

The Future Energy Mix in the Arab Gulf: Challenges and Opportunities

What is the ideal energy mix for the Arab Gulf Cooperation Council Countries? There is no solution appropriate for all cases for the Arab Gulf Cooperation Council Countries. The answer depends on the particularities of decisions made by each of the Arab Gulf Cooperation Council Countries. In other words, this shall depend mainly – on a set of political decisions and trends that may be random or otherwise as chosen by the governments. According to the statement of Jeroen Van der Veer, Ex-Chief Executive Officer of Royal Dutch Shell at the Ninth International Summit of Oil in April 2009, “Energy companies do not determine the energy mix, this is done by governments through granting licenses, imposing or lifting taxes and provision of support. The energy mix is a government decision.”

The selection of fuel mix – or more specifically, electricity – in all countries of the world was a critical aspect in the policies of energy. Truly, the behavior of governments and the nature of their political decisions differ totally when the energy mix in such countries is dominated by nuclear energy (France), coal (South Africa) or oil or gas (Middle East and North Africa countries). We find another class

of preference when asking if the sources of fuel are original or imported. But, even in the case of energy exporters such as the Arab Gulf Cooperation Council Countries, the access to fuel (in terms of volume and cost) is a major issue for the governments as the international markets are becoming more flowing and the price of crude oil is connected to the prices of products in markets (cost of alternative opportunity) considered on the basis that it is the proper guide to determine the energy prices.

Due to the special considerations of strategy, responsibility and geopolitics, the decisions concerned with nuclear energy are largely considered as one of the privileges of the State. Hydrocarbons and coal had been increasingly “commoditized”, and hence, benefiting from oil-and gas increasingly – in electricity sector should be in compliance with the overall policy of exports of the State. In the region, we find that most of the countries are reconsidering their positions regarding the fuel mix of electricity dominated by hydrocarbons and sometimes emphasize the necessity of freeing hydrocarbons for export. However, the major issues related to the fuel mix lay elsewhere – the need for limiting the use of valuable distillates (during the peak demand for electricity in summer), the increasing competition for natural gas of increasing cost. Since some countries

had become fuel suppliers from time to time, the need for providing some extent of supplies security is considered a relevant matter too.

In the specific case of the members of the Organization of Petroleum Exporter Countries (OPEC), there is a need for maintaining appropriate balance between the oil exports and internal consumption and then the energy sector is used as an access for crude oil particularly when there are no complicated refining abilities available in the country. However, this may change in the future with the operation of major refining projects.

The aforesaid political decisions should deal with series of challenges and new opportunities that face the region:

- The diversification of fuel mix started to increase in the agendas of governments for a number of reasons such as the exhausted fuel supplies, environmental concerns and geopolitics to name just a few. This also raises the important issue of fuel prices and the possible changes in the consumer's tariffs.
- Countries are increasingly giving attention to the need for achieving developmental growth "sustainable" while achieving the maximum-level of using natural resources or the ideal level of utilization of such sources.

- There are interrelated processes and mutual dependency between countries (in relation to electricity and gas). Hence, it is more appropriate that the various parts of the energy chain should become more integrated. For example, it is becoming more difficult to plan the energy sector with total isolation from the exploration and extraction sector when there is a large extent of mutual dependency between the two sectors.
- There are several new parties participating in the energy sector. Some of them, which were historically active in the business of exploration and production, had become companies integrated with energy business. Others, who were originally absent from the energy sector in the region, such as Asian companies, had found their way into the sector. Finally, the local bodies owned by the State (separate and national facilities), banks, funds and private companies are investing more in the assets of energy within and outside the region.²

**Energy Mix in the Gulf: Options and consequences of
sustainability and diversification**

Hydrocarbons (steam oil stations and gas turbines stations) dominate the fuel mix in electricity in the Arab Gulf Cooperation Council Countries even if the resources are different from one country to the other while natural gas plays a role of increasing importance.

It is likely that, natural gas shall continue to be the chosen fuel in the future except in some major projects that mainly burn oil because of lack of availability of gas or for strategic reasons. In countries like the Kingdom of Saudi Arabia, Kuwait, Sultanate of Oman and the Kingdom of Bahrain where more than half of the resources of gas are connected to oil, the availability of gas to generate energy had been a dilemma. In these cases, clearing the associate gas and then transferring it to cash is considered a big challenge – burning gas, recycled gas or in best cases injecting it back into the oil fields. Some countries started to deal with the issue and think of the best method to utilize gas before commencing projects for gas collection. At relatively early time, other countries implemented policies for managing the associate gas “despite” the policies of the country that tend to oil. However, most of such countries have to face organizational or technological issues. In the light of the increasing maturity of some oil production areas, the major utilization of oil in generating energy in its original location and manage the store (reinjection) means that it is increasingly important to estimate the

required quantity of gas. Then, even the oil sector concerned with exploration and extraction started to compete with the electricity sector over gas supplies.

To be fair, it should be said that very competitive offers (long term fuel supplies agreements in addition to long term energy purchases agreements at prices below the market price usually supported by sovereign guarantees) had largely contributed to the attraction of the independent energy product project in the region and the attraction of industrial projects. However, the demand for energy at absolute data and for individual levels led to sustainability levels. In such over exhausted environment – particularly concerning gas supplies – the authorities in the region started (a) to take into consideration methods to encourage the development of fuel prices and (b) to think of “alternatives” for hydrocarbons within a general trend to enhance the supplies security (including internal supplies).

Theoretically, we find that the main alternatives of hydrocarbons that had been studied in the region are coal, renewable sources and nuclear energy (on the long run) – although there are some practical considerations to be taken in account first.

Finally, we should not forget another source of supplies: invisible generation, i.e. the additional megawatt that could be saved by using the techniques of demand management. For example, the transformation of open cycle power stations to dual cycle stations is considered a low cost option that should be followed in most countries although it requires renegotiating the existing contracts. In addition, management of the demand aspect and maintaining energy are considered low cost options but with the existence of corporate challenges that result from the abundant participating entities (distribution companies, municipalities, customs authorities, etc...). Mostly, the management of the demand aspect is less than the new generation but execution takes time and results require patience.

Burning distillates (usually diesel) to generate electricity represents a high cost option but it is also one of the most flexible options since most of the last energy stations in the region are dually fueled and may burn distillates. This is a widely adopted practice in the Gulf region during the peak time in summer. If such practice is used widely or on long range basis, the logistic, contractual and environmental issues should be taken into consideration. Concerning the security of supplies, what is generally recommended is represented in that all the new gas turbines and the dual cycle stations should be dual fuel (gas and diesel) and storage of diesel should be made

available in every station that operates by burning gas. In the countries where the fuel mix tends to be gas, the steam energy stations that burn the heavy fuel oil or crude oil could improve the fuel security if gas supplies were not available but this option is usually measured against its highest capital cost and minimum efficiency. There are limited international experiences of operation of dual burning stations based on natural gas and heavy fuel oil and this is mainly due to the reduction of availability of heavy fuel oil and the relatively high costs of maintenance upon operating the heavy fuel oil.

Nuclear and renewable resources: Costly but may bring other benefits

The nuclear and renewable resources are also more costly than the dual cycle gas turbines that operate on gas but they bring other strategic benefits and may operate as protection against uncertain gas supplies or affect the cost of possible alternative opportunities of carbon dioxide (in case of additional development of the mechanism of development of carbon and the projects of carbon trading).

The potentials of renewable resources are being evaluated continuously but two technologies that have natural and technical potentials in the region – mainly solar energy and wind energy – still

have several essential technological challenges that they should face. These two technologies bring some benefits to the generation of the distributor but they need strong and clear support policy. The potentials of the renewable resources shall be low and will not constitute tangible share of the general fuel mix unless they were followed by active support policy that allow them to compete with thermal generation. The renewable resources require strong government will and support in addition to several solid commitments from the highest authorities – as we see now in some Gulf countries. It is certain that, despite the scattered large initiatives in the fields of solar energy or wind energy, the contribution of resources of renewable energy resources to the energy mix shall remain limited but it may play an important role in the policies.

Green Initiatives: From oil exports to energy exports

In particular, the countries that have more limited gifts of resources launched a number of renewable electricity projects and focused the major part on the wind energy and solar energy. In general, however, there was no major policy for clean energy except for some ambitious goals in the energy mix. The use of operations of reduction of emissions documented in Kyoto Clean Development Mechanism was lately followed in the Middle East and North Africa region. The

Middle Eastern countries were the most active in this regard and they were sometimes motivated by the support of the European Union and Barcelona Process. The lessons learnt from the regional experiences show that the definition of realistic goals is important. The government support (and types of support) is central in this concern but in this process, the foreign finance and loans played a major role also.

In respect of hydrocarbons producers, they thought that emphasizing the clean technologies and ceilings of emissions of carbon dioxide could only end with harming demand on hydrocarbons that they export on the long run. In best cases, the efficiency of energy used to appear in the agendas of some governments to limit the rocket rising in the growth of demand on energy. However, composition had changed today. The initiatives in various countries are not only driven by the increasing internal demand, exterior support/pressure or commercial incentives as traditionally stated in most cases. First, in the light of their modest volume – and in the absence of major technological change or change in cost – the renewable resources may be only part of more comprehensive solution for the issue of growth of internal demand. Second, several examples had shown that the exterior political support is not sufficient and in any case does not have a true relation for most of Arab Gulf Cooperation Council

Countries. Third, the commercial incentives were indeed very limited in the region. By February 2009, 79 projects of the mechanism of development of carbon were possible in the Middle East and North Africa region and represented 1.3% only of similar projects in the advanced world. These three factors may be elements of important contribution but they are not the main driving forces behind the change in the composition concerned with clean energy in general. Rather, some main producers decided to take the initiative to commence the activity instead of going through the consequences of a future that they cannot control. The volume of regional investment in the projects of renewable resources and clean energy is estimated at US\$ 33 Billion between 2009 and 2013.⁸

For example, the Kingdom of Saudi Arabia, Abu Dhabi and Sultanate of Oman, driven by economical and strategic factors, had developed several models of commercial businesses. Some initiatives may be late or freezed, but other initiatives shall continue. This will at least have effect on the fuel mix of electricity and also on the energy policies in these countries. After reviewing the options, it seems that the Arab Gulf Cooperation Council Countries had determined the capture and storage of solar energy and carbon as main focus fields for participation in the scene of clean energy.