The Strategic Significance of the Global Dependence on Oil – and the Possibility for Change

The Israeli government sees the R&D abilities and the innovative excellence in the State of Israel as a valuable resource that can accelerate and expand the development and implementation of technologies that could reduce the global dependence on oil in transportation.

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When the Yom Kippur War broke out in 1973, OPEC [Organization of the Petroleum Exporting Countries] decided to use the “oil weapon” by limiting their oil production and exports as a response to the U.S support to the State of Israel during the war. The fact that the lifestyle and the economy of the Western world was entirely dependent on a continuous supply of oil from OPEC came into the open. Most of the Western world countries import a huge amount of oil, and rapid changes in its price and disruptions in its supply constituted a direct and immediate threat to the most basic elements of life.

The characteristics of this dependency have changed significantly since the 1970s. Then, oil was used to produce a substantial part of electricity in the West: approximately 20% in the US and about 25% of the global electricity production. OPEC’s boycott caused a sharp rise in electricity prices and in the prices of gasoline for transportation.
The rise in oil prices and their volatility made it clear that oil is not an attractive raw material in electricity production. A rapid and effective R&D process, and modification of existing facilities within a decade, greatly reduced the use of oil in electricity production. Today, only 5% of the world’s electricity production depends on oil, mainly in less developed countries.

Instead, the developed countries is based use a mix of energy sources, including coal, natural gas, nuclear energy, hydro-electric energy, and other renewable and not renewable sources. The electricity supply practically does not depend on the geopolitical situation in the Middle East, where most oil reserves are concentrated.

**The Global Transportation Market – Creating New Possibilities**

The situation in the transportation sector is completely different. Today as before, this market is completely inflexible. Almost all of the 800 million cars moving on the roads today can drive only on fuels based on oil products. Every day, the developed and developing countries alike transfer much wealth to OPEC, which is responsible for more than 40% of global oil exports and owns more than 70% of global oil reserves.

Given that the only choice for car owners is whether to buy fuel or not to travel by car, the demand for oil is price insensitive. This and the concentration of oil in a small number of countries allows for cartelization of the market, and a continuous rise of the price above the cost.
In order to break this chokehold in the transportation market, there must be a continuous and consistent effort of research, development and deployment of alternative technologies. This effort has started in the 1970's, but unlike the electricity market it has been interrupted by a reduction in oil prices, which caused myopic investors and even more myopic governments to question the necessity of the technology, and stop the funding.

**The consequences of oil dependence**

One has to consider the long term effect of the global oil dependency in transportation. Developing countries, primarily China and India, are increasing their oil consumption every day at dramatic rates. This oil comes directly from the Persian Gulf, mainly Iran, and creates strategic alliances among these countries. Commercial ties and the dependence that is developing among these countries will make it difficult for the Western world in general, and the State of Israel in particular, to deal with dictatorial regimes.

The lack of oil substitutes and the fact that large quantities of oil are concentrated in the hands of a limited number of countries that affect the supply and the price of oil, lead to disproportionate political and economic power in their hands. The current difficulties with the international pressure on Iran are a good example.

Energy experts point out that in the coming decade oil production will reach its peak, and oil will become much more expensive as a result of its finite supply. Both the need to extract more difficult reserves as
well as the continuing rise in demand in developing countries will increase prices.

Rising oil prices have a variety of strategic effects. While the developed countries can afford rising prices, paying with lower growth, poor countries face possible economic collapse in the case of a major oil price surge.

Oil prices affect food prices, and the inability to cover food, energy, and transportation costs will cause severe humanitarian hardships in the low income countries. This could lead to severe global instability, and create a total dependence of low-income countries on oil exporting countries. This scenario is very problematic both in terms of income distribution around the world as well as in terms of the geopolitical ramifications for the Western world and Israel in particular.

**The Incentive to Develop Alternatives to Oil**

Another factor that encourages the global need to develop alternatives to oil is its high emission of pollutants and the fact that it is responsible for approximately 40% of global greenhouse gas emissions. Surprisingly, the environmental discourse is limited to coal use in electricity production and practically ignores the use of oil in transportation.

The reason for the extraordinary dependence on oil for transportation isn’t the inability to create competitive alternatives. Even today, there are viable solutions that offer a price competitive, cleaner, source of energy for transportation that doesn’t rely on oil from the Middle East.
These solutions include synthetic and biological fuels, from various feedstocks: from agricultural sources, to waste and Natural gas. In Brazil, for example, the transportation sector is based mainly on biofuels produced from local agricultural feedstock. Most vehicles in Brazil are "Flex Fuel", which can use both petroleum and ethanol. This allows Brazilian consumers to choose their fuel of choice at the pump, according to current prices. The Brazilian government was the only one that insisted on placing the infrastructure in the 1970's, which allowed it to be oil independent today.

Another exciting solution is the use of electricity in transportation. In recent years, there has been a significant surge of research and development in this field. Better batteries with higher energy density, innovative engine and propulsion systems, and new concepts and means of power management, are on their way to create a fundamental change in the world of transportation. The competitiveness of electricity from the grid and other means of energy for transportation are constantly improving.

To succeed in reducing its dependency on oil in the transportation sector, the world community must realize that this problem requires a coordinated and sustained effort for the next decade. It requires cooperation of all the links in the chain: car and engine manufacturers, fuel producers and distributors, energy suppliers, politicians and government regulators. It requires substantial financial investment as well as a tight international and commercial cooperation. These investments must not be affected by oil price fluctuations. The ability to provide certainty in this dynamic market
and to enable coordination in the private sector is the main added value the government can create.

**Israel as a catalyst in the Global Effort to Develop Oil Alternatives**

The State of Israel is a natural candidate to act as a catalyst in the international effort to develop oil alternatives. The absence of the oil industry and the public consensus that the global dependence on oil constitutes a strategic threat to the country enables decisive action directed towards creating a long-term global change. Israel is a world renowned leader of innovation. While the local industry in the field of oil substitutes is young, there is a great amount of knowledge in related fields of technology. This knowledge exists in the world class research that is conducted in the Israeli academia, in cooperation with the world's top scientists, focusing on long term solutions. It exists in a variety of young companies that are carrying out innovative development and implementation of solutions for the more immediate future.

Major industrial clusters in Israel can offer invaluable support for this emerging field. The chemical industry, the software and electronics industry, the bio-agricultural industry and the security industry, are all an important part of future solutions. These industrial clusters in Israel have a proven record, and can be instrumental in the scale-up process and in driving the change in the oil alternatives area.

The Israeli government sees the R&D and the innovation that exists in Israel as a valuable resource for a global influence. To accelerate
and expand the development and implementation of technologies that will decrease global dependence on oil in transportation, the government announced a national effort to encourage local research and development in this field. The program includes financial solutions for companies specializing in this area, assistance with approvals for experiments and pilot projects, and government support in creating international partnerships among researchers, entrepreneurs, companies and investors in this field. It is a ten year program that will combine public and private funding and will seek to significantly expand the R&D efforts in Israel.

The international cooperation is an important part of the government program. It will allow the novel technological solutions to be implemented around the world and to affect global consumer patterns. This change can create a different geopolitical environment and lead to a better, more equal world.

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