

EXECUTIVE SUMMARY

THE ELECTRICITY MARKET IN ISRAEL: A PROPOSAL FOR INCREASED EFFICIENCY BY CHANGING CONSUMER BEHAVIOR

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About the Koret-Milken Institute Fellows Program

The Koret-Milken Institute Fellows Program accelerates Israel's economic growth through innovative, market-based solutions for long-term economic, social, and environmental issues. The program focuses on connecting government, philanthropic, and business resources that are vital to national growth and development.

Directed by the Milken Institute Israel Center, the Koret-Milken Institute Fellows Program awards annual fellowships to outstanding graduates of Israeli and international institutes of higher education. Fellows serve yearlong internships at the center of the nation's decision-making—the Knesset, government ministries, and other Israeli agencies—and aid policymakers by researching and developing solutions for various economic and social challenges.

In addition, fellows craft their own policy studies aimed at identifying barriers to economic and employment growth in Israel. The fellows' studies, carried out under the guidance of an experienced academic and professional staff, support legislators and regulators who shape the economic reality in Israel. The program offers the ultimate educational exercise, combining real-life work experience with applied research five days a week.

Throughout the year, fellows receive intensive training in economic policy, government processes, and research methods. They acquire tools for writing memorandums, presentations, and policy papers, and they develop management, marketing, and communication skills. The fellows participate in a weekly workshop, where they meet senior economic and government professionals, business leaders, and top academics from Israel and abroad. They also participate in an accredited MBA course that awards three graduate-level academic credits that are transferable to other universities in Israel. The course, which focuses on financial and economic innovations, is taught at the Hebrew University of Jerusalem's School of Business Administration by Professor Glenn Yago, Director of the Milken Institute Israel Center and Director of Capital Studies at the Milken Institute in California.

Fellows Program alumni can be found in senior positions in the public and private sectors. Some serve as advisers to government ministries while others work at private-sector companies or go on to advanced studies at leading universities in Israel, the United States, and Great Britain. Within the program's framework, more than 80 research papers have been published, catalyzing reforms, reducing barriers, bringing about economic growth, and improving the quality of life for Israeli citizens.

The Koret-Milken Institute Fellows Program is nonpolitical and nonpartisan. It is funded by the Koret Foundation, the Milken Institute, and other leading philanthropic organizations and individuals in the United States and Israel.

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Since the establishment of the State of Israel policy makers have held the view that Israel Electric Corp. (IEC) should supply all electricity demand. This mandate led to a huge increase in IEC's electricity-production capabilities over the years, but the increased capacity has not been used efficiently. Due to the volatility of the market and inability to store electricity, just half of IEC's production capabilities were required to supply the total annual electricity needed in 2010.

This research aims to increase efficiency in the Israeli electricity market by introducing a program to influence demand known as a DSM plan, or demand-side management, especially directed toward the residential sector.

Electricity demand is volatile with the hottest days of summer and coldest days of winter experiencing demand that is as much as 72% above the yearly average. Because it's almost impossible to store electricity, the IEC is increasing its capacity to withstand peak demand.¹

This approach has created a situation in which costly power plants are being upkept just to supply the approximately 100 hours of peak demand per year. Addressing the demand issue would be a much cheaper alternative that also would provide additional benefits.

IEC offers economic incentives to encourage big consumers to shift their usage from peak to off-peak hours, reducing volatility and allowing the IEC to reduce its production capabilities. However, it does not direct these incentives to small, mainly residential, consumers, who account for 40% of annual consumption. A segmentation of demand by sectors shows residential demand is higher during peak hours relative to their weight in annual consumption. In 2008, the residential sector was responsible for 30.3% of total annual demand; 32% during summer peak hours; and 49% of during winter peak hours. (Ministry of Energy and Water Resources, 2010).

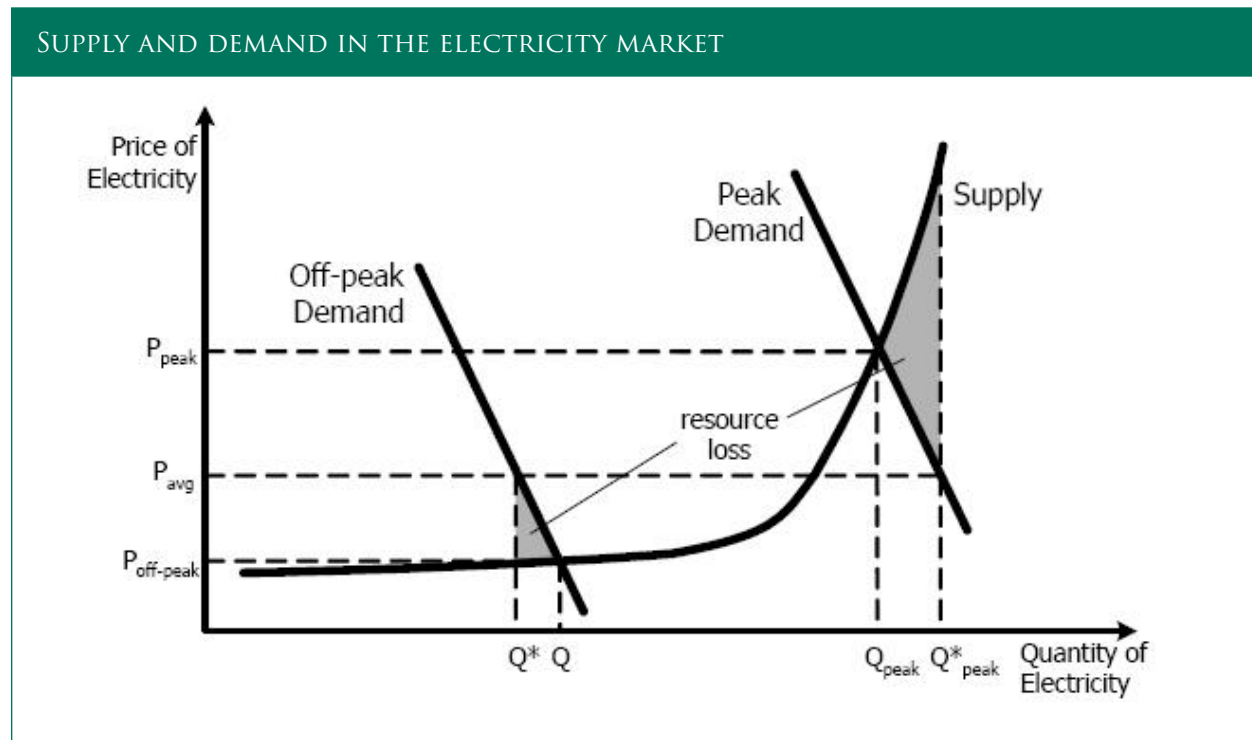
An international comparison shows the volatility of electricity demand in Israel (calculated by the ratio between peak demand and average demand) is much higher than the volatility reported for all OECD countries (Heinen et al., 2011).² This implies that it is possible to decrease the volatility of electricity consumption and thereby reduce the number of power plants needed.

In addition to wasted resources, this is causing inefficiencies throughout the production process. Currently, most residential and small customers pay a constant price for electricity regardless of the time it is consumed. This is problematic because the cost of producing electricity changes significantly according to the load on the system. In 2010, the cost of production during peak hours was as much as 10 times higher than the cost during off-peak hours. Constant pricing, based on the average cost of production rather than on marginal cost, causes inefficient consumption that leads to a loss of

¹ There are a few technologies that enable small and expensive ways to store electricity. More on this topic can be found in the full research.

² Israel is not included in this report. The comparison was based on self-calculation

resource as shown in the graph below.



Source: U.S. Department of Energy, 2006.

Both consumers and producers in this market suffer from the resource loss as it lowers the profits of the producers and leads to higher prices for consumers. Because electricity is used for every product and service, the high price also influences the cost of living, which has become a major social and political issue in Israel in recent years.

The first step in our proposed reform would be to change the cost of electricity paid by the residential sector from constant tariff to a one based on time of use (TOU). This would encourage consumers to shift demand from peak to off-peak hours, creating a more efficient market. The change of tariff also would raise awareness to the external benefits of shifting demand, leading to a decrease in electricity consumption (International Energy Agency, 2011).

Wrong perceptions and planning mistakes have led to what is being called an “electricity drought” in Israel and continue to influence the way the crisis is being handled. One misperception is that production of electricity and the construction of new power plants is beneficial to economic growth and creates jobs. Another misperception is that expenditure on energy is rigid and therefore the savings that could be achieved by differential pricing are small. International experience, especially from the last decade, however, suggests that these perceptions are inaccurate.

Countries around the world have demonstrated that DSM is a useful tool to cope with crises in

the electricity market. Especially impressive is the residential sector which has shown higher than expected flexibility, achieving significant savings in peak-hour demand in response to economic incentives and as a consequence of higher awareness. In California, for example, DSM programs during the electricity crisis in the summer of 2001 led to a 10.4% decrease in monthly peak demand. During Brazil's electricity crisis, residential customers in the country's south decreased their demand, even though they weren't part of the incentives program (International Energy Agency, 2005).

This research proves the inaccuracy of the assumption that residential consumers can't shift their demand. More than half of the California residential consumers who participated in a research study were shown to already be price responsive in the short term (Reiss and White, 2001). Therefore, a DSM plan targeted to such a population would be more efficient than a mandatory program to all consumers.

Other research indicates that consumers who joined these types of programs are more flexible than those who were forced to participate (Langmore and Dufty, 2004).

Concern that a change from a constant pricing to TOU pricing will lead to higher electricity bills for consumers is the main obstacle to implementing a DSM program (Lutzenhiser et al., 2002). In addition, there is a political concern that low income families and the elderly would suffer from a tariff change (Langmore and Dufty, 2004).

To address these concerns, our suggested DSM program would be voluntary and guarantee lower electricity bills for all consumers who adopt the plan. The TOU tariff would include just two cost levels: Peak-hour prices would be the same as the regular tariff, while off-peak prices would be 10% lower.

Direct benefits from this program would be seen in savings from lower production costs, while the shift of demand from peak to off-peak hours would allow the IEC to save billions of shekels in investments by delaying the construction of new power plants. Residential consumers who join the program would enjoy a lower price for electricity for off-peak usage, while those who don't would benefit indirectly from the lower cost of electricity resulting from a more efficient market.

Over a 20-year period, the capitalized saving of resources from this program would range between NIS 8.68 billion to NIS 52.43 billion. That represents 1.07% to 6.45% of 2010 GDP. By comparison, Israeli government expenditure on defense that year accounted for 6.2% of GDP.

The indirect benefits of the program would be just as important. Electricity cost savings would lead to a lower production costs throughout the economy, which would contribute to a lower cost of living and improve competitiveness with other countries. Moreover, consumers who join the DSM program would create demand for products and technologies that would enable them to control and plan their electricity consumption. This demand (currently nonexistent) could lead to the creation of new jobs and an increase in growth and export. The program also would have the environmental benefit of decreasing environmental pollution and lowering CO₂ emissions.

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