THE ROLE OF DOMESTIC OIL PRODUCTION IN ENERGY SECURITY INITIATIVE: THE CASE OF MEXICO

Jesus Duque Mora

ABSTRACT

Energy security is without a doubt the aim of any energy policy of every country. However, energy security means different things for every country. Among APEC members economies, the concept of energy security implies a wide range of factors which have to be taken into account in APEC cooperative relations for energy security such as: natural resources endowments, access to natural resources, availability of fuels, construction of emergency oil stocks; infrastructure, technology, institutional structure and information, human and financial capital. It is the asymmetry of these components among economies what makes trade and cooperation a necessary step for the benefit of all APEC member-economies.

However, in the APEC region there are different levels of access to natural resources and fuels availability. Some countries are net importers of crude oil, while others, such as Mexico, are net exporters due to the richness of natural resources endowments. At the same time, differences in the infrastructure of upstream and downstream activities and technology for the development of oil sector exist, as well as, human and financial capital differences among member economies. Institutional and regulatory frameworks and market structures are also varied. Given all these differences, the participation of Mexico in APEC Energy Security Initiative, as an oil producer country, is different from that of consuming countries.

The purpose of this paper is to present Mexico’s point of view on the role of domestic oil production in the context of the APEC Energy Security Initiative. The paper points out actions that the Mexican Government is adopting to increase domestic oil production and diversification of oil exports. It also underlines the importance of having reliable and transparent oil market information for implementing cooperative and emergency response measures.

Mexico gives high priority to its participation in the Asia-Pacific Economic Cooperation (APEC), given the fact that it is one of the world’s most important governmental fora of the region, and particularly to the Energy Working Group (EWG), which cooperation schemes Mexico supports through an active participation, such as this important Workshop.

In this context, considering its condition as oil producing and exporting country, Mexico ponders the following measures before energy security in the context of petroleum in the Asia-Pacific region:

- increasing of the domestic oil production,
- diversification of oil exports, and
• issue of reliable and transparent oil relevant information
• promotion of close dialogue between oil producing and consuming countries to strengthen market stability

In the following pages, I’ll try to develop these ideas, which comprises some of Mexico’s current energy policy priorities.

1. ENERGY SECURITY IMPROVEMENT THROUGH OIL PRODUCTION INCREASE

As of January 2000, proven crude oil reserves in Mexico reached a level of 28,399 million of oil equivalent barrels, ranking 9th in world’s oil reserves. In the Americas, Mexico ranks 2nd in crude oil reserves. Proven gas reserves in Mexico reached 30.1 trillion cubic feet, ranking 21st in world’s natural gas reserves. In the Americas, Mexico ranks 4th in natural gas reserves.

Considering the oil producing nature of Mexico, as well as its availability of fuels, however, Mexico lacks of modern technology and infrastructure. In this sense and according to the goal of improving its energy security, Mexico promotes the modernization of its infrastructure and technology, both in upstream and downstream activities. Likewise, Mexico is going through a institutional framework reform which objectives comprises a more efficient and competitive oil sector industry and an improved human capital through the development of training programs.

Oil production in Mexico has shown a higher rate of growth during the last 3 years. Different projects are underway optimizing production. The increase in crude oil production has been the result of the allocation of big amounts of investment and the application of new technologies. Thus, with an annual average crude oil production of 3.1 million of barrels per day in 2001, Mexico ranks 6th place in worldwide oil production. During the last 3 years, average daily crude oil production has accounted 2.9 millions of barrels of crude oil. The offshore regions production accounted for 75% of total domestic crude oil production.
Crude oil production allocation during the last 3 years has remained almost the same: 45% of oil production has been devoted to meet domestic demand and 55% has been used for oil crude exports. In this way, during the first half of 2001, domestic consumption averaged 1.457 millions of barrels per day (mb/d) and 1.643 millions of barrels were exported daily.

There is no doubt that oil upstream activity is the most profitable one since Mexico is an important energy exporter, mainly of crude oil. According with the Mexican global energy balance, in the year
2000, Mexico exported nearly 40% of total energy production, mainly crude oil. It also reported that 64% of total energy production was constituted by crude oil and condensates, followed by 18% of natural gas, 5.0% of electricity, 3% of renewable energy, and 2% of coal. Imports represented 8.3% of the total sources of energy.

**Energy Balance 1999 Vs 2000**

<table>
<thead>
<tr>
<th>Sources</th>
<th>Uses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coal</td>
<td>Export</td>
</tr>
<tr>
<td>Biomass</td>
<td>Other*</td>
</tr>
<tr>
<td>Electricity Imports and stock</td>
<td>Energy</td>
</tr>
<tr>
<td>change Natural gas</td>
<td>consumption</td>
</tr>
<tr>
<td>Crude oil and Condensates</td>
<td>1999</td>
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<td></td>
<td>2000</td>
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*Include: Transformation looses, statistical difference and losses of transformation, distribution and storage.

2. THE OIL SECTOR POLICY IN MEXICO

At present, Mexico’s oil sector faces three big challenges: 1) to provide Mexico with enough income to finance capital investment and public infrastructure, which are essential to promote sustainable economic development, 2) to guarantee a reliable fuel supply, of high quality and low environmental impact, and 3) to maintain a responsible oil export policy.

In the upstream activity, internal efforts are focused on making exploration and field development more efficient. The oil sector policy’s objective is to maximize the present value of oil wealth and to ensure availability of reliable and commercial energy sources for the country.

Mexico’s upstream activity will remain reserved to the State. The great challenge of the national oil company, Petroleos Mexicanos (PEMEX), is to transform itself into a more competitive and efficient firm, according to the changes observed the international oil industry, where big oil companies have begun a merging process and an allocation of high investment in order to modernize and turn the activity more competitive.

As established by the Mexican legal framework, it is responsibility of PEMEX, as a public decentralized entity, to execute projects related to exploration and transformation of hydrocarbons. By implementing this responsibility, through Pemex Exploración y Producción (PEP), PEMEX has increased the production capacity of Cantarell field, that is the sixth largest in the world, from 1.126 million of barrels per day (mb/d) of crude oil at the end of 1996 to 1.687 mb/d at the end of June of 2001. This production represents 54% of total domestic crude oil production.

PEMEX is doing all the necessary work to increase the extraction capacity of the Cantarell field, in order to maintain the pressure in it, as well as to optimize its production. At the same time is taking all the necessary measures for the optimum advantage of related natural gas, among other measures.
In order to develop the Cantarell project, a program of activities was designed for the years 1997 and 2012. The current construction stage is constituted by 57 engineering procure and construction modules (EPCs modules), from which 28 are in construction, 10 are finished and 19 are in the process of being authorized. The target of the Cantarell project is to increase its oil production in up to 2.0 mb/d by the year 2002, mainly in heavy crude oil.

From 1997 up to now, Mexico has invested more than 21 billion dollars in key projects for the oil sector. Of this amount, roughly 6 billion dollars are being allocated to the development of the Cantarell oil field. In the same period, investments for up to 2 billion dollars were added for upgrading of the National Refining System. This improvement and modernization of the National Refining System will increase overall refining capacity, will enhance the quality of gasoline and will enable domestic production of fuels to meeting higher environmental standards and allowing for a more intensive processing of heavy crude oil in refineries. It is noteworthy that half of the total oil investments are turnkey type projects, undertaken by private companies.

In addition to the Cantarell project, the Mexican government has approved the PEMEX 2001–2006 upstream investment program, called Strategic Gas Program, which covers a variety of projects, many of which intend to elevate oil and natural gas production. The program’s budget for a six-year period amounts $35.0 billion dollars. It is an ambitious project being undertaken for discovering and developing new gas fields onshore and offshore light oil fields with a high gas oil ratio in the Southeast Zone of the Gulf of Mexico.

Given the internal efforts that Mexico is making on exploration and field development in upstream activity, it is estimated that the domestic crude oil production will be substantially increased in the next ten years. Mexico’s crude oil production outlook for this decade estimates an increase of production from 3.0 mb/d in the year 2000 to 3.70 mb/d by the year 2010. Together with higher crude oil production, the quality of crude oil will also improve. It is projected that the proportion of light crude Istmo and extra light crude Olmeca will be increased in this decade. However, heavy crude oil Maya will continue representing the higher proportion of total domestic oil crude production, given the fact that the oil reserves in Mexico are abundant in heavy Maya crude oil, which allows to have a higher potential of exploitation.

<table>
<thead>
<tr>
<th>Prospect of oil production by type in Mexico (thousand barrels daily)</th>
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<tbody>
<tr>
<td>PROSPECT 2001-2010</td>
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<tr>
<td>---------------------</td>
</tr>
<tr>
<td>TOTAL PRODUCTION</td>
</tr>
<tr>
<td>MAYA (HEAVY OIL)</td>
</tr>
<tr>
<td>ISTMO (LIGHT OIL)</td>
</tr>
<tr>
<td>OLMeca (LIGHTER OIL)</td>
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<tr>
<td>SOURCE: PEMEX</td>
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</tbody>
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Given this projected higher oil production, Mexican crude oil capacity for exportation is also projected to increase, from 1.650 mb/d in 2000 to 1.900 mb/d by the year 2010. The estimated growth of Mexico’s oil production during this decade will represent an increase of Mexican crude exportation capacity and the possibility of carrying out a diversification strategy towards APEC oil consuming countries, promoting a reliable supply of oil for the region.
Mexico: Volume of production and exports of crude oil
(Thousand barrels daily)

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>PROSPECT 2001-2010</th>
<th>AVERAGE 2001-2010</th>
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</thead>
<tbody>
<tr>
<td>PRODUCTION</td>
<td>3,012</td>
<td>3,125 3,636 3,506 3,520 3,905 3,674</td>
<td>3,600</td>
</tr>
<tr>
<td>EXPORTS</td>
<td>1,652</td>
<td>1,740 1,963 1,823 1,840 2,070 1,910</td>
<td>1,902</td>
</tr>
<tr>
<td>% EXPORTS</td>
<td>55</td>
<td>56 54 52 52 53 52</td>
<td>53</td>
</tr>
</tbody>
</table>

3. THE MEXICAN OIL EXPORTATION POLICY IN THE MEDIUM TERM

Given the instability of the international oil market, at the beginning of 1998, exceptionally, Mexico approached the OPEC, due to the emergency situation resulting from a considerable drop in oil revenues that implied high economic and social costs for oil producing and consuming countries. In this context, Mexico played an important role in promoting production cut down agreements among OPEC countries. These efforts were aimed at defending national interests regarding protection and viability of the Mexican government economic program, as well as stability of world’s economy. Since 1998 up to date Mexico has participated, along with OPEC countries, in efforts to stabilize the international oil market.

Mexico’s most recent agreement established a cut in oil exports of 115 thousand barrels per day aim to maintain an oil balance between world’s oil supply and demand, considering that world economy, in particular, the United States economy, faced a very low rate of growth. Over the past three years, Mexico has adopted a responsible approach in its oil export policy, since 1998 up to date has fully adhered to its commitments with a 100% of compliance and have contributed to the world’s oil market stability.

Further than Mexico’s cooperation efforts to stabilize the oil market, the crude oil export policy objective is to secure long-term sale contracts in the international oil market. Heavy Maya crude oil reserves are abundant, which allows a high exploitation potential degree. With the beginning of Cantarell project operations, production capacity will increase to 2.0 Mb/d by the year 2002, mainly in heavy crude oil, which will require the sale of the additional production within the market in the best possible terms.

Considering that in the coming years, Mexico will access a higher relative supply of Maya heavy crude oil, it will be necessary to adopt a middle and long-term strategy geared towards maximizing the economic value of crude oil reserves. In order to accomplish this goal, a higher rate of return is expected from products deriving from Maya crude, by promoting the construction of high conversion refineries (coking units), which will allow to obtaining a higher proportion of high quality products such as gasoline and intermediate distillates.

The adopted strategy applies in two directions: both internal and external. Internally, the upgrading and modernization policy of the National Refining System has been adopted. Mexico has six refineries, which are going through a renovating and updating process towards high conversion processes.

Externally, PEMEX has established a series of long term supply contracts of Maya crude oil with USA companies. Such contracts are associated with the execution of coking unit’s projects that will increase the high conversion capacity of heavy crude oil in foreign companies’ refineries.

As part of this strategy, PEMEX has traded long-term contracts (5-8 years) of Maya crude oil in exchange for gasoline. Such contracts are associated with conversion projects for the construction of
coking units in refineries. Mexico has signed contracts amounting 463 thousands of barrels per day with US refineries such as: Clark, Coastal, Deer Park (Shell), Exxon and Marathon.

<table>
<thead>
<tr>
<th>REFINERY</th>
<th>Additional capacity kbd</th>
<th>Signed capacity kbd</th>
<th>Initial date of project</th>
<th>Term years</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clark, Port Arthur, US</td>
<td>170</td>
<td>158</td>
<td>01/2001</td>
<td>8</td>
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<tr>
<td>Coastal, Aruba, Caribbean</td>
<td>100</td>
<td>100</td>
<td>07/2000</td>
<td>5</td>
</tr>
<tr>
<td>Deer Park, US</td>
<td>70</td>
<td>50</td>
<td>10/2001</td>
<td>7</td>
</tr>
<tr>
<td>Exxon, Baytown, US</td>
<td>109</td>
<td>65</td>
<td>07/2001</td>
<td>5</td>
</tr>
<tr>
<td>Marathon-Ashland, Garyville, US</td>
<td>137</td>
<td>90</td>
<td>10/2001</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>586</strong></td>
<td><strong>463</strong></td>
<td></td>
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In this context, the Asia Pacific region is an expanding market, which potential is being evaluated by Mexico in order to assign a greater proportion of its crude oil exports. In order to effectively achieve a higher proportion of exportation volumes to this region, long term contracts associated with execution of coking projects in the companies’ refineries to which the Maya crude is sold, will be required.

As Mexico advances towards the goal of having a competitive and efficient oil and gas industry sector, it is also in Mexico’s interest to cooperate, as an oil country producer, with APEC member economies to pursue mutual energy objectives. Mexico needs to diversify its oil exports to new markets as well as APEC economies need to diversify its oil import supply for security reasons. Relying on a single source or region for oil import supply is far riskier than importing oil from multiple sources. Mexico oil exports can be a secure source of oil supply for APEC member economies.

4. DIVERSIFICATION AS ENERGY SECURITY POLICY

Like any investment portfolio, energy security means diversification. Excessive reliance on a single region for oil supply to satisfying an increasing demand generates vulnerability in oil importing economies, instable supply and disruptions, and oil price volatility. Oil consuming countries can minimize these risks by coordinating energy policies through strategic partnership organizations like APEC. The Asia Pacific Energy Research Center (APERC) has been warning about the high dependence, which APEC economies have on oil supply coming from the Middle East producing countries. For this reasons, energy security is a great concern for the APEC member economies.

Given the high rate of growth of APEC petroleum consumption expected for the coming years, oil imports supply in the APEC region is expected to increase by more than 10 millions of b/d over a twenty-year period. APEC imports of petroleum from non-OPEC producers is expected to increase in more than 6 millions of b/d and which larger amount will come from the Caspian basin and from African offshore sources. Roughly two thirds of the world’s proven oil reserves are located in the Persian Gulf region and, even with development of resources in the Caspian region, the rapid growth in of oil demand will, in all probability, be met by increased Persian Gulf exports.

Imports from (non-Persian Gulf) non-OPEC countries will increase only in a modest amount over the next twenty-year period. In this context, Mexican oil exports can be a secure alternative supply source for APEC member economies in the coming years. Mexican oil exports up to day are
concentrated in the North American market. In 2000, Mexican crude oil exports to APEC member countries averaged 1.236 million of b/d, which represented 79.6% of total volume exported by Mexico. However, by country, crude exports to the United States averaged 1.17 million of b/d, which represented 75.1% of total oil Mexican exports. Mexican oil exports to the West Coast of the United States averaged 31.9 thousand barrels per day (kb/d), which represented 2.7% of total volume exported to that country. The volume destined to Canada amounted 22.9 thousand b/d. To Japan reached 42.1 thousand b/d, which represented 2.7% of total Mexican crude oil exports. In 2000, exports to the Pacific Basin (Japan and West Coast of US) averaged 74.0 thousand b/d, which represented only 4.8% of total Mexican crude oil exports.

![Crude oil exports by area of destination](image)

Mexico needs to diversify its increasing oil exports for security reasons, and it also requires diversifying the destiny of its oil exports. Currently, 75% of foreign sales of Mexican crude oil are destined to the United States, which makes Mexico vulnerable to any discretionary measure, which could be adopted by that country. In this sense, Mexico is evaluating the convenience of diversifying its crude oil commerce towards other markets, particularly to the Asia Pacific region, taking advantage of its high growth potential.

5. THE IMPORTANCE OF RELIABLE AND TRANSPORTATION

Mexico is a trustworthy and responsible supplier of oil that provides reliable and transparent information on its reserves, production and oil exports. In the past three years, Mexico has contributed to stabilize the international oil market and has promoted a close collaboration between oil producing and consuming countries, reducing uncertainty of possible interruptions in supply. Therefore, Mexico has been one of the main oil producing countries that has contributed responsibly in maintaining stability of the international oil market.

The Asia Pacific Energy Research Center (APERC) has developed a very important work in the region fostering member economies’ understanding of future energy supply and demand trends and associated energy policy implications, which will in turn improve the quality of available energy information and, therefore, the efficient operation of regional energy markets.

Reliable and transparent information is required for energy security since it supports an effective monitoring of international oil supply and demand situation and the consequences of any supply
disruptions. It also reduces uncertainties in oil market and enables appropriate and timing responses to oil supply disruption.

According to the present situation of the international crude oil market, it is of great relevance to have access to transparent information on production, stocks and other fundamental market variables, which allows reaching greater market price stability. Currently, the international oil market experiences a huge paradox: being an industry constituted by a great number of producer firms, with high investment and commercial transactions levels, transparent and reliable information on the market hardly exists.

Even though specialized agencies exist with a wide oil market data basis, the adequate distribution of transparent information that contributes to informed and correct policy decision-making has not been reached. In the future, it will be crucial for the welfare of both, oil producing and consuming countries, to promote sound fundamental conditions that allow to building up a more stable international oil market.

As a security measure some countries hold oil stocks. Five of the 21 APEC member economies, including the United States, Canada, Japan, Australia and New Zealand, are members of the International Energy Agency (IEA). Considering this, these economies have obligations derived from an Agreement of the International Energy Program (IEP), which required them to carry stocks equivalent to 90 days of oil net imports. Within the remaining 16 member economies, seven are net oil exports and they do not hold any emergency oil stocks (Brunei Darussalam, Indonesia, Malaysia, Mexico, Papua New Guinea, Russia and Vietnam). The exception is Indonesia, which imposes a stockpiling obligation to its national oil company, PERTAMINA. There are some other economies that maintain emergency oil stocks like Korea, China Taipei and Thailand.

The United States is the only economy that periodically publishes data on domestic and imported crude oil prices, volumes of domestic and imported crude oil, demand, supply and stocks of domestic oil, types of crude imported, through the DOE’s Energy Information Administration. This information helps to avoid speculation in the market.

As member countries of APEC, we need to publish updated and reliable information about our industrial and strategic stock levels and other fundamental variables, in order to support the collective action between oil producing and consuming countries in the design of common policies to reduce speculation in the international oil market.

Today we face a changing international oil market due to the expansion of new markets. In the last decade, the world oil market faced a large expansion of new regional markets. The Asia Pacific, China and India’s markets, as well as those from emerging economies Latin America are now important sources for the world’s oil demand, which have summed up to traditional markets of OECD’s developed consumer countries. The growth of these new regional markets has been of great relevance to determine the behavior of crude oil prices in the world market. It is worth remembering that the 1998 fall in oil prices was related mainly to the contraction of oil demand in countries of South East Asia.

At the same time, new regional markets have grown, in the supply side other oil producing regions have developed apart from the large traditional oil producing regions of the Middle East and the North Sea. Now small producer countries of Latin America such as Colombia, Ecuador and Argentina as well as from Africa such as Congo, Angola and Gabon have gradually increased their oil exports towards consumer countries.

In this context of growing new markets and of a larger number of oil export countries, the flow of international oil trade has been intensified considerably, and the number of players in the world oil market has been multiplied, which every time requires more and better information on the oil market which means opportune, consistent and reliable information.
Paradoxically, in contrast with market development and the larger number of players, the available information about the oil market is scarce and slow. In many cases the available statistics of the fundamental variables of the market such as production, demand and oil stocks are delayed and incomplete, which creates a distortion of the real situation of the balance of the world’s oil demand and supply. This has made the analysis of market tendencies and oil policy decision-making, more difficult.

Mexico has been characterized for supplying transparent and timely information of its crude oil reserves, its production and oil exports, as well as of its public finances, trade balance, current account and balance of payments, as well as of the evolution of its economic activity. In the case of other important oil producers, such as Saudi Arabia and Venezuela, this type of information is very scarce and in many cases is not available. As member economy of the APEC, Mexico will continue to release transparent and timely information of its crude oil reserves, production and oil exports. Mexico proposes that all APEC members economies, oil consuming and producing countries, must continue cooperating in the creation of a more transparent, reliable and timing oil information statistical system.

In order to increase cooperation among APEC economies and to implement more effective cooperative and emergency response measures, it is fundamental to develop a timely and transparent information system about the key variables related to crude oil production and foreign trade, as well as to oil and products’ stocks, to pricing and the relationship between oil producing economies and their clients trade relations. The construction of an open timely and transparent system of oil relevant information for APEC economies will allow to evaluate, with a higher level of certainty, economies joint actions and to have successful agreements between member economies on the measures that should apply during oil emergency situations and, at the same time, to respond on time to the changes of market conditions. Markets pay off open and reliable information with greater stability of international oil market and punish the lack of transparent information with higher oil market instability.

6. CONCLUDING REMARKS

Energy security is without doubt the aim of any energy policy of every country. However, energy security means different things for every country. Among APEC member economies, the concept of energy security implies a wide range of factors, which have to be taken into account for progress in cooperative relations in energy security for the region. Given this wide range of factors, the participation of Mexico in the APEC Energy Security Initiative as an oil producing country is different from that of consuming countries.

Mexico identifies two parts in the APEC Energy Security Initiative: one devoted to sharing information -which has been widely explained- and other dedicated to the establishment of regional oil emergency stocks.

Considering this, it is not feasible for Mexico to maintain strategic oil reserves as an emergency measure, therefore the idea of an APEC region cooperation framework which allows the implementation of different long and short term measures (technology transfer, promotion of dialogue between producers and consumers, information sharing, promotion of energy efficiency and conservation, mainly), in order to provide market stability and avoid supply shortcuts, seems more appropriate.

Mexico does not support the establishment of Oil Emergency Stocks in APEC. Such proposal is incompatible with Mexican oil policy. Furthermore, Mexico considers that the establishment of such stocks will create a fictitious demand, which, in the short term, will affect oil market stability and will introduce strong market distortions in the long term.
Mexico has decided not to accept to be part of the IEA and OPEC, in order to maintain an independent energy policy that corresponds to our national interest and needs.

Mexico has supported the objective of maintaining oil price levels that do not interfere with the world economy dynamism, and that provide and strengthen market stability through the dialogue between consumers and producers.

Mexico has supported and promoted international oil market stability, through a close dialogue and exchange with major oil producing countries. Regarding oil price levels, the Mexican position has been that prices should not be so low as to hinder investments in oil production nor so high that they affect the dynamism of the world economy. Mexico considers that the dialogue between consumers and producers is essential for oil market stability.

One of the main aspects of current Mexico's energy policy is fostering of new and renewable energy, its technologies and investments, energy efficiency and conservation, reliable and transparent regulations. Current strategies to improve energy efficiency are closely linked with related policies to achieve national priorities: non-renewable energy resources conservation, modernization of productive sector, and environmental protection.

APEC economies should commit to have a fluent and transparent information sharing and to exchange points of view in order to promote preventive actions. In this regard, the design and creation of demand and supply projection models that could allow a close sound knowledge of oil market, as well as actions that eliminate uncertainties in the oil market, may avoid the creation of uninformed or irrational behavior in the international oil market.

During the presentation of the APERC’s document “Energy Security Initiative: Emergency Oil Stocks As an Option to respond to Oil Supply Disruptions” at the 21st EWG Meeting held in Kuala Lumpur, in May 2001, Mexico along with Canada, Singapore and Australia supported the idea of an energy security initiative focused on information exchange. More than one country, including Mexico, expressed that they did not support the idea of promoting the establishment of oil stocks within APEC. Such policies can be national policies, but should not be construed as APEC policies.

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