Study Funded by Nazarian Family Foundation Analyzes Risks, Benefits to Israel of Increasing Reliance on Natural Gas

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Israel can make natural gas usage a bigger part of its energy portfolio without jeopardizing its security, but even more importantly, the nation needs to make conservation measures a priority in its future energy plans, according to a RAND Corporation study issued today.

"The single most important factor to having a successful energy policy is for Israel to slow the growth in demand for electricity and use its energy more efficiently," said Steven Popper, lead author of the study and a senior economist with U.S.-based RAND, a nonprofit, nonpartisan research organization with more than 60 years of experience tackling tough policy problems around the globe.

"Even in those scenarios where conditions favored using natural gas for up to 50 percent of Israel's electricity-generating fuel needs, the country also needs to maintain a diversified mix of fuels – including solar and other non-fossil fuel means – to make it less vulnerable to supply disruptions or abrupt shifts in costs."

Israel is running out of capacity to meet its electricity demands. Its power grid is not connected to that of any other nation, making it an electricity "island." Partly for reasons of supply security, Israel has relied heavily on imported coal supplies to fuel its electric-power-generating plants. Now, given how long it takes to build new electric-power plants, Israel faces the need to make expensive, critical decisions on investing in new baseload-generating capacity in the near future.

The study represents RAND's first major project in Israel. It was funded through a philanthropic grant from the Y & S Nazarian Family Foundation (www.yandsnazarianfamilyfoundation.org), for the benefit of the State of Israel. RAND has also created the Israel Public Policy Fund, which will be used to conduct further public policy research in Israel in the areas of safety, development, and education among others. The Israeli government would provide funding for these projects to be matched by philanthropic donations made to the Fund.

The goal of the energy project was to build analytic tools that Israel's planners can use to enhance supply security while still meeting goals for cost, environmental protection, and land use – especially when the economic, technological, political, and energy future is so uncertain.

RAND researchers determined that Israel may primarily invest in combined-cycle natural-gas power plants to generate electricity. These plants can draw on gas from an existing foreign pipeline and new, offshore fields without running undue risks if proper precautions are taken. The nation should also continue with plans to build an inland high-pressure natural-gas distribution pipeline to parallel the existing offshore pipeline.

The study recommends that Israel should prepare for, but not yet build, a liquid natural gas (LNG) terminal. Israel also needs to maintain a wide mix of fuels to defray supply and cost risks. Despite higher costs, Israel should invest in some solar-thermal electrical power plants or use solar units to preheat steam for fossil fuel-fired power plants. It should also regulate the wholesale and retail prices of domestically produced natural gas based on the cost of imported gas and costs of developing offshore fields.

Because storing natural gas is so expensive, Israel should guard against disruptions in supplies by storing sufficient quantities of diesel, not natural gas, to smooth future supply disruptions.

More generally, for planning the expansion of generating capacity, Israel should adopt a two-stage process that separates preliminary planning from the decision to actually build a facility – be it natural gas, LNG, coal-fired, or another type. The decision to build should depend on internal and external "triggers" that analysis can identify. This would enable Israel to take better advantage of updated information and so be better positioned to take advantage of

opportunities and avoid surprise.

"Everyone understands the value of being adaptive to new information when doing long-range planning," said Claude Berrebi, one of the co-authors of the study and a RAND economist. "The question is, how best to do that? We think we show the way. Our findings will be useful for Israel, but may also prompt other nations to take a serious look at their own energy strategy. Planners and government officials can develop strategies and courses of action using this robust decision method, even when several variables are not only unknown, but unknowable."

The study brings to Israel new methods to help make decisions when there is great uncertainty, applied in this case to the central question of how large a role natural gas should play in Israel's energy balance. Instead of relying on the typical planning method of trying to develop an optimal plan around a best forecast or a small number of "most likely" scenarios, RAND sought to help Israel's planners discover strategies that are robust – in other words, strategies that perform well across a large range of plausible futures.

To demonstrate the use of their framework, RAND researchers generated tens of thousands of future scenarios to the year 2030. They even simulated a one-year shut-off of all natural gas supplies through foreign pipeline sources in 2025 to see how different strategies performed. The study considered what combination of fuels might work best for Israel, how its natural gas infrastructure could be expanded and what actions the state could take to guard against such future uncertainties as changes in prices in the global energy market or supply disruptions.

"Governments face hard choices, often with insufficient information," Berrebi said. "RAND doesn't make these choices; national leaders do. What we have done is to help them understand the implications of these choices based on different assumptions."

Berrebi used the RAND study as an illustration. "In our work, we assumed that there was equal value to energy security, cost, reducing emissions, and minimizing land impact. If you use our tools and set different weights among these goals you could get different results. The point is that we can now show precisely what the implications are of those policy choices."

The study, "Natural Gas and Israel's Energy Future: Near-term Decisions from a Strategic Perspective," can be found at www.rand.org. A technical report, providing more detail about the study, is also available.

The research was conducted under the auspices of the Environment, Energy, and Economic Development program within the RAND Infrastructure, Safety and Environment division. The mission of ISE is to improve the development, operation, use, and protection of society's essential physical assets and natural resources and to enhance the related social assets of safety and security of individuals in transit and in their workplaces and communities.

Other authors of the study include James Griffin, of the University of Hawaii; and Thomas Light, Endy Min, and Keith Crane, all of RAND.

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