions need to be weighed carefully as to their implications on the three determinants, as well as to the structural long-term needs of a given country.

Global energy production—oil, gas and their use—is changing, and this change will have major economic and geopolitical implications. To see, observe, and understand these changes, and to set the correct policies for energy, the economy and foreign policy is crucial for all of us.

Our numbers show that Iraq will play a crucial role in the oil markets in the coming years with its huge oil and gas reserves that allow low-cost energy production. However, two challenges confront Iraq before it can play this decisive role in the global energy market and for the country’s very destiny itself.

There are two trends, which are both difficult to understand. One is that CO₂ emissions are increasing, as is the frequency of extreme weather events. The other trend is that attention given to climate change is decreasing. Climate change is slipping off the international energy policy agenda and receiving less and less attention. This means that even if we find a solution for climate change, it will be expensive; and the more expensive it is, the more difficult it will be to convince the world to reach an agreement. We may well be seeing ourselves in a vicious circle in terms of climate change.

However, energy efficiency is within reach. The awareness that most energy efficiency policies can be implemented using existing technologies is important to achieving a sustainable and economically viable energy system.

Let me finish with one last point. This is not a prediction but a hope. Four years ago, in World Energy Outlook when it was published and again in Tokyo, I predicted that an unconventional energy revolution—a shale revolution—is starting. That prediction came true. Now, my hope is to see another unconventional energy revolution, but this time one for energy efficiency. As my closing words, I wish to say that Japan is a very good example to inspire this revolution.

Thank you very much for your attention.

<Summary by: Hisayoshi Tanda, Administration Dept.>