Joint IEA-IEF-OPEC Report

on the Symposium Energy Outlooks

24th January 2011, Riyadh

Executive Summary

The International Energy Agency (IEA), the International Energy Forum (IEF) and the Organization of the Petroleum Exporting Countries (OPEC) jointly hosted a Symposium on Energy Outlooks on 24th January 2011 in Riyadh, Saudi Arabia. Held under the Chatham House Rule, the Symposium offered a platform for sharing insights and exchanging views about energy market trends and short-, medium- and long-term energy outlooks, including analysis of market behaviour and discussion of the key drivers of the energy scene along with the associated uncertainties. The Symposium provided rich and diverse views from distinguished experts with different backgrounds and affiliations. The presentations were based upon the IEA's Oil Market Report and World Energy Outlook 2010, and OPEC's Monthly Oil Market Report and World Oil Outlook 2010.

The discussion in the first session, which concentrated on recent market developments and near-term prospects, focused on the shape of, and the risks associated with, economic recovery in the world's major regions, a well as the patterns of energy demand in major regions/countries after the financial crisis. The session identified the main convergences and differences between the IEA and OPEC's outlooks and discussed the reasons behind the differences, such as those related to definitions, data sources and uses or presentation of the results.

There was a consensus that, while economic recovery is under way, it remains fragile and risks are skewed towards the downside. Participants noted that both the IEA and OPEC's projections were similar in terms of supply/demand growth figures for 2011. This paints a market situation in 2011 characterized by a high level of spare capacity, in both upstream and downstream; relatively high OECD commercial inventories, an expected slowdown in oil demand growth compared to 2010, and increases in oil supply. The influence of non-fundamentals on the market was also highlighted.

The second session discussed the longer-term outlooks. Apart from looking at the main assumptions behind the outlooks, the session also emphasized the uncertainties that surround the longer term. There was a consensus that oil will likely remain the dominant fuel in the energy mix by 2030, but that there are considerable uncertainties concerning how future demand will evolve, in particular with regard to energy and environmental policies. Other key uncertainties relate to economic growth assumptions and technological change. However, looking 20 years into the future, the participants accepted that differences between the outlooks in the central scenarios were relatively small.

There was also a consensus that oil resources, both conventional and non-conventional, are sufficient to meet future demand. In addition, there was a common recognition and emphasis upon the fact that uncertainties complicate the making of appropriate investment decisions, in an industry with long lead times, huge upfront capital

requirements and long pay back periods. In this regard, participants underscored that security of demand and security of supply are mutually supportive.

The discussion also looked at domestic prices and discussed the role of subsidies and taxation. While one view considered that inefficient fossil fuels subsidies that lead to wasteful consumption should be phased out, another view stressed the fact that subsidies are an important country-driven policy instrument and that the rationalization of inefficient subsidies should be based on country-defined strategies that take into account national circumstances. In addition, the need to broaden the analysis to all forms of energy subsidies was also mentioned.

The Symposium also heard details of the outlooks for the downstream sector. It was pointed out that a surplus capacity is emerging, particularly in the Atlantic region. This underscores the increasing potential for refinery closures.

The Symposium ended with a Wrap-up Session, which drew attention to key issues. This included the issue of climate change. There was recognition that the international community had agreed in at the COP 16 in Cancun that the long-term global average surface temperature increase should not exceed 2°C above pre-industrial levels. There was also a convergence of views about the large uncertainties associated with climate sensitivity and the extreme difficulty in achieving a 450 parts per million (ppm) atmospheric greenhouse gas (GHG) concentration stabilization level. While a view pointed at the potential detrimental consequences of such a situation, another view stressed the historical responsibility of developed countries in regard to the current state of the atmosphere and the implications for developed countries to lead the mitigation and adaptation efforts, including in terms of the provision of new and additional financial resources and technology transfer.

There was consensus on the need to alleviate energy poverty. Participants considered the objective of universal access for the poor to modern energy services laudable; some, however, were of the view that the suggested level of per household consumption was insufficient and should be made more ambitious.

The IEA-IEF-OPEC Symposium on Energy Outlooks offered an opportunity to discuss energy market trends and outlooks, as well as the associated uncertainties. Recognizing that energy markets have become increasingly complex and global, it underlined that sharing insights and analyses among the organizations and other experts would be mutually beneficial and reflect the diversity of views on oil and energy outlooks to contribute to a better mutual understanding of the interests and concerns of every stakeholder.

With this in mind, the second Symposium on Energy Outlooks will be held in 2012.

1. Introduction

The IEA and OPEC regularly publish energy and oil outlooks covering the short-, medium- and long-term. In addition, on the occasion of the IEF Ministerial Meetings, each organization contributes by submitting a focused energy analysis that is presented to IEF Ministers. Short- to long-term energy outlooks are also published by other government, consultancy, banking and academic institutions.

The IEA, IEF and OPEC jointly hosted a Symposium on Energy Outlooks on 24th January 2011 in Riyadh, Saudi Arabia. Held under the Chatham House Rule, the Symposium offered a platform for sharing insights and exchanging views about the short- medium- and long-term energy outlooks, including analysis of market behaviour and discussion of the key drivers of the energy scene, along with the associated uncertainties. The Symposium discussed the short-, medium-, and long-term projections of the IEA and OPEC based on their latest publications. The agenda of the Symposium (Annex I) and the Introductory Paper (Annex II) are attached to this Report.

This event is part of a wider joint programme of work included as an Attachment to the Cancun Ministerial Declaration. This emerged from the meeting of Energy Ministers at the 12th IEF (Cancun, March 2010).

To facilitate the discussions during the Symposium, an introductory paper was prepared by the IEF, in consultation with the IEA and OPEC. The Introductory Paper compared the short- (to 2011), medium- (to 2014), and long-term (to 2030) projections. For the short-term, the IEA's latest projections from its Oil Market Report (OMR) was referenced and compared to the projections in OPEC's Monthly Oil Market Report (MOMR), both published in January 2011. For the medium-term, the IEA's latest projections published in the December 2010 OMR was used and compared to the medium-term projections in OPEC's World Oil Outlook (WOO 2010), published in November 2010. For the long-term, OPEC's projections from the WOO 2010 and the IEA's from the World Energy Outlook 2010 (WEO 2010) were used. Only central projections were used in this comparison, and scenarios that explored uncertainties were not included.

The Symposium sought to identify major similarities and differences between the IEA and OPEC's short-, medium- and long-term outlooks in terms of underlying assumptions, economy, demand and supply projections, and to highlight areas where improved comparability and understanding could be useful.

2. Recent market developments and near-term prospects

The discussion in this session focused on the shape of economic recovery in the world's major regions, the patterns of energy demand and supply in major regions/countries and the impact of the global financial crisis. The session also addressed OPEC crude supply, the recent strong non-OPEC supply and its potential sustainability, the issue of natural

gas liquids (NGLs) and unconventional oil, as well as the potential consequences of the Gulf of Mexico oil spill on future deepwater drilling and supply.

Participants also discussed refining capacity, inventory levels, products specifications, biofuel mandates and growing non-refinery products and their implications for the downstream sector. The session concluded with a discussion of the uncertainties affecting near term energy outlooks.

To facilitate the discussions in this session the IEA's short- and medium-term and OPEC's near-term outlooks were presented by the representatives of the two organizations.

The session identified the main similarities and differences between the IEA's and OPEC's outlooks and discussed the reasons behind these differences, such as those related to definitions, data sources and uses or presentation of the results. The differences in historical figures were also discussed. The session noted that the difference between the IEA and OPEC world demand figures for the 2009 is modest, at only 0.5 million barrels a day (mb/d), and appears to be mostly attributable to definitional differences regarding the product mix considered in the measurement of demand for some regions (e.g. ethane use). Another example is Russian supply, with the two organizations using different sources for this figure.

It was further noted that 2010 witnessed stronger oil demand growth than initially thought, although some data for the year was not expected to be received until the middle of 2011, even for OECD countries. A major part of the differences in 2010 world demand growth is believed to be due to differences in estimated demand for China (where an apparent demand proxy is used), and, to a lesser extent, other non-OECD regions. There was an agreement that better crude and products stocks data from high demand-growth countries will help achieve more convergence in demand data for these countries. In this regard, the role of an enhanced Joint Oil Data Initiative (JODI) with the cooperation of several international organizations has been stressed again.

The participants noted that both the IEA's and OPEC's projections for 2011 are very similar and that the nature of the market situation in 2011 seems to be characterized by a high level of spare capacity, both upstream and downstream, expected moderate growth in oil demand compared to 2010, and a steady increase in oil supply. The influence of non-fundamentals on the market was also highlighted. However, many uncertainties remain in regard to the global economic recovery and the health of the financial system, and, thus, risks were rather skewed towards the downside.

The participants highlighted the usefulness of understanding how each organization establishes data for the base month or year and to explore the differences in historical data. In addition, they commended the regular contact between organizations to compare projections after their public release, with the purpose of discussing and building a clearer understanding of their respective outlooks.

Some participants considered it useful to improve the understanding of the treatment of non-OECD demand and energy intensity; to differentiate, where possible, between crude oil and products; to encourage more detailed and timely disclosure of OECD data; and, to hold joint meetings, as and when appropriate, on focused technical areas.

The session noted that the variations in OPEC spare capacity figures in the medium-term between the two organizations can be explained by the differences in their demand level forecasts for OPEC crude and the IEA's use of the concept of effective capacity that has the effect of lowering the figure of spare capacity by about1 mb/d.

Finally, the participants noted that the environment for the dialogue between the organizations has improved in recent years. This improvement has led to recognition, as well as a better understanding of the other's interests, concerns and policy objectives, which in turn has resulted in some convergence in ideas and thinking. For example, in the linkage between supply and demand security and the appreciation that very low prices, as well as very high prices, are detrimental to both producers and consumers.

The session also pointed to a number of areas where there was scope to discuss analytical issues – not necessarily to come to a common view, but to ensure a better understanding of each stakeholder. Examples included demand growth in some regions, such as China, India and the Middle East, the treatment of the Strategic Petroleum Reserves (SPR), ethane, spare capacity, bunker fuels, biofuels, processing gains, NGLs, and the links between GDP growth and oil demand.

3. Long-Term Energy Outlook

This session discussed the main assumptions behind the IEA's and OPEC's outlooks, in particular population growth, including the importance of changes in age structures and the trend towards urbanization, price patterns, economic growth, energy and environmental policies, as well as technological developments. It addressed issues related to all forms of energy supply, especially for liquids, including both conventional and non-conventional resources and the prospects for biofuels. The session also emphasized the uncertainties that surround the longer term, and the implications that this has for making appropriate investment decisions.

The session discussed, among others, the gradual shift in energy demand toward emerging economies (non-OECD region); the impact of energy and environmental policies on energy outlooks and the energy market; and finally, the implications of the outlooks and associated challenges for the downstream sector.

To facilitate the discussions in this session, the IEA WEO, and OPEC's WOO were presented by representatives of the two organizations.

Both the IEA and OPEC noted that oil will likely remain the main fuel in satisfying the world's energy needs for the foreseeable future, but that there are considerable uncertainties concerning how future demand will evolve, in particular with regard to energy and environmental policies. Other key uncertainties relate to economic growth

and technological change. However, looking 20 years into the future, the participants accepted that the differences between the outlooks in the central scenarios of the two Organizations, in the range of 3-4 mb/d by 2030, are quite normal given the level of uncertainties ahead.

The IEA's WEO and OPEC's WOO project that global primary energy demand will continue to grow over the forecast period, and there was a consensus that oil resources, both conventional and non-conventional, are amply sufficient to meet future demand.

The participants noted that, because energy and environmental policies are one of the key drivers for future energy demand and supply, and are also among the most uncertain areas for energy outlooks, it is important to explore and better understand the effect of policy implementation on the results of the outlooks.

In addition, there was a common recognition and emphasis upon the fact that uncertainties complicate the making of appropriate investment decisions, in an industry with long lead times and payback periods. Some of these uncertainties, which are policy-driven (policy proposals to combat climate change, economic policy across the world, etc.) are subject to particular uncertainty. Other significant long-term ambiguities relate to supply and demand price elasticities, which affect the assessment of the sustainability of any given oil price, the future role of coal, natural gas and renewable energies, and the possible role of technology in affecting future demand patterns. When the results of projections are shown with the ranges that reflect such uncertainties, outlooks may actually diverge substantially.

Another area of uncertainty is the assessed potential of petroleum liquids derived from non-conventional gas resources. This resource base may prove to be bigger than currently expected, but uncertainty is still rife as many factors, both technical and policy-oriented, will have an influence over the long-term.

The discussion also looked at domestic prices and energy demand and discussed the role of subsidies and taxation. While one view considered that inefficient fossil fuels subsidies that lead to wasteful consumption should be phased out, another view stressed the fact that subsidies are an important country-driven policy instrument and that the rationalization of inefficient subsidies should be based on country-defined strategies that take into account national circumstances. Some pointed at broadening the analysis of subsidies/taxation to all forms of energy.

The Symposium also heard details of the outlook for the downstream sector. It was pointed out that a surplus capacity is emerging, particularly in the Atlantic basin. This underscores the increasing potential for refinery closures. Having said that, capacity additions will be required both because of the expanding need for new capacity in the Asia-Pacific and the Middle East, as well as the further demand shift towards middle distillates and light products. The often overly ambitious targets set for biofuels use is also a particularly large uncertainty for the downstream sector.

The Symposium ended with a Wrap-up Session, which drew attention to key issues. These included the issue of climate change. There was recognition that the international community had agreed at the COP 16 in Cancun that the long-term global average surface temperature increase should not exceed 2°C above pre-industrial levels. There was also a convergence of views about the large uncertainties associated with climate sensitivity and the extreme difficulty in achieving a 450 ppm atmospheric GHG concentration stabilization level. While a view pointed at the potential detrimental consequences of such a situation, another view stressed the historical responsibility of developed countries in regard to the current state of the atmosphere and the implications for developed countries to lead the mitigation and adaptation efforts, including in terms of the provision of new and additional financial resources and technology transfer.

There was also a consensus on the need to alleviate energy poverty. Participants considered the objective of universal access for the poor to modern energy services laudable; some, however, were of the view that the suggested level of per household consumption was insufficient and should be made more ambitious.

Finally, participants also discussed a number of areas where the future focus of analytical work would be of benefit. Going forward, some participants noted two different possible frameworks for dialogue, meetings between the organizations, and open meetings that include other experts that concentrate on a specific deliverable and focused theme.

4. Summary of the discussions

The IEA-IEF-OPEC Symposium on Energy Outlooks offered a timely opportunity for energy stakeholders to discuss energy market trends (energy supply, demand and prices) and associated factors that influence these trends (environmental policies, economic conditions, technological development, etc.).

The Symposium recognized that energy markets have become increasingly complex and inter-related and that sharing insights and analyses among the organizations and other experts is mutually beneficial, reflecting the positive effect of having a diversity of views on oil and energy outlooks. The Symposium recognized that the objective is not to align the Organizations assumptions and outlooks, but to improve clarity and understanding over the various outlooks.

The meeting identified the main convergences and differences between the IEA's and OPEC's outlooks and discussed the reasons behind these differences, such as those related to definitions, methodologies, and the presentation of results.

The discussions revealed that methodologies and definitions are important factors in identifying the reasons behind the differences in the outlooks. With this in mind, the Symposium recommended moving towards harmonizing definitions, where possible and appropriate, and disclosing more data, in a more timely manner, to enhance comparability between the outlooks. In addition, it highlighted the need for a better exchange of data and information through a strengthened and improved JODI.

Moreover, it recommended exploring the possibility of further possible joint meetings on certain technical areas of interest.

The Symposium noted that energy and environmental policies are one of the key drivers for future energy demand and supply; however, they are also one of the most uncertain areas of the outlooks. In this respect, some participants recommended the need to explore and better understand the effect of different policy assumptions on the results of the outlooks.

The participants pointed at a number of areas in which comparability of IEA and OPEC outlooks could be improved, including through more convergence in definitions and greater disaggregation of information. Again, the role of JODI was highlighted in this regard.

5. Conclusion

The IEA-IEF-OPEC Symposium on Energy Outlooks reached its objective of offering a platform for experts to discuss energy outlooks and gain a better understanding of the interests and concerns of each Organization. It also helped in identifying and discussing the similarities and differences between the outlooks, in order to advance clarity in terms of the data, assumptions, methodologies and the analysis of the results of these outlooks.

Participants commended the efforts made by the three Organizations and praised the areas of cooperation that they have identified and included in the Cancun Declaration.

In this context, the second Symposium on Energy Outlooks will be held in 2012.

Annex I

IEA-IEF-OPEC Symposium on Energy Outlooks

24th January 2011, Riyadh, Saudi Arabia

Tuesday, January, 24, 2010	
9:30 to 09:45	**Opening Session** Introductory Remarks **HRH Abdulaziz bin Salman bin Abdulaziz Al Saud**, Chairman of the IEF Expanded High Level Steering Group Welcoming Address **Noe Van Hulst**, Secretary General, IEF **Nobuo Tanaka**, Executive Director, IEA **HE Abdalla El-Badri**, Secretary General, OPEC
09:45 to 12:00	**Session I: Recent market developments and near-term prospects** Moderator: **Adnan Shihab-Eldin**, Former Acting Secretary General for OPEC Panellists: **David Fyfe**, Head, Oil Industry and Markets Division, IEA **Hojatollah Ghanimi Fard**, Head, Petroleum Studies Department, OPEC
12:15 to 13:30	Lunch
13:30 to 14:45	**Session II: Long-term energy outlook** Moderator: **Claude Mandil,** Former IEA Executive Director Panellists: **Fatih Birol,** Chief Economist, IEA **Gary Brennand,** Senior Research Analyst, Energy Studies Department, OPEC
14:45 to 15:00	Coffee Break
15:00 to 16:45	**Session III: Wrap-up** Moderator: **Guy Caruso**, Former Administrator of Energy Information Administration (EIA) Panellists: **Fatih Birol**, Chief Economist, IEA **Said Nachet**, Energy Director, IEF **Mohamed Hamel**, Senior Advisor, OPEC
16:45 to 17:15	**Closing Remarks** **Noe Van Hulst**, Secretary General, IEF **Nobuo Tanaka**, Executive Director, IEA **HE Abdalla El-Badri**, Secretary General, OPEC **HRH Abdulaziz bin Salman bin Abdulaziz Al Saud**, Chairman of the IEF Expanded High Level Steering Group
20:00	Dinner hosted by HRH Abdulaziz bin Salman bin Abdulaziz Al Saud, Chairman of the IEF Expanded High Level Steering Group.

Annex II

Introductory Paper

1. Background and Objectives

The IEA and OPEC regularly publish energy and oil outlooks covering the short-, medium- and long-term. In addition, on the occasion of the International Energy Forum, each organisation contributes by submitting a focused energy analysis to be presented to IEF Ministers. Short- to long-term energy outlooks are also published by other government, consultancy, banking and academic institutions.

The IEA, IEF and OPEC will be holding a Symposium on Energy Outlooks on January 24th, 2011 in Riyadh. The Symposium will offer a platform for sharing insights and exchanging views about energy market trends and short- medium- and long-term energy outlooks, including analysis of market behaviour and discussion of key drivers of the energy scene and associated uncertainties.

This event is part of a wider joint programme of work agreed by the three organisations and endorsed by energy ministers at the 12th International Energy Forum (Cancun, March 2010) as part of the Cancun Declaration[1].

This introductory paper provides a comparison of the IEA's and OPEC's short-, medium- and long-term energy outlooks. It aims to:

- Identify the major differences between the IEA and OPEC's short-medium- and long-term outlooks in terms of economy, demand and supply projections;
- Identify the similarities and the major differences between the assumptions used in determining the projections; and
- Highlight areas where improved comparability and understanding of the similarities and differences could be useful.

This paper compares the short-medium (to 2014) and long-term (to 2030) projections. For the short-term, the IEA's latest projections from their Short-Term Oil Market report (OMR) published in January 2011 are used and compared to the Short-Term in OPEC's Monthly Oil Market Report (MOMR) published in January 2011. For the medium-term, the IEA's latest projections update published in December 2010 OMR are used and compared to the Mid-term point of projections in World Oil Outlook (WOO 2010) published in November 2010. For the long-term, OPEC's projections are taken from the WOO 2010 and the IEA's from the World Energy Outlook 2010 (WEO, 2010).

WEO 2010 introduced the New Policies Scenario, as the central scenario. This scenario takes into account broad policy commitments that have already been announced by

[1] http://www.ief.org/Events/Documents/CANCUNMINISTERIALDECLARATION.pdf.

countries around the world, to tackle environmental and energy-security concerns. In addition to this scenario, the WEO presents two other scenarios, differentiated by the underlying assumptions about government policies. The first one, the Current Policies Scenario which is equivalent to the Reference Scenario of the previous WEO and the second scenario, the 450 ppm Scenario, assumes implementation of the high-end of national pledges and stronger policies after 2020, to limit the concentration of greenhouse gases in the atmosphere to 450 ppm of CO_2 equivalent. However, the WEO-2010 emphasizes that these scenarios should not be interpreted as forecasts.

The Reference Case of the OPEC WOO-2010 is defined in a similar way as in the previous version of WOO. Besides standard updates and adjustments, it generally reflects also measures adopted to boost biofuels in both the US and the EU, though the WOO does not fully factor these targets into the Reference Case.

2. Recent market developments and near-term prospects

This session will review market development over the past year and discuss the shape of economic recovery in the world's major regions, the patterns of energy demand in major regions/countries after the financial crisis and the impact of the global financial crisis on investment in the energy sector. The session will address OPEC crude production and NGLs, the recent strong non-OPEC supply and its sustainability as well as the consequences of the Gulf of Mexico oil spill on future deepwater drilling and supply. On the downstream, the session will discuss refining capacity, inventory levels, and their implication on the downstream sector. Finally the session will discuss the uncertainties surrounding the energy outlooks.

To facilitate the discussions in this session the IEA and OPEC near-term outlooks are summarized below. The IEA short-term projections are taken from IEA's Oil Market Report (OMR) published in January 2011 and from OPEC's Monthly Oil Market Report (MOMR), also published mid-January 2011.

2.1. Short-Term Outlook

2.1.1. Economic Growth

The IEA report used the IMF World Economic Outlook's GDP projections, while OPEC's GDP data is assessed internally utilizing a model based approach, and compares a variety of sources, including publications of official, semi-official and private institutions. The two reports observe that the world economic recovery is proceeding, though recovery is unbalanced between countries and regions. It is slow in advanced countries and much stronger in emerging and developing economies. Overall, **both reports expect robust economic growth for 2010 and 2011 with no sign of double-dip recession**. However, the IEA is more optimistic than OPEC about the global economic growth prospects for 2010 and 2011. The IEA report expects the world economy to grow by 4.7% in 2010 and 4.2% in 2011, versus 4.5% and 3.9% for OPEC respectively, Table (1). However, given the economic uncertainty and a number of

cautionary signs on the economic side, the IEA OMR also replicated lower GDP sensitivity for the oil demand projection.

Table (1): Economic growth rates 2010-2011 (%)

	IEA[1]		OPEC	
	2010	2011	2010	2011
OECD	2.7	2.2	2.8	2.1
Non-OECD	7.2	6.5	-	-
China	10.5	9.6	9.7	8.8
India	-	-	8.5	8.0
World	4.7	4.2	4.5	3.9

1. December 2010 OMR

2.1.2. Oil Demand

Both IEA and OPEC have continually adjusted their demand projections upward during 2010, driven mainly by mixed evidence of economic recovery as well as weather related issues and revisions of baseline data. In addition, both reports are forecasting a rise in demand growth for both 2010 and on into 2011.

However, there is around 1.1 mb/d (million barrels per day) difference between the two reports on 2010 oil demand growth, with the IEA expecting much higher growth, but that difference drops to 200,000 b/d (barrel per day) in 2011 estimates. The IEA January report expects an increase in oil demand of around 2.7 mb/d to reach 87.7 mb/d in 2010, Table (2). OPEC's January 2011 report also revised up the assessment of 2010 demand, by around 130,000 b/d, but expects growth of only 1.6 million b/d to a global demand total of 86.1 mb/d.

Table (2): World oil demand 2009-2010-2011 (mb/d)

	IEA			OPEC		
	2009	2010	2011	2009	2010	2011
OECD	**45.4**	**46.1**	**45.9**	**45.5**	**46.0**	**46.1**
North America	23.3	23.9	23.9	23.3	23.8	24.1
Europe	14.5	14.4	14.3	14.5	14.4	14.3
Pacific	7.7	7.8	7.6	7.7	7.8	7.7
Non-OECD	**39.5**	**41.6**	**43.2**	**39.0**	**40.1**	**41.2**
China	8.4	9.3	9.8	8.3	8.8	9.3
FSU	4.0	4.3	4.4	4.0	4.1	4.1
World	**85.0**	**87.7**	**89.1**	**84.5**	**86.1**	**87.3**

For 2011, OPEC expects demand growth of 1.2 mb/d to a total daily volume of 87.3 mb/d. The IEA's report assumes demand growing by 1.4 mb/d for a total daily demand of 89.1 million barrels/day. However, when the IEA replicated a lower GDP case of

around 3% in its model, the demand for crude came in around 540,000 b/d lower than its base case

The differences between the IEA and OPEC's estimates stems mainly from their diverse views on the level of demand growth in the non-OECD countries especially demand growth in China. Table (2) shows that the IEA estimates for demand in non-OECD countries by 2011 are 2.0 mb/d higher than OPEC's estimates. **Both reports also have different views on OECD countries demand.** For example in 2011, the IEA report expects decline in OECD countries' demand while OPEC's report projects small growth in demand.

Here it is worth mentioning that the differences between IEA and OPEC's global demand figures grew from around 200,000-300,000 b/d in 2007-2008 to 500,000 b/d for 2009 and to 1.6 mb/d in 2010.

2.1.3. Oil Supply

Turning to supply, the IEA and OPEC reports also continually adjusted their non-OPEC supply projections upward during 2010, and forecasting a rise in non-OPEC supply for both 2010 and into 2011. However, there is around **0.5 mb/d difference in their non-OPEC supply figures of 2009 which add to the differences in 2010 and 2011**. This difference stems mainly from their **diverse views on the level of Russian production and processing gain.**

Table (3) shows that the growth in non-OPEC supply in 2010 is very similar in both OPEC and IEA reports. As the two reports expect non-OPEC supplies to increase by 1.1 mb/d in 2010, the 2010 gain alone is greater than the total increase in non-OPEC supply over the four-year period of 2004–08 and is largely the result of delayed projects coming on-stream, owing mostly to the recession and drop in oil prices. However, for 2011, the IEA is rather more optimistic than OPEC, with non-OPEC supply increasing by 0.62 mb/d according to the IEA report versus 0.41 mb/d in OPEC's report. Both reports point out that output growth remains concentrated in few non-OPEC countries including Brazil, Russia, Azerbaijan, Kazakhstan, Colombia, Ghana, US Gulf of Mexico and Canada. Elsewhere, new developments are relatively much smaller.

The IEA report expects OPEC NGLs and non-conventional oil to average 5.3 mb/d in 2010 and 5.8 mb/d in 2011, representing growth of 0.5 million barrels per day for both years, a growth similar to OPEC's figure. However the **absolute levels for 2010 and 2011 differ by around 0.5 mb/d**, as the IEA report sees more OPEC NGLs and other liquids in 2009. Adding this figure to the difference in the non-OPEC supply level mentioned above, this will result in more **than 1 mb/d difference between the IEA and OPEC projections**.

Table (3): World oil Supply 2009-2010-2011 (mb/d)

	IEA*			OPEC		
	2009	2010	2011	2009	2010	2011
OECD	**19.77**	**19.98**	**19.85**	**19.72**	**19.89**	**19.81**
North America	**14.38**	**14.96**	**14.84**	**14.36**	**14.90**	**14.97**
US	8.18	8.66	8.64	8.14	8.58	8.61
Canada	3.24	3.35	3.30	3.24	3.36	3.47
Mexico	2.97	2.96	2.90	2.96	2.96	2.90
Western Europe	**4.73**	**4.38**	**4.33**	**4.73**	**4.39**	**4.23**
OECD Pacific	**0.66**	**0.63**	**0.68**	**0.64**	**0.60**	**0.61**
China	3.93	4.14	4.26	3.85	4.14	4.18
Other Asia	3.64	3.71	3.70	3.70	3.69	3.70
Europe	0.14	0.14	0.14	0.14	0.14	0.13
Latin America	4.38	4.63	4.99	4.41	4.72	4.94
Middle East & Africa	4.29	4.30	4.33	4.34	4.38	4.49
Russia	10.21	10.46	10.58	9.92	10.14	10.15
Other FSU	3.07	3.13	3.20	3.04	3.08	3.18
Processing gains	**2.25**	**2.30**	**2.35**	**2.00**	**2.08**	**2.08**
Total Non-OPEC Supply	**51.69**	**52.79**	**53.41**	**51.13**	**52.26**	**52.67**
OPEC NGLs and other Liquids	4.80	5.30	5.80	4.35	4.79	5.25
Call on OPEC Crude	**28.69**	**29.22**	**29.90**	**28.71**	**29.0**	**29.4**
World Supply	**85.19**	**87.32**	**89.1**	**84.20**	**86.05**	**87.32**
Global biofuels	**1.57**	**1.82**	**2.00**	**1.57**	**1.85**	**2.07**

* Biofuels are re- included in the countries and regions

2.2. Medium-Term Outlook

The IEA medium-term projections presented here are taken from IEA Medium-Term Oil Market update (MTOMR) published in December 2010 and from OPEC's World Oil Outlook 2010, published early November 2010. OPEC's mid-term projection is 2014 and this is the comparison year used in this paper. The IEA takes its medium-term projections out to 2015.

2.2.1. Oil Prices and Economic Growth

The oil price assumptions of both the IEA and OPEC over the medium term are very similar. The IEA medium-term update assumes that oil prices will remain within a $75-$85/bbl range for 2010-2015 and OPEC's WOO-2010 assumes that oil prices will remain in the same range but over the years to 2020 in nominal terms.

For economic growth, the IEA report assumes that the trend of global economic growth from 2010 onwards under the base case will remain close to 4.5% per annum (based on the IMF's October 2010 outlook), and a reduction in oil use intensity of 3% annually.

OPEC's WOO-2010 assumes that the global economy will grow by 3.9% in 2010, and then by 3.7% per annum in the medium-term to 2014. **The biggest difference between the two reports over the medium term seems to be the economic growth in non-OECD countries**. The IEA report also maintains a low growth/lower efficiency gain case with GDP expanding by only 3.3% on average, roughly a third less than in the base case, and with an annual oil intensity reduction of 2%.

2.2.2. Oil Demand

Both the IEA and OPEC expect robust growth in global oil demand over the medium term. However, **IEA and OPEC global medium term oil demand projections differ by around 2.4 mb/d by 2014**, Table (4). The higher demand figures by the IEA over the medium-term can be traced to their higher assumptions for economic growth, especially for 2010 and the difference in the base year mentioned above. However, when the IEA replicated low GDP sensitivity for the oil demand projection in its model, the demand for crude oil in 2014 came in at about 90.3 mb/d, nearly identical with OPEC's report estimate.

The IEA expects global oil demand to average 92.3 mb/d by 2014, an annual growth close to 1.5 mb/d over the years to 2014 on average Table (4). While OPEC estimates that global oil demand will average near 90 mb/d by 2014, an annual average growth of just over 1.0 mb/d over the years to 2014.

Table (4): Medium-term oil demand outlook (mb/d)

	IEA			OPEC		
	2009	**2014**	**Change 2009/2014**	2009	**2014**	**Change 2009/2014**
OECD	45.5	**44.9**	**-0.6**	45.5	**45.3**	**-0.2**
North America	23.3	23.7	0.4	23.3	23.8	0.5
Europe	14.5	13.9	-0.6	14.5	13.9	-0.6
Pacific	7.7	7.3	-0.4	7.7	7.6	-0.1
Non-OECD	39.5	**47.4**	**7.9**	39.0	**44.6**	**5.6**
China	8.4	11.2	2.8	8.3	10.4	2.1
World	**85.0**	**92.3**	**7.3**	**84.5**	**89.9**	**5.4**

At the regional level, both the IEA and OPEC expect oil demand to be driven by non-OECD countries. However, the extent of the growth in non-OECD countries differs, creating a difference in the oil demand projections at regional level. Table (4) shows that **the IEA projection for demand in non-OECD countries in 2014 is 2.8 mb/d greater than OPEC's projection, one quarter of this difference attributed to China alone**. For other countries, comparison of the regional breakdown between specific non-OECD regions is difficult as the OPEC projection separates out OPEC demand, while IEA includes OPEC countries demand within the respective geographical region. The IEA report expects that the total non-OECD oil demand will overtake the demand for oil in the OECD countries by 2013.

While OPEC's report shows that by 2014, the total OECD demand continues to account for over half of the world's oil demand.

When considering the OECD region, the **IEA expects oil demand in OECD countries to decline slightly higher than OPEC's report estimates by 2014**. Within the OECD, most of the difference in demand in 2014 comes from differences in the projections of demand from OECD Pacific.

2.2.3. Oil Supply

The IEA and OPEC both projected high growth in the global oil supply over the medium term to meet the projected demand increase by 2014. **However, their medium term global oil supply forecasts differ by around 2.4 mb/d by 2014** as the case in the oil demand, Table (5).

Table (5) shows that **IEA and OPEC have an almost convergent projections when it comes to the growth in non-OPEC supply over the medium term**, with non-OPEC supply reaching 53.6 mb/d by 2014 according to the IEA projection versus 53.3 mb/d by OPEC. Though, the IEA projecting 0.3 mb/d more than OPEC does in absolute terms, the growth in non-OPEC supply by OPEC's report is higher by 0.3 mb/d by 2014. This is due to the difference in non-OPEC supply figures used by IEA and OPEC for the base year, 2009. On the regional level, the differences between IEA and OPEC projections by 2014 are not substantial, with a maximum of 0.2 mb/d.

Table (5): Medium-term oil supply outlook (mb/d)

	2009	2010	2011	2012	2013	2014	Increment 2009/2014
Non-OPEC							
IEA	51.7	52.8	53.4	53.8	53.5	53.6	**1.9**
OPEC	51.1	51.9	52.2	52.6	52.9	53.3	**2.2**
OPEC NGLs*							
IEA	4.8	5.3	5.8	6.3	6.6	6.9	**2.1**
OPEC	4.3	4.8	5.3	5.7	5.9	6.2	**1.9**
OPEC Crude							
IEA	28.50	29.40	29.50	30.0	31.0	31.8	**3.3**
OPEC	28.7	29.3	29.2	29.6	30.2	30.6	**1.9**
Total Supply							
IEA	85.0	87.5	88.7	90.1	91.1	92.3	**7.3**
OPEC	84.2	86.0	86.8	87.8	89.0	90.1	**5.9**

* including GTLs.

The IEA expects OPEC NGLs and non-conventional to average 6.9 mb/d by 2014, representing growth of 2.1 mb/d. This growth being consistent with OPEC's figure of 1.9 mb/d, Table (5). However the absolute levels for 2014 differ by some 0.7 mb/d, largely because the IEA reports more OPEC NGLs and other liquids in 2009.

Given that the IEA projects more increase in oil demand than OPEC does over the medium term, the net result is a higher call on OPEC crude expected by IEA. **By**

2014, required OPEC crude is projected as 31.8 mb/d by the IEA and 30.6 mb/d by OPEC, a difference of around 1.2 mb/d. However, the IEA sees more NGLs coming from OPEC countries than OPEC's report does.

Table (6): OPEC crude spare capacity (mb/d)

	2009	2010	2011	2012	2013	2014	Increment 2009/2014
OPEC crude capacity							
IEA	34.86	35.50	35.22	35.31	35.67	36.67	**1.81**
OPEC	35.18	36.31	36.86	37.33	37.77	38.21	**3.03**
Implied spare capacity							
IEA	6.36	6.10	5.72	5.31	4.67	4.87	**-1.5**
OPEC	6.48	7.01	7.66	7.73	7.57	7.61	**1.13**

The IEA and OPEC are both expecting an increase in OPEC crude production capacity over the medium term, but with different assessments of the level of capacity increase. The IEA expects OPEC crude capacity to increase by 1.8 mb/d, from 2009 to 2014 versus 3.0 mb/d by OPEC. **Consequently, whereas OPEC foresees steady increase in OPEC spare capacity over the medium term to reach over 7.0 mb/d by 2014, Table (6), the IEA expects the spare capacity to fall after 2009, to around 4.9 mb/d by 2015**. This implies that the IEA assumes there is less capacity coming on stream over the medium term than the OPEC assumes.

3. Long Term Energy Outlook

This session will discuss main assumptions behind IEA and OPEC's outlooks including population growth, price patterns, economic growth, energy and environmental policies, and technological developments. The session will also address issues related to non-conventional resources, second generation biofuels, peak oil (in supply and demand), investments, decline rate, oil intensity, energy efficiency, sources and quality of data, and several other issues.

The session will also discuss the low energy demand in the OECD region; the regional shift in energy demand toward emerging markets (non-OECD region); the impact of energy and environmental policies on energy outlooks and the energy market, and finally, the implications of the future crude quality trends on the downstream sector.

The long-term projections from the IEA are taken from IEA's World Energy Outlook (WEO) and from OPEC's World Oil Outlook (WOO), both released in November 2010.

3.1. Basic Assumptions for the Outlooks

The central scenario of the IEA WEO-2010 is different from the previous version of the WEO. The 2010 WEO introduced the New Policies Scenario as the central scenario (Reference Case). This scenario takes into account broad policy commitments that have already been announced by countries around the world, to tackle environmental and energy-security concerns. In addition to this scenario, the WEO presents two other scenarios, differentiated by the underlying assumptions about government policies. The first one, the Current Policies Scenario which is equivalent to the Reference Scenario of the previous WEO and the second scenario, the 450 Scenario, assumes implementation of the high-end of national pledges and stronger policies after 2020 to limit the concentration of greenhouse gases in the atmosphere to 450 ppm of CO_2 equivalent. Yet the WEO-2010 emphasizes that these scenarios should not be interpreted as forecasts.

The Reference Case of the OPEC WOO-2010 is defined in a similar way as in the previous version of WOO. Besides standard updates and adjustments it generally reflects measures adopted to boost biofuels in both the US and the EU, however the WOO does not fully factor their targets into the Reference Case.

3.1.1. Population Growth

IEA and OPEC outlooks use consistent demographic assumptions based on the United Nations, Department of Economic and Social Affairs, Population Division (UNPD). Both reports forecast that most of the population growth to 2030 will occur in developing countries, although the rate of expansion will gradually decline in all regions. They also point to the higher proportions of populations in urban areas, with the notable exception of Africa. The rapid urbanization will have significant implications on demand for energy services. OPEC's WOO also emphasizes the importance of the changing age structure of populations, and the impact that will have on the growth of working age populations.

3.1.2. Oil Price assumptions

On projecting supply and demand an important assumption is "what will be the price of crude oil over the forecasting period". Price assumptions do not constitute price forecasts as they are determined by a bottom-up approach of prices needed to generate sufficient investment in supply to meet projected demand over the projection period.

The price assumptions in the IEA WEO report are based on average IEA crude oil import price as a proxy for international oil price. In OPEC WOO, the price assumptions are based on the OPEC Reference Basket (ORB) crude oil price.

In the New Policies Scenario of the IEA WEO, oil prices are assumed to rise steadily to $127/barrel (nominal term) in 2020 and $177/barrel in 2030, in nominal terms, reflecting rising production costs. In addition, the IEA report assumes the price rises more rapidly in the Current Policies Scenario to $209/barrel (nominal term) in 2030, as demand grows more quickly, and more slowly in the 450 scenario to $145/barrel (nominal term) in 2030

on lower demand. However, it is not clear whether the price assumptions are an input to, or output of, the model. In the supply forecast it looks that the price assumptions are input to the model, as low oil prices imply low non-OPEC supply. While for the demand projection it seems that prices are output of the model, as demand increases lead to prices increase, rather than an input which will lead to increasing prices leading to lower demand.

Clarification of this issue provides a better understanding of how the price assumptions feed into the projections and drive the differences in the IEA's and OPEC's supply and demand projections.

The Reference Case of the OPEC WOO, assumes a nominal price that remains in the range $75-85/barrel over the years to 2020, reaching $106/barrel by 2030, reflecting OPEC's member countries production policies, abundant world oil resources, the behavior of marginal costs, technology advances and supply and demand dynamics.

Both the IEA and OPEC outlooks form their price assumptions based on their expectations for marginal costs of oil supply among other considerations. However, they have diverse views on the level of these marginal costs.

3.1.3. Economic Growth

Economic growth is an important assumption in determining the supply and demand projections. There are some difficulties in comparing the GDP growth rates assumed by the IEA WEO and OPEC WOO. First, there are differences in the regional definitions. Second, there are differences in the base year and forecast period.

Table (7) shows that the IEA's and OPEC's long-term expectations for world economic growth are broadly similar, although the IEA's is a little lower. The differences may be attributed to the differences in both the base year and forecast period.

The IEA WEO assumes that the world global economy grows on average by 4.4% over the five years to 2015. In the longer term, the rate of growth is assumed to temper, as the emerging economies mature and their growth rate converge with those of the OECD economies. Global GDP growth is assumed to grow by an average of 3.6%, 2.9% and 3.2% per year over the periods 2008-2020, 2020-2035 and 2008-2035 respectively.

Table (7): Long Term economic growth rates (%)

	IEA			OPEC		
	2008-2020	2020-2035	2008-2035	2010-2020	2021-2030	2010-2030
OECD	1.8	1.9	1.8	2.1	1.9	2.0
China	7.9	3.9	5.7	8.0	5.6	6.9
World	3.6	2.9	3.2	3.7	3.2	3.5

OPEC's WOO-2010 projections are broadly similar but with the greatest growth to be in China (6.9%) and OECD countries. It assumes that the global economy will grow by 3.7, 3.2% and 3.5% per year in 2010, over the periods 2010-2021, 2020-2030 and 2010-2030 respectively.

In both outlooks, the developing countries as a group are assumed to continue to grow much more rapidly than the OECD countries, driving up their share of world GDP. However the OECD countries will retain their position as the wealthiest nations in terms of income per capita.

3.1.4. Energy and Environmental Policies

The central scenario of the IEA WEO-2010 is different than the previous version of the WEO. The 2010 WEO introduced the **New Policies Scenario**, as the central scenario. This scenario takes into account broad policy commitments that have already been announced by countries around the world, to tackle environmental and energy-security concerns. These policies include the national pledges to reduce greenhouse-gas emissions and plans to phase out fossil-energy subsides, even where the measures to implement these commitments have yet to be identified or announced. In this regard, the scenario assumes that these commitments will be implemented in a relatively cautious manner, reflecting their non-binding character and, in many cases, the uncertainty shrouding how they are to be put into effect. Financing for mitigation actions is also assumed to be limited and carbon markets are assumed to grow only moderately. This scenario assumes completely phasing out of fossil-fuel subsidies in all net-importing regions by 2020, and in net-exporting regions where specific policies have already been announced.

In addition to this scenario, the WEO presents two other scenarios, differentiated by the underlying assumptions about government policies. The first one, the **Current Policies Scenario** which is equivalent to the Reference Scenario of the previous WEO and the second scenario, the **450 Scenario**, assumes implementation of the high-end of national pledges and stronger policies after 2020, to limit the concentration of greenhouse gases in the atmosphere to 450 ppm of CO_2 equivalent.

The **Current Policies Scenario** assumes no change in policies, and intended to serve as a baseline against which the impact of new policies can be assessed. It takes into account those measures that government had formally adopted by the middle of 2010 in response to and in pursuit of energy and environmental policies. But takes no account of any future changes in government policies and does not include measures to meet any energy or climate policy targets or commitments that have not yet been adopted of fully implemented. However, the WEO-2010 emphasizes that these scenarios should not be interpreted as a forecast.

The WOO **Reference Case** incorporates in its projections the estimated impacts of legislation that have already been passed into law. Two key recent examples are the US Energy Independence and Security Act (EISA) and the European Union's (EU) package of implementation measures for climate change and energy objectives. These measures include transportation fuel efficiency and biofuels. However, the biofuels targets, in both the US and the EU have not been fully factored into OPEC's Reference Case. The Reference Case also includes some further additional road transportation efficiency gains at a global level, which reflects the massive research and development (R&D) currently underway in this sector. However, the Reference Case still does not introduce the scale of technological breakthroughs and changes in consumer behavior that would be necessary for ambitious GHG emission targets to be met. On energy subsidies, the Reference Case assumed that only gradual change to subsidy levels occurs in line with current policy directions. OPEC's WOO also presents two other scenarios, but for oil demand only, reflecting the uncertainties over energy and environmental policies, technological developments, as well as the impact of recent economic downturn and the implications this will have on the oil market in the future.

Energy and environmental policies are one of the key drivers for future energy demand and supply; however they are one of the most uncertain areas of the outlooks. The policy assumptions incorporated in the Central Scenario of the IEA WEO-2010 are different than the assumptions considered by OPEC's Reference Case. This difference in energy and environmental policy assumptions will create some ambiguity in the comparison between the outlooks and drive the differences in the supply and demand projections. However, for the purpose of this report the IEA **Current Policies Scenario** and OPEC's **Reference Case** are mainly comparable.

3.2. Long Term Energy Demand Outlook

The IEA WEO sees that the global primary energy demand continues to grow in the Current Policies Scenario. But at a slower rate than in recent decades, by 2030, it is 38% higher than in 2008. Non-OECD countries account for over 90% of the increase. Fossil fuels maintain a central role in the primary energy mix in the Current Policies Scenario, although their share declines slightly, from 81% in 2008 to 79.5% in 2030, Table (8). Oil demand[2] is up by 22%, from 84 mb/d in 2009 to 102.7 mb/d in 2030. Coal demand is

[2] Excludes biofuels demand, which is projected to rise from 1.1 mb/d (in energy-equivalent volumes of gasoline and diesel) in 2009 to 3.0 mb/d in 2030.

around 49% higher in 2030 than today, with almost all of the growth before 2020, Table (9). Gas demand is up by 43% in 2030 compared to 2008, though it does not surpass that for coal. The share of nuclear power stays more or less flat over the projection period at around 6%. The use of modern renewable energy, including wind, solar, geothermal, marine, modern biomass and hydro, increased over the outlook period, its share in total primary energy demand increases from 7% to 14.4%, Table (8).

Table (8): World primary energy growth and fuel share (%)

	IEA[a]		OPEC	
	Growth p.a. 2008-2030	**Fuel shares 2030**	**Growth p.a. 2008-2030**	**Fuel shares 2030**
Oil	0.8	28.5	0.9	30.2
Coal	1.8	29.1	1.6	28.5
Gas	1.7	22.0	2.0	24.5
Nuclear	1.7	6.1	1.7	6.4
Hydro	1.9	2.5	2.3	2.8
Biomass	1.3[b]	9.6[b]	3.3	5.4
Other renewable	6.9	2.3	7.8	2.1
Total	**1.5**	**100.0**	**1.6**	**100**

a. Current Policies Scenario.
b. Includes traditional and modern uses.

OPEC's Reference Case sees that global energy demand continues to increase, as economies expand, the global population grows and living conditions across the world improve. By 2030, world energy demand will be more than 40% higher than it is today. In the future, developing countries will account for most of the demand increase, however energy use per capita in developing countries will remain well below that of the OECD countries in 2030. Fossil fuels maintain a prominent role, and though their share in the energy mix is expected to fall, it remains over 80% throughout the period to 2030. Oil's leading role in the energy mix will continue with its share remaining above 30%, albeit falling over time. Oil use, however, grows at the slowest rate of all fuel types. The rate of expansion in natural gas use is expected to be up by 54% in 2030 than 2008, especially with the technological developments that have made economic the exploitation of unconventional resources. Coal is expected to retain its importance in the energy mix as the second most important fuel; it grows by more than 42% over the forecast period. Renewable energy will grow fast, but from a low base, while both hydropower and nuclear power witness some expansion.

Table (9): World primary energy (mboe/d)

	IEA[a]		OPEC	
	2008	**2030**	**2008**	**2030**
Oil	82.6	98.3	80.9	97.6
Coal	67.5	100.4	64.8	92.1
Gas	52.9	75.8	51.4	79.1
Nuclear	14.5	21.2	14.4	20.7
Hydro	5.6	8.5	5.5	9
Biomass	24.9[b]	33.0[b]	8.6	17.5
Other renewable	1.8	7.8	1.3	6.8
Total	**249.9**	**344.9**	**226.8**	**322.9**

a. Current Policies Scenario
b. Includes traditional and modern uses

The IEA Current Policies Scenario sees global energy demand in 2030 very slightly lower than its previous version of the WEO, mainly because it considering more or less similar energy policy measures. The current OPEC's WOO projects slightly higher primary energy use by 2030, compare with its previous version.

OPEC's WOO sees slightly higher growth in the world primary energy use than the IEA WEO does, 1.6% versus 1.5% Table (8). However, the global energy demand levels in the IEA Current Policies Scenario by 2030 are slightly higher than OPEC's reference case projections, Table (9); this is mainly due to the higher base data, as the IEA WEO includes traditional biomass uses. **The IEA WEO and OPEC WOO's growth rates by fuel type are relatively comparable**, although OPEC Reference Case projects slightly faster growth in oil, gas, hydro, biomass and other renewable demand, while IEA Current Policies Scenario projects faster growth in coal.

Both IEA and OPEC expect that oil will continue to be the single largest constituent of primary energy demand in 2030; although its share as a proportion of total fuels will have fallen, to 30% from more than 35% in 2008 according to OPEC's report and to 28.5% from around 33% in 2008 according to the IEA WEO.

There are some difficulties in making direct comparisons on regional/country levels between IEA and OPEC figures for oil demand, for several reasons:

- **Different treatment of biofuels and marine bunkers**. The IEA does not include biofuels in its WEO definition of oil, and consequently, reports biofuels separately, bunkers are only included as an aggregate, not at the regional level;

- **Differences in the regional breakdown**. WOO has an OPEC grouping, while the IEA WEO does not routinely publish its demand projection for OPEC as the OPEC Member countries are split across different WEO regions.

A comparison at global level between the IEA Current Policies Scenario and OPEC Reference Case is presented in Table (10). Over the forecast period IEA Current Policies Scenario and OPEC Reference Case sees similar growth in oil demand of around 1%.

The IEA long-term projection for world oil demand in 2030 is 107.1 mb/d whereas OPEC's Reference Case projection is 105.5 mb/d, **a difference of around 1.6 mb/d;** this is mainly due to the higher base data by the IEA**.** Both outlooks see decline in the OECD oil demand over the forecast period and most increase in developing countries demand. However, they have different views on the absolute levels of demand.

Table (10): Global Oil Demand[1] (mb/d)

	2009	2015	2020	2025	2030	Growth[2] p.a.	Increment 2009/2030
OPEC	84.5	91.0	96.2	100.9	105.5	1.1	**21.0**
IEA[3]	85.6	92.6	96.7	101.6	107.1	1.0	**21.4**

1. Includes biofuels (volumetric bases) and international marine and aviation fuels.
2. Compound average annual growth.
3. Current Policies Scenario.

In addition to the oil demand in the Current Policies Scenario, the IEA projected oil demand under two other scenarios, differentiated by the underlying assumptions about government policies as highlighted earlier.

OPEC's WOO also presents two other scenarios for oil demand, reflecting the uncertainties over energy and environmental policies, technological developments, as well as economic growth and the implications these will have on the oil market in the future. The low growth scenario reflects the downside risks to demand stemming from these uncertainties. The high growth scenario, considers the upside potential for economic growth, with an even swifter recovery from the recent economic downturn than that assumed in the Reference Case. This scenario also involves a more optimistic view over the long-term sustainable rates of GDP growth.

Indeed, oil demand projection is based on various assumptions (such as economic growth, oil prices, energy policies, technology developments, etc). For example, the IEA long-term projection for world oil demand in 2030 is 101.5 mb/d under the New Policies Scenario. Whereas OPEC's Reference Case projection is 105.5 mb/d, a difference of around 4.0 mb/d**.** The divergent views in the underlining assumptions between the IEA New Policies Scenario and OPEC's Reference Case, especially those related to energy and environmental policies drives the differences in their oil demand projections.

3.2.1. Long-Term Supply Outlooks

The IEA and OPEC outlooks assumptions regarding the availability of resources and the size of the resource base are quite similar. The leading source of estimating ultimately recoverable resources of conventional crude oil and NGLs for both outlooks is the 2000 assessment by the US Geological Survey (USGS-2000).

According to both organizations, the ultimately recoverable conventional resources- a category that includes initial proven and probable reserves from discovered fields, reserves growth and economically recoverable oil that has yet to be found amounts to 3.5 trillion barrels and the remaining resources as of the end of 2009 is around 2.5 trillion barrels.

The IEA WEO projections take account of current field production profiles and future decline rates based on field characteristics, including size and physiographical situation. However, the IEA WEO report does not refer to any decline rate figures for the Current Policies Scenario, but under the New Policies Scenario the report mentioned that by 2035, aggregate output from fields already in production in 2009 is declining at a rate of 8.3% per year. OPEC current projections do not refer to any decline rate figures as well. However previous WOO[3] stated that the production weighted average annual observed decline rate for non-OPEC is around 4.6% p.a., and this is higher than that in OPEC Member Countries. In addition, the IEA WEO oil supply balances the modelled WEO oil demand; the OPEC WOO does the same, but with around 0.2 mb/d allowance for stock building. Differences in methodology and decline rate assumptions between the two outlooks could explain the difference in crude oil supply between the WEO and the WOO by 2030 and can clearly translate into differences in projections for crude oil production investments needs.

A comparison between IEA's WEO supply projection in its Current Policies Scenarios and OPEC's WOO supply projection in its Reference Case appears in Table (11). Both outlooks have been similarly adjusted for the purposes of consistency of the comparison. There are very minor differences in expectations for total non-OPEC supply between the two outlooks; IEA WEO sees non-OPEC supply increasing slightly higher than the figures in the OPEC's WOO, reaching 57.7 mb/d by 2030, only 0.2 mb/d higher than the OPEC WOO figure. However, there are some differences on the regional/country level. To identify the differences within the non-OPEC regions between the two outlooks, Table (11) presents also more detailed breakdown of non-OPEC regions/countries.

As Table (11) shows, **there is a difference of around 1.0 mb/d** between the OPEC's WOO and IEA's WEO projections **for supply from Russia only**, **compared to an overall difference in supply projections for non-OPEC regions of 0.2 mb/d**. There

[3] WOO 2009, p. 123.

is a difference of 1.4 mb/d in the projections for China, other Asia and Middle East & Africa regions. The regions where the IEA WEO projection is greater than OPEC's are North America (Mexico), Latin America and other FSU. This region covers those areas (after accounting for Russia) defined by OPEC as "transition economies" and by the IEA as "Eastern Europe / Eurasia".

All in all, the Non-OPEC supply as projected by the IEA WEO is thereby only 0.2 mb/d higher than for the OPEC WOO figures. It is worth highlighting that despite the large difference in their oil prices assumptions, by 2030 OPEC assumes $106/bbl (nominal) versus $209/bbl (nominal) by IEA, there is only very minor difference in their non-OPEC supply projections.

The IEA WEO projects higher OPEC NGLs and other liquids than OPEC's WOO does by around 2.2 mb/d. This will partially balance the higher projection of global oil demand by the IEA WEO as mentioned above. However, **the IEA WEO estimate for the call on OPEC oil in 2030 is still lower than in the OPEC WOO, 37.5 mb/d versus 38.7 mb/d.**

Table (11): Long-term world oil Supply (mb/d)

	IEA[1]			OPEC		
	2009	2015	2030	2009	2015	2030
OECD	18.7	17.4	18.0	18.7	17.8	17.3
North America	13.6	13.2	14.9	13.6	13.6	14.1
US & Canada	10.6	10.7	12.4	10.6	10.9	12.1
Mexico	3.0	2.5	2.6	3.0	2.6	2.0
Western Europe	4.5	3.5	2.5	4.5	3.6	2.6
OECD Pacific	0.7	0.7	0.5	0.6	0.7	0.7
China	3.8	3.8	3.3	3.8	3.9	3.8
Other Asia	3.6	3.5	2.9	3.6	3.9	3.4
Latin America	3.9	5.3	7.0	3.9	4.8	5.7
Middle East & Africa	4.2	4.0	3.3	4.3	4.4	3.8
Russia	10.2	10.2	9.7	9.9	10.4	10.7
Other FSU	3.2	3.9	6.0	3.2	3.9	5.0
Non-OPEC Supply[2] of which	**47.7**	**48.2**	**50.2**	**47.6**	**49.1**	**49.6**
Crude Oil	39.6	38.4	36.8	40.0	39.9	36.2
NGLs	6.2	6.7	7.0	5.7	6.4	7.1
Non-conventional	1.8	3.1	6.4	1.8	2.8	6.3
Biofuels[3]	1.6	2.5	4.4	1.6	2.4	5.1
Processing gains	2.3	2.5	3.1	2.0	2.3	2.9
Total Non-OPEC Supply	**51.6**	**53.2**	**57.7**	**51.1**	**53.9**	**57.5**
OPEC NGLs and other Liquids	4.6	7.4	11.7	4.3	6.5	9.5
NGLs	4.6	7.2	11.2	4.2	6.2	8.9
Non-conventional	0.0	0.2	0.5	0.1	0.3	0.6
OPEC Crude[4]	**28.7**	**31.9**	**37.5**	**28.7**	**30.8**	**38.7**
World Supply	**85.0**	**92.6**	**107.1**	**84.2**	**91.2**	**105.7**

1. Current Policies Scenario.
2. Includes non-conventional and exclude biofuels.
3. Volumetric bases.
4. Include Venezuela extra heavy oil.

The oil supply projections are also available by oil type and this analysis attempts to further demonstrate where differences may lie. The IEA's and OPEC's projections by oil type are given in Table (12). OPEC's WOO and the IEA WEO projects almost the same non-OPEC non-conventional oil and NGLs, and they have only 0.6 mb/d difference in their non-OPEC crude oil projections. However, **the IEA sees more NGLs coming from OPEC member countries than OPEC does, the difference by 2030 is around 2.2 mb/d**.

Both outlooks recognize that there will be a wide range of sources of oil to satisfy demand. In particular, they see non-crude liquids supply, from both OPEC and non-

OPEC sources, such as non-conventional oil, condensate and NGLs and biofuels, almost doubled by 2030. Consequently, global conventional crude supply in 2015 is around 2.2 mb/d higher than 2009 level, and by 2030 the demand for crude will reach 74.9 mb/d, according to OPEC' WOO and 74.3 mb/d based on IEA WEO projection, **a difference of only 0.6 mb/d**. On the other hand global non-crude supply in 2015 is more than 5 mb/b higher than 2009 level, and by 2030 the non-crude supply almost doubled.

Table (12): Long-term world oil Supply by type (mb/d)

	IEA*			OPEC		
	2009	**2015**	**2030**	**2009**	**2015**	**2030**
Non-OPEC crude Oil	39.6	38.4	36.8	40.0	39.9	36.2
Non-OPEC NGLs	6.2	6.7	7.1	5.7	6.4	7.1
Non-OPEC non-conventional*	1.8	3.1	6.4	1.8	2.8	6.3
Biofuels	1.6	2.5	4.4	1.6	2.4	5.1
Processing gains	2.3	2.5	3.1	2.0	2.3	2.9
OPEC crude oil**	28.7	31.9	37.5	28.7	30.8	38.7
OPEC NGLs and other Liquids	4.6	7.4	11.7	4.3	6.5	9.5
World crude oil	68.3	70.3	74.3	68.7	70.7	74.9
World non-crude	16.7	22.3	32.8	15.5	20.5	30.8
Crude oil share, %	80	76	69	82	78	71
Non-crude liquid share, %	20	24	31	18	22	29

5. * Included oil sands, ** Include Venezuela extra heavy oil

In addition to the oil supply in the Current Policies Scenario, the IEA projected oil supply under two other scenarios, New Policies and 450 Scenarios, differentiated by the underlying assumptions about government policies and oil prices. Under these scenarios, the **IEA WEO projects much lower global oil supply for both non-OPEC and OPEC regions**.

OPEC's WOO also presents two other scenarios as mentioned above, the lower growth scenario is assumed to be accompanied by oil prices that are lower than in the Reference Case, which could mean lower non-OPEC supply. However, under this scenario OPEC carries most of the burden resulting from the weakness in demand. In the higher growth scenario stronger growth in non-OPEC oil, both conventional and non-conventional, is projected associated with higher oil prices. In addition, the key supply response comes from OPEC.

4. Remarks

This paper has identified the main differences between the IEA and OPEC's outlooks and reasons behind these differences, including areas in relation to definitions or presentation of the results.

The differences in the IEA and OPEC's projections for future energy demand especially those for oil demand can be attributed mainly to their energy and environmental policies assumptions. As these policies are one of the key drivers for the energy outlook, however they are at the same time one of the most uncertain areas for the outlooks.

For oil supply the primary difference in the IEA and OPEC's projections was over their views about non-OPEC supply.

Of course it should not be expected to reconcile the IEA and OPEC's assumptions and outlooks, but to improve clarity over how the assumptions differ and the reasoning behind these differences could prove worthwhile.

Uncertainty affecting the global economy in the short term associated with price volatility witnessed over the past years has fogged structural development making energy forecasting more difficult than ever.

The IEA-IEF-OPEC Symposium offers a timely opportunity for relevant energy stakeholders to discuss energy market trends (energy supply, demand and prices) and associated factors that influence these trends (environmental policies, economic conditions, technological development, etc.).