EXPERTS DISCUSS FUTURE ENERGY PROSPECTS

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[Article: "Energy Problem; Special Jordanian Concerns on Self-Sufficiency Path: Oil or Alternative Sources; Prices Problem in Light of Continuity and Change; Official Opinions on Given Facts of Local Energy Map"]

[Text] Jordan is a country which lacks local energy resources that can be exploited commercially with well-known technological means. Jordan's discovered mineral resources are small, excluding some raw materials such as phosphate, potash, the Dead Sea salts, shale, gypsum, Kaolin, sand glass, raw materials involved in cement production, construction materials, marble, some common industrial rocks, and copper and manganese deposits found in Wadi 'Arabah and not exploited so far because of low prices in the international markets.

In the past 2 years, the burden of the oil bill grew heavier on the national economy, with the value of Jordan's oil imports exceeding $600 million.

The government has devoted special attention to oil and natural gas exploration and prospecting, increasing the spending on this activity from 619,000 dinars in 1980 to 14.9 million dinars in 1985.

Jordan has also experienced a constant growth rate of about 9 percent in electric energy and increased interest in the alternative energy sources, such as solar energy and wind-generated energy which have begun to occupy an important place in the priorities of the Ministry of Energy.

As for the rationalization of energy consumption, the ministry has implemented a number of programs seeking to conserve energy and to curtail the waste to the minimum possible.

Recently, the issues of energy and its future have aroused a major controversy and have raised questions which seek an answer:

What is oil's future in Jordan?

What about the establishment of a private company to prospect for oil?

Will the current prices be reconsidered?

In an endeavor to find an answer to the numerous questions, we in AL-IQTISADI AL-URDUNI decided to turn to Dr Hisham al-Khatib, the minister of energy and mineral resources, and Dr Ibrahim Badran, the ministry undersecretary, to give us some clarifications on the latest and possible price developments and their consequences to the Jordanian economy.

In an open symposium on the various aspects of Jordan's energy problem, AL-IQTISADI AL-URDUNI has also met with Engineer Rashad Abu Ra's, the head of the Industrial Energy Department of the Ministry of Energy; Dr 'Ali al-'Anani, the head of the Renewable Energy Resources Department of the Ministry of Energy; Engineer Muhammad Abu 'Ajamiyah, the minister's adviser and the head of the Geological Research Bureau of the Natural Resources Authority; Engineer Malik al-Kabariti, the head of the Energy Bureau of the Royal Scientific Society; and 'Atallah al-Halabi, a representative of the Jordanian Petroleum Refinery Company, to discuss with them the energy concerns and affairs with the purpose of clearing up matters in a way that contributes to serving the country and the citizen.

In respect to the effects of reduced electricity prices on Jordan's various sectors, the minister of energy and mineral resources said:

The latest electricity and energy price reductions seek to achieve a number of objectives, of which the most important are:

To supply heavy fuel and electric energy to the export industries at relatively low prices so as to enhance their competitiveness in the foreign market.

To supply electricity to agriculture and to water pumps at convenient prices so as to assist the agricultural sector and to reduce the costs of supplying water to the citizens and to the economy's various sectors. This has consequently led to reducing water prices.

To reduce the burden of the electricity bill to the citizen by reducing the price of the first part of home consumption, thus reducing the cost of electricity to all the kingdom's households that benefit from electricity and that exceed 400,000 households. The greater benefit has been to the people with a limited income.

To encourage the tourism industry by greatly reducing the cost of electricity to hotels.

To prevent excessive consumption and the misuse of electricity in homes by retaining high prices for high consumption rates that exceed the reasonable average home consumption.

Dr Ibrahim Badran, the undersecretary of the Ministry of Energy, had the following observations to make:

What is fundamental in this phase is to engage in a process of understanding energy affairs, to plan future energy and to strengthen the local capabilities to finance national programs to develop the energy system, to create new energy sources and to enhance the efficient use of energy.

It is also necessary not to dwell long on the current crude oil prices because they are unstable and because, consequently, it is difficult to use them as a certain indicator of the future.

Therefore, it is not beneficial to build the local prices structure or the financial plans connected with energy on the basis of the current crude oil price which may change as a result of a sudden circumstance.

It must be noted here that some countries, such as Egypt and Tunisia, have taken inverse positions and have increased the prices of oil derivatives to their citizens.

Therefore, the price drop must be utilized as an opportunity to put the internal affairs in order and to correct the conditions connected with energy, not only for the present but also for the future.

I stress here that we must not rush to tie the local price to the international or immediate price because the latter changes rapidly. Nobody can foretell the price levels, despite the statements we hear from officials at all the international levels that the prices will drop. These statements are pure speculation and assumptions founded on no firm facts.

This is confirmed by the past speculations expecting an increase in oil crisis. What has happened contradicts those speculations.

Slow-Moving Commodity

I believe that energy prices must not be changed rapidly because if you allow them to do so, they will reflect on the various government and economic facilities and it will not be easy to restore them rapidly.

If you reduce the prices and if an upheaval develops in the prices and causes them to rise again, it will be difficult for the national economy to adapt and accept the high prices within a short period of time.

Throughout the past years, the government policy has been a policy of absorbing the price shock and transmitting it to the national economy gradually so that it may be able to adapt. When the prices were very high, the government provided a subsidy to lessen the shock. We must help the continuation of this role because it has been greatly successful in maintaining stability in the prices.

But if it is confirmed that the prices will be stable and low at the same time, and this confirmation may require some time, then the talk about reducing the prices of oil derivatives will be realistic.

We are now talking about prices, not stability. What is always important is price stability, not the change of prices. Nobody can claim that the prices have stabilized at this level and that we can, consequently, formulate a fiscal and price policy based on this situation.

I can assert that no country, especially among the non-oil countries, has tied local prices to the international prices. In the industrial countries, there has been a small price drop because the economies of these countries are more capable of countering the shock than we are.

I stress on this occasion the need to make use of this period to put our energy affairs in order, whether in terms of looking for new energy sources or in terms of underlining the programs to rationalize energy consumption. I stress, moreover, that Jordan's energy system must be bolstered so that we may utilize the low-price period to chart for Jordan a new energy future that is more stable and more secure than the past situation and that lessens the burden to the treasury and the citizen.

The energy bill will increase constantly as a result of the economic and social growth. The government's past intervention to subsidize fuels for the citizen does not mean that the government will continue to play this role in the future. Therefore, we must have sound planning so that if the prices move upward, the national economy will be prepared. Such planning will render the citizen's interest a greater direct and indirect service than a temporary reduction.

I also believe that state-level utilization of the price differences can yield a much greater benefit than utilization at the individual level, meaning that reducing the cost to the citizen by 5 dinars will not lead to a fundamental change in the individual citizen's comfort standard whereas the state can put the total sum reduced to great use.

The citizen's prosperity stems from the ability of the national economy in its entirety to perform. If we divide any differences into small components, then they will be spent on ordinary consumption, such as luxuries and goods. Consequently, the national economy will not benefit. Therefore, the complete utilization of these prices, especially to bolster Jordan's energy system and alternative systems, will be beneficial to the national economy as a whole.

Symposium Proceedings

[Question] How do you view the present status and future of Jordan's energy problem?

[Engineer Rashad Abu Ra's] Jordan relies totally on imports to meet its energy needs. The demand for energy has grown greatly in the past 10 years as a result of the economic and social growth achieved by Jordan in the past decade.

But the growth rate in the demand for energy is faster than the economic growth rate. The demand for energy grew in the past 5 years by nearly 12.5 percent whereas the economy has grown by 9 percent. This indicates the presence of wasteful consumption. In the industrial countries, the demand for energy either keeps pace with or is smaller than the economic growth whereas what is happening in the developing countries is the opposite, with the demand exceeding the growth.

Fourteen Percent of National Product

The energy bill's burden to the Jordanian economy has grown considerably. In most of the recent years, the bill has consumed nearly 14 percent of the gross national product and has represented 24 percent of the total imports, thus exceeding in most years the total value of our annual exports.

The government has embraced a reasonable pricing policy to supply the consumer with energy within the limits of his capabilities. As a consequence, the government has subsidized the energy bill, with the subsidy increasing year after year and amounting to nearly 46 million dinars annually over a number of years. The size of the subsidy provided by the government from 1976 to 1985 has been estimated at nearly 255 million dinars, thus causing the energy bill to constitute a burden to the budget. In light of this situation, the government found that the way to solve Jordan's energy problems was to create the Ministry of Energy and to entrust it with implementing a plan to reduce energy's burden to the national economy. One of the plan's components is to intensify the search for local energy resources and to exploit whatever resources are discovered, if their exploitation is economically feasible.

The ministry has also worked to diversify the sources of the imported energy instead of relying on a single source--oil. The ministry has completed studies on using coal to generate electric power. Thus, it will be possible to make savings of nearly 30 percent in electric power generation. This is in addition to working to rationalize consumption so as to reduce waste, not to curtail economic and social growth to encourage the use of alternative energy, to adopt a pricing policy that seeks to supply energy to people with limited income and to encourage the national industry, especially the export industry.

[Dr 'Ali al-'Anani] The value of Jordan's oil imports last year amounted to $602 million. I believe that in a developing country like Jordan, this sum constitutes a major burden and a major problem to the Jordanian balance of payments. I also believe that one of two things has to be done:

First, reduce the oil imports, invest the difference in cost of importing alternatives in essentials that are not in conflict with the national interest, and curtail waste.

Second, replace oil by an alternative energy source, such as coal, and save energy by developing the conservation means that can be developed and that can produce major savings in Jordan.

Energy conservation is important, but not an easy thing to achieve because convincing the public is a process that requires a major effort and a long time before people's minds and behavior are influenced. Energy saving is not something tangible, even though one spends less when one follows the rationalization instructions. This fact is what makes people more interested in quick and tangible profit. People are less interested in concealed profit. Consequently, the campaign launched by the Ministry of Energy urging people to rationalize must continue, must be patient, and must ceaselessly address the people at all levels.

The difficulties of the energy-saving campaign are summed up in the need for local technical resources capable of implementing and developing the rationalization processes. The proper manufacturing of consumption-reducing materials and the proper installation and use of such materials will help create greater demand for them.

Therefore and to cover all aspects of this issue, the infra-structures that help achieve the message must be completed. A guidance campaign to save energy moves in several directions, including the direction of persuading people to save energy by using insulation materials and the direction of introducing such materials and making them fit for proper home use because the improper use of such materials leads to adverse results and causes the materials to lose 60 percent of their effectiveness.

Ultimately, all these elements collectively must be used ideally because the complexity of the sides connected with energy saving makes the problem more difficult and causes the period for obtaining a direct yield to be longer than expected.

There have to be incentives because the benefits of energy savings are not tangible and not immediately visible. To compel the citizen to save energy, he must be given an adequate subsidy. In other countries, interest-free loans are given to finance the materials that have to be purchased. At the same time, contraveners must be penalized. The carrot-and-stick policy can convince people.

In the home sector which consumes more than 20 percent of the total energy, 70 percent of the total energy consumed by this sector, or nearly $84 million annually, can be saved through thermal insulation, through the use of well-studied lighting and through competitive designs compatible with Jordan's climatic conditions.

[Question] What are the means adopted to rationalize energy consumption in the industry and transport sectors?

[Engineer Abu Ra's] The industrial sector has been divided into two parts:

First, the major export industries (including phosphate, potash, cement, oil refinery, fertilizers, power plants, iron plants, lime, brick and pottery plant):

We have enlisted the help of Bechtel, an international consulting firm specialized in this field, to conduct a study on the rationalization means so as to reduce energy consumption in these industries. The firm completed its study nearly a month ago and submitted a comprehensive and beneficial report containing purposeful recommendations which, if implemented, will lead to saving nearly 5 million dinars annually.

Second, the small industries which are helped by one of the ministry's technical agencies which offers these industries free advice and recommendations on the spot.

Last year, this agency conducted a study on 17 factories and commercial establishments and concluded that 5-10 percent of the total energy consumption of these factories and establishments can be saved.

In the transport sector which uses nearly 50 percent of the total energy consumed, the Ministry of Energy has cooperated with a number of specialized French circles because France is a technologically advanced country and because it has experience in rationalization, considering that it is an energy importer, like us. Three studies have been carried out in this sector:

Forst, a study on the rationalization of energy consumption by the major transport organizations (the Public Transport Organization, the Syrian-Jordanian Land Transport Company, the Iraqi-Jordanian Transport Company, the oil refinery's fleet of trucks, the ground vehicles and machinery operating with 'Aliyah). The studies have concluded that 7-10 percent of the total energy consumption of these companies and vehicles can be saved if the necessary instructions are observed.

Second, an economic feasibility study on setting up an advanced technical center to train drivers, technicians, and all workers in the transport area on sound driving and maintenance. It is hoped that this center will be set up in cooperation with the Vocational Training Organization.

Third, a study covering the basic issues connected with the transport sector, such as traffic lights wind breakers and engine maintenance. This is in addition to another study on training the officials in charge of energy in the transport organizations. The ministry is conducting this study in cooperation with the organization and it is hoped that 5-10 percent of the energy consumption will be saved.

[Engineer Malik al-Kabariti] Making the citizen aware of the importance of rationalization is an extremely difficult process. But to help in this connection, I propose one of two approaches:

Either encouraging the citizen through incentives for those who rationalize and fines for those who don't or promulgating the right laws through cooperation between the ministry and the Engineers' Union, for example, so that energy saving may be made through the architect and the engineer by their observation of the thermal insulation standards.

For example, a large number of solar heaters have been checked and it has been found that they have been poorly used because of simple mistakes in installation.

Since its creation, the Royal Scientific Society has been conducting research on exploiting alternative energy sources. The Society's Solar Research Center has been founded on the basis of this principle to study the possibility of utilizing Jordan's alternative energy sources in cooperation with the Ministries of Energy and of Industry (and to establish the initial standards for solar collectors). The center tests the solar equipment available in the country and issues evaluation certificates so that the citizen may be able to purchase the best heater.

Use of Wind Energy

Some remote areas which will not receive electricity in the next 5-10 years have been singled out and we have begun to build pioneer plants to pump water and generate electricity in these areas. One of these plants is built in Jurf al-Darawish where we use wind energy to pump out water at the rate of 40-70 cubic meters daily.

We also have pumps operated by solar energy in the areas of al-'Umari and al-Jafar. The village of al-Qurayqirah, located 15 kilometers north of al-'Aqabah, is lighted with solar energy. This is the first experiment of its kind in the area and it proves the possibility of using alternative energy (wind, solar, and energy mixture) in areas which will not receive electricity in the next 5-10 years, not to mention the maintenance problems and the impossibility of supplying fuel to such areas.

[Question] What is your assessment of Jordan's energy position and is there an actual possibility of discovering economic energy sources?

[Engineer Abu 'Ajamiyah] Jordan is rich with energy resources, even though a large part of these resources is still buried underground and has not been utilized. This fact has its geographic and historical reasons.

Insofar as oil is concerned, exploration was carried out previously by foreign firms which did not find enough inducements to motivate them to continue exploration and prospecting at a time when the neighboring countries were offering inducements and incentives for prospecting in their territories, keeping in mind that the risk element in these countries was smaller by virtue of the fact that oil had been discovered there earlier.

Jordanian territories were not tempting to those firms because the risk element was high, considering that oil prospecting is a risk that depends on the land's terrain and geology. Thus, the foreign firms were not as earnest in their efforts to find oil in Jordan in the 1960's as they were in their efforts to obtain information on the nature of the Jordanian territories.

The Natural Resources Authority has been able, with its intrinsic efforts, to discover oil in the area of al-Azraq and in Hamzah field. The authority continues its work in this area to determine the store, to assess the discovery and to draw up the plans needed to exploit it.

The Natural Resources Authority is also engaged in oil exploration activities in a number of other areas, using treasury funds. Drilling operations are now underway in three areas:

First, on the Iraqi borders where the drilling started some time ago.

Second, in (Uzqaymat) al-Hasa area of Wadi Sarhan.

Third, in Northern Jordan and al-Mafraq.

The success achieved and the information obtained by the Natural Resources Authority have tempted a number of foreign and international firms with enough expertise and money for prospecting operations to apply to us to prospect for oil. The first agreement was concluded with AMCO, a U.S. firm. We hope that another agreement will be concluded to lighten the treasury's burden because prospecting operations are costly, not to mention the expertise we can gain from these firms.

Other Energy Sources

In the Natural Resources Authority, we have programs for other energy sources, such as shale, nuclear fuel and underground thermal energy.

Jordan has vast quantities of high-quality shale containing more than 10 percent oil. When it becomes possible to exploit shale economically, these quantities will be enough to meet Jordan's needs for hundreds of years to come, considering that shale rocks exist in vast quantities exceeding billions of tons. A part of the shale rocks, existing at surface levels, has been studied and assessed. The rest exists at varying depths and exceeds hundreds of billions of tons in volume. Efforts are currently underway to conduct preliminary studies on extracting oil and secondary products, such as sulfur and gas, from shale. We conducted feasibility studies that have produced positive indicators. We are now completing the other detailed studies.

Within this framework, an agreement has been concluded with a number of specialized FRG firms to extract oil from shale. Another agreement has been concluded with the PRC to make use of its experience in extracting oil from shale rock. We can assert that it is extremely easy to obtain hydrocarbons--oil--from shale. Moreover, the quantities of shale rock needed for the distillation process are smaller than they used to be.

The Natural Resources Authority and the Electricity Authority are cooperating to generate electric power from shale through direct incineration. New areas,

other than al-Lajjun, located conveniently for generating and exploiting electricity, have been selected and contacts are underway with several firms specialized in this field to find the best means for incinerating shale rock directly because incineration is less costly than distillation.

We must not forget that sulfur can be extracted from this mineral and that the Jordanian fertilizer industry is in strong need of sulfur.

An important study is being currently conducted on radioactive substances, such as uranium and thorium. A study has been completed to determine the percentage of uranium in phosphate. Thorium deposits has been discovered in sandy areas of the kingdom's southeastern deserts. But further studies are needed on this metal.

Agreement was also reached recently with a specialized agency of the United Nations to finance the search for basic sources of uranium in Jordan--sources other than phosphate which is classified as a secondary source because it contains a small percentage and which can be used in the fertilizer industry only. Meanwhile, it is hoped that original uranium sources in the form of deposits will be discovered in the southern parts of the kingdom and in Wadi "Arabah. This project will be launched in 1987 in cooperation with International Atomic Energy Agency and with its technical and financial support.

Underground Thermal Energy

Comprehensive studies have been conducted in Jordan to determine the possibilities of generating electricity from the underground thermal energy resources in Zarqa' Ma'in and al-Zarah. The characteristics of these two areas have been defined and work will begin in 2 months to drill a well with a depth of roughly 1,500 meters in al-Zarah area.

[Question] A call was launched recently for setting up a private or joint oil-prospecting company. What are the true motives behind this call?

[Engineer Abu 'Ajamiyah] This call is due to a number of reasons:

First, as a result of the geological survey and drilling operations carried out in recent years, Jordan has changed the view on the possibility of the presence of oil in its territories. The operations have produced a technically positive and hopeful impression of the possibilities of finding oil in our country, thus justifying the creation of a national company to take charge of this work.

Second, the Natural Resources Authority is a government agency tied down by bureaucratic redtape. Administratively, oil prospecting activities are in contrast with the integrated government pattern (control by the Accounting Bureau, procurement system, the civil service system, and so forth).

Therefore, in order that we may be able to move better and more freely, there has to be a company with the flexibility and the technical resources to move quickly to face any emergencies that encounter the prospecting operations and to deal with foreign firms that may be engaged in prospecting operations and with the local agencies operating in this area. For example, the authority has leased three drilling rigs by the hour to carry out oil prospecting operations. The authority pays the drills, regardless of whether they operate or not, and provides the equipment and instruments needed for drilling. We have discovered that the authority incurs heavy losses because of the procurement system. If the authority needs a simple sparepart, it cannot purchase it until it goes through the legal channels. Meanwhile, the rig remains idle while waiting for the sparepart. This saddles us with heavy losses that exceed the cost of the needed spareparts.

A company can have such spareparts delivered by air, if necessary, and then taken, to the site. In a past incident, we had to ask the highest state authority to intervene to deal with some urgent problems in Hamzah oilfield and to order the importation of a drilling part as quickly as possible.

Third, international firms have made bids to prospect for oil in Jordan. This requires the creation of a Jordanian national oil-prospecting company, not a government bureau, to deal with these firms well.

[Question] Are the reports circulated among people on the presence of three oil lakes in Jordan true?

[Engineer Abu 'Ajamiyah] Modern science has been able to determine the geology of any country in the world by studying the pictures and invaluable data provided by satellites. The authority uses satellite data, or the so-called remote-sensor data, to determine the nature of our country. But we have not reached in this sphere the level attained by Europe and the United States, the sources of this science. We have sent a number of local engineers and experts to train on this science abroad so that it may be put to advantageous use.

It is to be noted here that satellite pictures do not provide an immediate proof of the presence or absence of oil in any spot in the world. All they offer is data that can be exploited indirectly to direct the prospecting activities, whether for oil, underground water, or minerals. We cannot consider the data firm data because they amount to no more a preliminary study for any country planning to embark on the very costly prospecting operations. The pictures provide good and useful indicators and signals but do not determine the presence or absence of oil. Consequently, the circulated reports are inaccurate and lack a sound scientific logic.

Satellite pictures can provide a geological map for the surface of an area in which one wishes to operate. But one cannot proceed to drill in this area with certainty before conducting a seismological survey in preparation for the prospecting activities.

It should be noted that a part of the data gathered by satellite cannot be supplied to all because it is gathered by the advanced countries for military or research purposes. Satellites may be able to probe the earth to certain depths but they definitely cannot probe to the depths at which one looks for oil, namely depths of 3,000 meters and more.

A geological map is needed for Jordan's surface and satellites may help by providing good useful data with extraordinary speed so that we may determine where the hopeful work site is located, may reduce the search area and may lessen the possibilities of waste.

Scientifically, every geologist knows the geological structure of the layers in which oil can be found. But if the layers are deep, one needs engineering processes, such as seismological surveys using sound waves, to determine the geometrical form of these layers. If they are surface layers, they can be determined immediately and without much survey work. But if they are deep, like the layers shown by satellite pictures on the Jordanian-Iraqi borders, then the conventional geological surveys take a year or more to verify the data supplied by satellite pictures. Therefore, what satellites provide is beneficial in making the work of a researcher studying the nature of a certain area easier.

But the final scientific conclusion is that exploratory drilling operations are the decisive factor in the oil prospecting operations and in determining the possibilities of discovering oil.

[Question] Do you think that the current price structure for oil derivatives is fair and compatible with the present economic conditions? What do you have to say about maintaining the existing prices in light of the big drop in oil prices?

['Atallah al-Halabi] The pricing issue concerns every citizen. The price components include the price of crude oil, the refining costs, the commission paid to distributors, transportation costs, and the levied fees. Generally, the final price the consumer pays comprises the above-mentioned components.

The price structure sets a certain price for the product at the refinery. This price represents the cost of crude oil, refining costs, refinery profits, state-levied fees on oil derivatives, and municipal and village fees on some derivatives.

The government began subsidizing fuels in 1973 when oil prices began to rise. The government purchases crude oil from the Tapline Company and then sells it to the refinery which refines it and sells it to the citizen. As a result, the rise in crude oil prices has been accompanied by a rise in the price of sale to the consumer.

The prices of the intermediate elements involved between the crude oil price and the price to the consumer have remained unchanged. At one time, the customs fees were cancelled.

As for the fairness of prices, fair to whom? To the consumer, to the shipper, or to the distributor?

The various commission fees and the fees charged by the transportation means have remained unchanged. The number of fuel stations in all parts of Jordan (East Bank) is 287 stations, each with 7 pumps. This number was 54 stations when the refinery began operating in 1960. Therefore, the price structure must be reconsidered.

[Question] Will the price structure be reconsidered in both directions? In what direction will it be reconsidered?

['Atallah al-Halabi] The price must change because of the change in circumstances. The refinery appealed to the Ministry of Energy to study this issue. A committee was formed to study the price structure and met at the end of last July.

[Question] Will the price come down for the consumer?

[Al-Halabi] This is the question that concerns the citizen. The committee studying the price structure will meet shortly to submit its recommendations to the decisionmaking authorities. Reconsideration of the price structure must take into account the components forming the price so that a fundamental solution may be found to the problems facing the people.

[Question] Is the committee studying all the elements connected with pricing?

[Al-Halabi] The committee formed will study all the elements connected with pricing, including the price to the consumer who pays the cost of all the above-mentioned elements involved in pricing, namely the price of crude oil, refining costs, distribution commissions, fees, transportation costs, and so forth. The price the consumer pays comprises all these elements. Consequently, prices must be moved upward or downward, beginning with the sale price at the refinery which is affected by the crude oil price and ending with the price to the consumer.

[Engineer Abu Ra's] 'Atallah al-Halabi has correctly defined the price structure and the elements influencing the price, including crude oil price, refining cost, distribution commission, and so forth. But the decisive element in the price is the social group consuming the oil derivative. For example, the price of kerosene, a derivative consumed by people with limited income, is still cheap in comparison with other countries because of a social reason. There is also the economic sector that consumes a derivative. For example, the prices of heavy fuel have been recently reduced for the export industries to encourage and strengthen them.

As for the nature of the task of the committee about which al-Halabi has spoken, it will study the financial relationship between the oil refinery and the Ministry of Energy and the price structure pertaining to the government's relationship with the refinery. But the committee is not empowered to study the price to the consumer.

[Question] Will this committee's work affect the "citizen" consumer?

[Al-Halabi] The committee we are talking about will examine the first segment of costs, namely crude oil prices, refining costs, and government revenues. As for the consumer price, what is required is an ongoing comprehensive study of the price structure itself because the company complains of it and the distributor complains of it. The citizen's complaint affects the structure.

[Question] In light of the drop of prices from $28 to less than $10, will the price of oil derivatives remain as it is?

[Dr al-'Anani] In answering this question, we must consider the national dimension. When the government reduced electricity prices by nearly 1.2 dinars for the first 160 kilowatts, it was noticed that the citizen's consumption rose by about 25 percent in the wake of the reduction. This means that reducing fuel prices will inevitably lead to an increase in consumption and in imports, i.e., the savings made as a result of lower crude oil prices will be paid for increased imports.

Consequently, I urge the government to direct its attention to the principle of energy saving and not to subsidizing excessive consumption. For example, the transport sector consumes nearly 50 percent of the energy consumed in Jordan. Replacing ordinary tires by radial tires will save 5-7 percent of the sector's consumption. In this case, the subsidy should go to the radial tire, not fuels and to solar heaters which can save nearly 73 percent of the heavy fuel used for heating water annually.

Why were fuel prices to industry reduced before a study was conducted by industry on all means of energy saving? Industry can save 1 percent [as published] of its energy consumption costs if it adopts the steps necessary for such saving. Moreover, a properly designed and insulated home can save 70-80 percent the energy consumed by a traditional home.

Consequently, I stress that subsidy must be first given to energy saving and then to the price structure.

[Engineer Abu Ra's] The world oil prices have dropped and oil is currently sold in foreign markets at nearly $10. But in Jordan we have totally disregarded this price. The average price per barrel in the first half of this year was $16 because the oil purchase price was not stable. We started with $28 at the beginning of the year and then the price began to drop gradually.

In the Ministry of Energy and Mineral Resources, we made the following conclusions:

First, eliminate government subsidy for fuels which cost the government an enormous sum exceeding 40 million dinars annually.

Second, in the first half of this year, the government reduced heavy oil prices and electricity prices. Consequently, the savings made in reduced crude oil prices were absorbed by the subsidy, by the reduced electricity prices, by the reduced prices of energy for the export industry, and by the reduced prices of heavy fuel.

Consequently, the current price for the other oil derivatives is, in my opinion, fair and reflects the real cost, keeping in mind that the social group and the economic sector consuming a derivative are the main factor in determining the price.

[Question] The price per barrel assessed by the ministry in the first half of this year indicates savings of nearly $200 million or more, if the prices continue as they are. It is no secret that this is a large sum. What is the ministry's position?

[Engineer Abu Ra's] The mentioned figure is axaggerated. We are still in the first half of the year and the prices are still changing. Nobody knows in what direction these prices will go because they are affected by a number of political changeables and by numerous other factors. The government has studied this issue comprehensively and has taken good steps in this connection, reducing electricity prices by 20 percent, heavy fuel prices for the export industries by 50 percent and for hotels by 40 percent.

This shows that the government has taken positive steps in this regard. The government subsidized fuel prices in the past and we hope that these prices will not be subsidized this year. In the first half of the year, the government took good and proper steps. But we don't know what will develop in the second half.

[Malik al-Kabariti] The government subsidized fuels for more than 12 full years. Isn't it unfair to the government to be asked to reduce the prices during the short period of less than 6 months in which the prices have decreased, keeping in mind that the government took the consumer's side? If there has to be a subsidy, then I demand that this subsidy be given to the means that rationalize, not increase, energy consumption.

[Question] It is said that a large part of the subsidy is channelled to certain organizations. What is the ministry's response?

[Engineer Abu Ra's] The government subsidy is channelled mainly to the groups with a limited income and then to some export industries that help boost the economy. I can ascertain that no subsidy is channelled to certain organizations or establishments. The price at which 'Aliyah Royal Jordanian Airlines buys fuel is 80 fils per liter. As for the Public Transport Organization, it is treated like any ordinary customer.

[Dr al-'Anani] I urge all the authorities concerned to subsidize the public organizations, such as the Public Transport Organization, because they encourage

mass transport instead of individual transport, thus reducing energy consumption and saving energy. If this is not the case, then we hope it will be.

[Engineer Abu Ra's] The government has subsidized the organization indirectly. A team of experts from a specialized French consulting firm conducted a study on rationalized energy consumption in the organization at no charge to the organization. If the study is implemented, it will produce savings of 5-10 percent.

[Question] What are the ministry's efforts to preserve energy?

[Dr al-'Anani] The ministry spares no effort to save energy. The thermal insulation code has already been issued. We are currently cooperating with the Royal Scientific Society to prepare a guide for thermal insulation. The ministry is also conducting studies to develop local insulation materials. We have reduced the customs fees levied on some equipment and appliances that save in energy consumption. We are also studying the promulgation of legislation that makes application of the thermal insulation code mandatory.

[Malik al-Kabariti] A legislative and legal agency with the power to enforce observation of the proper standards and laws must be created and must involve all the organizations connected with these issues, such as the Ministry of Energy, the Engineers' Union, and the Royal Scientific Society. Without laws, we will not be able to implement and, consequently, rationalize energy consumption.

[Engineer Abu Ra's] The ministry works in cooperation with all the other circles to create the proper legislation for the rationalization of consumption. For example, the Ministry of Finance--Customs Department--levies higher fees on big cars consuming heavily while reducing them for the less-consuming small cars. The same applies to licensing. We are also working to create legislation that requires car suppliers to display the car's consumption data so that the citizen may be aware of the consumption of the car he wishes to buy and may buy cars with smaller consumption.

[Question] We have two social phenomena that increase energy consumption. In housing, the citizen is inclined to live in separate houses rather than in apartment buildings with minimum energy consumption. In transport, the citizen is inclined to use private transport means rather than mass transportation. These tendencies do not serve the cause of rationalized energy consumption. What is the ministry's role in pushing for laws or in bringing about a change of attitude in this regard?

[Engineer Abu Ra's] Legislation on such an issue is undesirable. Education and enlightenment are needed in numerous areas, and this is something that requires time and patience. The ministry has made long strides in this regard and it is carrying on with its approach which seeks to serve the citizen primarily.

[Question] What is the nature of the agreements concluded between Jordan, the Tapline, and Iraq on the supply of oil. What are the provisions of these agreements and are there special conditions?

[Engineer Abu Ra's] There are two agreements to supply oil to Jordan:

First, an agreement between Jordan and the Tapline Company in accordance with which the Jordanian Government pays all the wages and costs needed for the operation and maintenance of the Tapline pipeline which supplies us with crude oil from the Kingdom of Saudi Arabia at the world price.

Second, an agreement between Jordan and Iraq which is renewed annually by the Joint Jordanian-Iraqi Committee, headed on the Jordanian side by Prime Minister Zayd al-Rifa'i. This agreement determines the trade volume between the two countries. In accordance with the agreement, Iraq supplies us with crude oil for sums agreed upon annually in return for Jordan's supply of goods and services to Iraq. The 1986 agreement sets the trade volume between the two countries at $150 million. A protocol attached to the agreement calls for $50 million more. Thus, we will import nearly $150 million in crude oil and export the equivalent in goods.

[Question] Can you give us an idea on the Oil Refinery Company's profitability?

[Al-Halabi] The law guarantees the company a minimum profit of 7.5 percent annually. This percentage is guaranteed the company in accordance with the concession agreement. But the company's activities have surpassed the oil refining operations. It produces other products, such as mineral oils and cylinders, and reaps from these products profits that are not included in the previously mentioned percentage. The maximum ceiling of profits distributed to the shareholders is 16 percent, calculated according to a special equation. In 1985, the company distributed 10 percent profits to the shareholders upon the completion of its annual activities.

[Question] How do you view the continued oil exploration activities in light of the sharp fall in oil prices?

[Engineer Abu 'Ajamiyah] The fluctuation in world oil prices has not affected the Natural Resources Authority's exploration program or the authority's programs to supply alternative local energy sources. The authority is planning to intensify its efforts in this area in accordance with a complete and growing program. Our programs for this year are bigger than last year's programs. In 1987, they will be greater than this year's programs, whether in terms of fiscal spending, or in terms of the areas included.

It must be noted here that the fall in oil prices reduces the exploration cost because a drilling rig, for example, can now be leased in Jordan at lower rates than in the past.

The crude oil commodity is limited and not renewable. It is, like all the ground energy sources, a depletable source. Therefore, this commodity's price will rise in the future higher than they did in 1973 because the world's consumption is increasing and its store decreasing. We will automatically reach a phase when the conventional energy resources will become scarce and when oil prices will rise anew. Therefore, it is a major gain to us to intensify the exploration activities, in addition to exploring the alternative sources. Shale may become the main source of energy in numerous countries by the year 2000.

Consequently, we must continue the projects connected with energy so that we may be able in the future to supply our needs from the basic or alternative resources.

[Dr al-'Anani] Oil exploration in Jordan is necessary for training skilled cadres capable of dealing with crises and developments because it is extremely costly to import such cadres when they are needed. Therefore, the price of suspension of the exploration will be paid at the time when the required capabilities are needed.

[Question] Are there plans to look for energy sources other than those already mentioned?

[Engineer Abu 'Ajamiyah] Our plans in the Ministry of Energy and Mineral Resources take into their consideration the possibility that we may need to use nuclear energy to generate electricity.

Therefore, we must study these resources in our country and must look for local nuclear energy resources, such as uranium. This is one of the projects undertaken by the Natural Resources Authority. In 1987, the authority will launch the project in cooperation with the International Atomic Energy Agency even if uranium prices are not appropriate at the time. It is essential for our strategic security to supply uranium locally because we may not be able to secure it from foreign sources.

Moreover, we need major technical preparation and long time to prepare and train technicians capable of utilizing and living with this energy, considering that some advanced countries have encountered problems in this area.

Our plans in the Ministry of Energy are ambitious and there are cast energy resources which are not exploited because of certain circumstances and which we may find ourselves compelled to exploit in the future, regardless of the economic feasibility studies conducted on these resources according to the current criteria.

If we start with the shale project now, I may be able to exploit shale in 6 years. Can we make a judgment on oil prices after a number of years, even though the shale oil production cost is high in comparison with the currently prevalent prices? Of course not.

Work must be started to prepare the technical cadres capable of performing such a task. This is why oil exploration projects and projects to exploit shale are atop the Ministry of Energy's projects.

[Engineer Abu Ra's] A developing country, such as Jordan, cannot use nuclear power before the end of the century for several reasons, including:

First, nuclear power requires a major investment.

Second, the electricity loads needed in the developing countries are small and do not justify the use of nuclear power generators because such generators require the presence of networks with loads of more than 600 megawatt. At present, the Jordanian network cannot withstand more than 130 megawatts.

Third, the technological barrier: We need very advanced expertise which we lack at present.

[Dr al-'Anani] The alternative energy resources begin with energy conservation. Such conservation begins with the increased efficient use or the diversification of energy. For example, Saudi Arabia and West Germany are now working to produce hydrogen from solar energy at a cost of $50 million. Why don't we begin such projects?

Wind energy is currently used to pump water. But in Ra's Munif in Irbid, we can generate electric power at less than 9 percent the cost of current conventional process. Why don't we utilize the energy mixture (solar and wind energy)?

We are currently studying, in cooperation with the Royal Scientific Society, supplying electricity to a village from solar energy by day and wind energy by night.

[Engineer al-Kabariti] Alternative energy will not replace oil but will help in several aspects. Solar energy is used to operate solar heaters in many of our homes. Moreover, a number of factories are making use of this energy. One factory is using this energy to heat the water it needs for sterilization purposes.

Jordan uses solar energy more than any other country in the world. The Potash Company uses solar energy to produce potash by evaporation in an area of 60 square kilometers.

[Question] The conventional question is: Is there oil in Jordan? What is your assessment in this regard?

[Engineer Abu 'Ajamiyah] We have not yet reached the stage when we can answer this major question. It is not a matter of a secret formula or of a magic wand. We improve our knowledge of what exists underground by inasmuch effort as we exert. Compared to numerous other countries, our efforts in this area are still modest.

The exploratory oil drilling operations we have carried out are much smaller than needed, when compared with the operations carried out by other countries with conditions similar to ours. We still have a long road ahead of us.

To be able to answer the urgent question on this issue--the question of whether we have oil or not, of how large is its volume, and of whether it will meet our needs--we must carry out further studies, regardless of the cost, and must attract foreign firms to participate in this area so as to lighten the treasury's burden.

We can say that Jordan's local energy sources are sufficient and that we may turn from an energy importer to an energy exporter in the future.

[Question] Can we get an idea on the question of oil storage in saline layers, taking advantage of the current low prices?

[Engineer Abu 'Ajamiyah] This issue is very important and is viewed with favor by the developing countries, including Jordan. Underground storage might be the best approach in the oil trade, especially since some Arab countries, such as Jordan and Morocco, are prepared for such storage.

It is well-known that the United States is the country that has stored the largest quantities of oil in old depleted oilfields, taking advantage of the current prices. It is no secret that we have in Jordan the geological capabilities to store vast amounts of oil. I wish our merchants would cooperate with the public sector in this regard because it is beneficial to them and to the country.

The best oil storage sites are the salt layers existing in Jordan at a depth of more than 3 kilometers. Oil can be stored in these salt layers easily because it does not at all react with these salts that may exist underground in melted form as a result of heat.

We have submitted to the Potash Company a study demonstrating the presence of potash in such salts in al-Lisan area, near al-Karak. It is more profitable to utilize these salts than to utilize the Dead Sea potash salts.

Numerous countries have taken advantage of such storage for strategic and commercial reasons.

[Question] Can you give us an idea on the Public Service Bureau?

[Dr al-'Anani] It is well-known internationally that those who use an agency are the ones who have most dealings with it. Therefore, we want to reach the citizen to hear his opinions and complaints. We will also distribute clear and simplified technical studies to the citizens through this bureau.

This bureau's objectives are confined to conveying the outcome of studies to the citizens and to conveying the citizen's concerns and problems to the sector involved to help conserve energy.

AL-IQTISADI: Thanks to the gentlemen participating in this symposium.

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