

# RAND study: Curbing demand for electricity should be Israel's prime energy priority

*Think tank to provide gov't with tools to conduct long-range planning*

• By EHUD ZION WALDOKS

Energy efficiency, more natural gas and an adaptive planning strategy – those three pillars give Israel the best chance of meeting demand for electricity over the next 20 years, according to a new RAND Corporation study released Sunday afternoon.

The highly regarded think tank conducted an independent assessment using state-of-the-art policy analysis tools to provide guidelines for setting energy policy. This was the first such study in the world to use these techniques to assess the energy market.

The California-based research institute was commissioned by the Younes and Soraya Nazarian Family Foundation to undertake the two-year study as a way to help out Israel, Dr. Steven Popper, RAND senior economist and lead researcher on the study, told *The Jerusalem Post*.

Popper and fellow researcher Claude Berrebi are visiting Israel for the report's release.

The study, "Natural Gas and Israel's Energy Future: Near-Term Decisions from a Strategic Perspective," is unique in several ways, Popper said. It is the first RAND study in its 61-year history written for Israel's benefit. Other studies have focused on issues in which Israel plays a part, but were not focused on Israel policy planning.

The study also signifies the beginning of RAND's analysis of Israeli policy, which the not-for-profit company is keenly interested in pursuing.

They are strongly considering putting together a RAND research program for Israel and a RAND Israel Public Policy Fund to go with it, Popper said. The fund would take half its money from the government, in order to give the government a stake in the studies, while the other half would come from donations.

While the study did offer some clear-cut conclusions and policy directions, its value was really in the tools it developed to analyze the energy market and conduct long-term planning, said Popper. RAND is willing to pass on the techniques to Israeli decision-makers and a follow-up project would train them in their use.

The study used a process called Robust Decision Making (RDM) to provide guidelines for future planning, given the uncertainties inherent in the energy market. RDM was developed by Popper and his colleagues at RAND over the last 12 to 15 years and has proven applicable as a policy-analysis tool across a variety of fields, he said.

While traditional planning tries to predict one likely future and chart the best possible path based on that prediction, RDM focuses on generating rules and signposts for an adaptive strategy that acknowledges the fact that there are many unknown-

ables in the planning process.

In this case, Popper, Berrebi and their colleagues used computer models to generate 1,400 potential scenarios. They started with simple scenarios and gradually made them more complex, Popper said. Running particular sets of conditions through the simulations determined how robust the strategy was.

The study itself focused on the proportion of natural gas Israel should use to generate electricity. They crafted their scenarios by taking into account potential variables like system costs, greenhouse gas emissions, and land use and energy security.

Because they were not privy to internal government debates and prioritizing, they weighted each of the four variables equally, even though it is possible that the government would prioritize energy security and system costs over emissions and land use or some other way, Popper qualified.

Israel's energy situation is characterized by two main factors: the country is an energy island and demand is constantly rising. Israel is not connected to any of its neighbors' grids for obvious diplomatic reasons.

Likewise, an increasing standard of living and growing population has caused demand for energy to climb every year. That has led to a situation in which demand has nearly reached capacity, making brownouts or blackouts during peak periods, like the summer months, a distinct possibility.

While the study did not attempt to suggest specific ratios of natural gas to coal to renewables (the three main components of Israel's future energy basket), the analysis did come up with certain conclusions which provided the most "robust" decisions across all scenarios.

In general, the researchers concluded that natural gas could play a significant role in Israel's energy basket. Currently, coal provides the bulk of electricity, and natural gas the rest. Future ratios envision coal providing 50%, natural gas 40% and renewables 10% by 2020.

The study's main conclusion focused on the need to reduce demand. If demand continues to increase every year as it has for the past couple of decades, no matter what Israel tries to do, it will run into serious costs in the future, be they financial or environmental. Therefore, reducing demand is paramount for Israel's energy policy.

The researchers suggested starting with simple solutions, like insulation in buildings, energy-efficient appliances and behavioral changes. Eventually, the country could introduce a "smart grid" for electricity management which would enable time-of-day pricing, charging more for usage during peak times than off-peak hours.

They also suggested that Israel



DR. STEVEN Popper (left) and Dr. Claude Berrebi of the RAND Corporation are visiting here to mark the release of the think tank's first Israel-focused study, in this case on energy policy. (RAND Corp.)

might have to increase electricity prices by as much as a third to encourage conservation.

Second, Israel should divide its planning into two stages. A traditional planning phase, which focuses on when to build power plants, should be used until 2015. However, from 2015 to 2030 an adaptive process should be utilized, the study argued.

An adaptive process does not lay out a timeline of power plant construction stretching into the future. Instead, it focuses on evaluating new information based on the rules generated by the planning process and then making a decision whether to build.

In the meantime, planning for new construction could take place to enable a quicker inception to completion phase, the study suggested.

Should Israel rely solely on domestic deep water (DDW) natural gas sources, or simultaneously build a liquid natural gas (LNG) terminal? Large fields of natural gas were discovered deep under the ocean off the Haifa coast earlier this year by a consortium led by Yitzhak Tshuva's Delek company.

The third major conclusion of the study was to use domestic sources first, but plan for an LNG terminal at the same time. There are too many uncertainties at this point to definitely say whether Israel should build an LNG terminal, which cost about \$1b., so the decision should be revisited in a few years and the policy options run through the RDM process then.

The researchers also concluded that Israel should continue to import natural gas from Egypt to diversify sources, but not increase imports beyond the current capacity of 7 billion cubic meters (bcm) per year so as not to rely too heavily on any one source.

Israel should also invest in solar thermal energy in order to diversify supply, they wrote. They also advocated regulating the price of domestic gas based on the cost of importing gas, and laying in a stock of diesel fuel in the event of supply disruptions.

Stocking up on natural gas is too expensive because storage of natural gas is very expensive,

they wrote.

Finally, they suggested Israel "should continue building an inland high-pressure natural gas distribution pipeline to parallel the existing offshore line."

In addition to teaching the RDM techniques, the RAND researchers raised the idea of a follow-up study in conjunction with the Israeli government which would include up-to-the-minute data and the prioritization of the government vis a vis the four issues: energy security, system costs, emissions and land use.

This study, though conducted independently, received input by an informal government steering committee comprised of representatives of the National Infrastructures and Finance Ministries, the Prime Minister's Office and other government agencies.

Popper said that they were warmly received by all the government agencies that were keen on the long-term policy planning capabilities.

He added the company's next likely study would focus on the Israel Police.

The National Infrastructures Ministry called the RAND report fundamentally sound, and said it puts good tools into decision makers' hands. They thanked the researchers and those who made the study possible and said they hoped for a follow-up project.

The Environmental Protection Ministry welcomed the report and said that in light of its findings the decision to build another coal-fired power plant in Ashkelon should be revisited.

Originally focusing on defense research when founded in 1948, the RAND Corporation now analyzes policy in a number of fields including: children and families, education and the arts, energy and environment, health and health care, infrastructure and transportation, international affairs, law and business, national security, population and aging, public safety, science and technology, and terrorism and homeland security.

All of its studies are made available to the public and it operates its own graduate school in public policy analysis.