Energy Resiliency
A New Way for Israel to Tap into the Future
—By Steven W. Popper

Pooled Assets: Three Ways for Coping in Hard Times
—By Susann Rohwedder, Jinkook Lee, and Craig Evan Pollack

Deep-Seated Entanglements: The Web of Iranian Leadership Can Be Negotiated, Not Unraveled
—By David E. Thaler and Alireza Nader
“Pooled Assets" (see story on page 10) points to credit unions as one potential remedy for the economic crisis: "In the current climate of bank failure, cooperative banking provides a unique opportunity for credit union members to police the soundness of their own banking practices.”

• Would you move your money from a commercial bank to a credit union? Why or why not?
• If you already belong to a credit union, would you recommend that others make the switch?
Fresh Approaches to Familiar Problems

One nation needs new energy supplies but does not know which ones warrant the biggest investments. Another nation is a riddle wrapped in a mystery inside an enigma behind a veil. A third nation juggles a banking crisis, a housing crisis, and a health care crisis all at once. These problems are familiar, but the approaches discussed here for addressing them are anything but.

In our cover story about managing Israel's electricity demand, the proposed diversification of energy strategies toward a greater reliance on efficiency, natural gas, and renewable energy is nothing unusual. But what sets this story apart is the rejection of any pretense of predicting the future. Instead, as explained by Steven Popper, nations and regions can plot resilient energy strategies by planning for that which cannot be planned—that is, by scanning the range of potential future outcomes associated with different assumptions about key variables that are intrinsically unpredictable. Public officials can then spot the strategies that offer the highest overall probabilities of success.

In our story about the Iranian leadership, David Thaler and Alireza Nader look behind the veil of public pronouncements emanating from Tehran and find that factional competition and informal political maneuvering trump the country's formal policymaking processes, as seen in its Middle East policy, its nuclear program, and its very constitutional framework. Only by becoming familiar with Iran's web of influential personalities, networks, and institutions operating behind the scenes can Western negotiators hope to initiate a meaningful dialogue with those on stage.

Our story about the economic recession in the United States assesses one important response to the crisis thus far: family support. In addition, the story proposes two responses that have yet to gain much traction: switching to credit unions (as alternatives to commercial banks) and combining the forces of housing and health advisers to counsel homeowners who face not just financial but also physical and mental devastation. In all three cases, Susann Rohwedder, Jinkook Lee, and Craig Pollack remind us of the value of pooling our assets in hard times.

—John Godges
Upgrading the Refueling Fleet Would Cost Less Than Not Doing So

Spending money to modernize the U.S. Air Force’s KC-10 air refueling fleet to meet upcoming global air traffic mandates would be more cost-effective than not spending the money, according to a RAND study.

The fleet of 59 KC-10 aircraft, which refuel other jets in mid-flight, has been operating for 25 years without significant modernization. International air traffic management mandates regulating the minimum communication, navigation, and surveillance capabilities for flying in certain regions and altitudes will take effect in 2015, with additional mandates scheduled for 2018 and 2020. To ensure that the KC-10 operates smoothly with civil air traffic control systems worldwide, the aircraft’s avionics systems need to be upgraded.

The study examined the cost of upgrading those systems (across a range of modernization options) relative to the costs of leaving the KC-10 noncompliant with the new mandates until the aircraft is phased out in 2045. Noncompliance would prevent the aircraft from flying the most fuel-efficient altitudes and routes and would cause delays on the ground and in the air—all of which involve costs. Most of the costs incurred from noncompliance would come from increased fuel expenditures to operate the KC-10. The remainder would come primarily from added costs for military personnel and for logistics support for contractors.

As the figure shows, the cost of upgrading a single aircraft, including a 50-percent cost increase to account for uncertainties, would just exceed $10 million. But this amount would still be less than the cost of noncompliance in all assumed circumstances. For example, if fuel costs are $3 per gallon and nonfuel costs grow at 2.5 percent, it would cost the Air Force $32 million extra to operate a single noncompliant KC-10 over its lifespan until 2045. With 59 of these aircraft, the cost to upgrade the entire fleet would approach $2 billion.

“Even if fuel costs only a dollar a gallon and there is no nonfuel cost growth, it still makes sense to pay to upgrade the avionics on the KC-10s,” said Anthony Rosello, a RAND senior engineer and leader of the study. “In fact, the savings from avoiding altitude restrictions alone—not counting the savings from avoiding delays—are still greater than the upgrade cost.”

The study also examined the impact of avionics modernization on the effectiveness of the KC-10 fleet in wartime operations. If modernization does not occur, the study concluded, wartime effectiveness would be degraded. Moreover, successfully executing wartime missions under the mandates without modernization would require more tankers, and the cost of the additional tankers would be comparable to the cost of modernization. KC-10 modernization would confer other benefits as well, including increased access to airports and continued access to established air refueling routes.

Reducing Air Pollution Can Also Reduce Hospital Spending

Not meeting federal air pollution standards in California raises the costs of health care substantially, and public health insurers bear more than two-thirds of the costs. Conversely, cleaner air would reduce the costs, according to a RAND study.

More residents of California live in areas that do not meet federal air quality standards than do residents of any other U.S. state. Moreover, California gathers detailed information on hospital spending according to the type of insurer that pays for care. Taking advantage of these conditions, RAND researchers examined how failing to meet federal and state standards for two types of pollutants—fine particulate matter and ozone—affects private and public insurer spending on two types of health outcomes: hospital admissions for respiratory and cardiovascular ailments and emergency room visits for asthma.

The study found that failing to meet federal air quality standards in California for the two pollutants from 2005 to 2007 led to nearly 30,000 hospital admissions and emergency room visits throughout the state. Nearly three-quarters of these events were attributable to high ambient levels of fine particulate matter. The rest were attributable to high ozone levels. The adverse health events were concentrated in the San Joaquin Valley and South Coast Air Basins.

The figure shows that the three-year spending on the hospital admissions and emergency room visits amounted to $193 million. “To put this number in perspective, the annual costs would be sufficient to pay for pediatric influenza vaccinations for 85 percent of California’s under-15 population,” said John Romley, a RAND economist and the study’s lead author.

As for who pays the costs of dirty air, public insurers spent the most. Overall, Medicare and Medicaid (called Medi-Cal in California) paid about two-thirds of the estimated costs ($132 million). Medicare spent about $104 million, and Medi-Cal spent about $28 million. Private insurers paid $56 million, suggesting that private employers and private insurers also have major financial stakes in reducing air pollution.

“Substantial as these costs are, it is important to remember that they are conservative estimates,” noted Romley. “The study looks at only two types of pollutants and two health endpoints, and it does not include other well-known adverse health effects associated with particulate matter and ozone, such as chronic and acute bronchitis, heart attacks, lost work and school days, restricted activity, and premature mortality.”

No-Fault Insurance: A Classic Example of Unintended Consequences

Although no-fault insurance was intended to lower the costs of compensating people involved in car accidents by taking most of these cases out of the court system, no-fault insurance has actually increased those costs because of rising medical claims, according to a RAND study.

In the 1970s, many policymakers and analysts believed that no-fault automobile insurance—in which an automobile accident victim seeks recovery from his or her own insurer instead of from another driver—would be a superior recourse that would displace conventional, tort-based automobile insurance policies and reduce insurance costs. Between 1970 and 1977, 27 states enacted no-fault laws, and no-fault had the support of some insurers, consumer groups, and academics.

Drawing on 20 years of data that allow comparisons of different insurance regimes across states, RAND researchers have compiled the most comprehensive retrospective of the U.S. experience with no-fault insurance to date. The study finds that the main reason no-fault insurance declined in popularity is that it has not reduced premium costs. The figure shows that premiums have been consistently higher in no-fault states since 1986, and the gap has widened over time. By 2004, premiums under no-fault were 50 percent higher than those under the tort system.

“While no-fault insurance was intended to offer less-expensive resolution of injury-related claims, it hasn’t,” said James Anderson, the study’s lead author and a RAND behavioral scientist. “No-fault insurance is a classic example of unintended consequences.”

The cost increases have been driven primarily by high medical costs. The costs of medical treatment covered by auto insurance in no-fault states have become much higher than in the other states because claimants in no-fault states have grown more likely than claimants elsewhere both to claim the use of more types of medical providers, from emergency rooms to chiropractors, and to visit each type of provider more often. There is also evidence of greater medical cost inflation in no-fault states.

Despite waning support for no-fault insurance, there are few signs it will be repealed in most states where it still exists. In some states, there is consumer support for a modified form of no-fault—“choice”—that lets consumers forgo their right to sue other drivers in exchange for lower premiums.

“Further research is needed to determine exactly why medical costs grew so dramatically under no-fault insurance and to evaluate reforms introduced in no-fault states to control the growth of medical costs,” Anderson concluded.

Lessons learned from the collapse of silica litigation suggest ways to make it easier to uncover abusive medical diagnostic practices in mass personal-injury litigation in the future, according to a RAND study.

By 2001, growing numbers of workers were claiming to have suffered lung damage from inhaling silica dust on the job—so many, in fact, that silica began to be feared as the next asbestos. In 2003, more than 10,000 claims were aggregated in the Southern District of Texas before U.S. District Court Judge Janis Graham Jack. The proceedings uncovered gross abuses in the diagnosis of injuries, and Judge Jack’s scathing opinion, published in 2005, was an important contributor to the collapse of the litigation.

A number of defense actions were key to the litigation’s collapse, notably the defendants’ success in aggregating cases from Texas and Mississippi state courts into a federal court in front of a single judge. Doing so enabled the judge to see that a small number of doctors accounted for nearly all the diagnoses. The creation of a large database of silica and asbestos claims ultimately revealed that large numbers of silica plaintiffs had also previously filed asbestos claims.

Active case management by Judge Jack played another key role. By allowing the diagnosing doctors to be deposed in her presence, she was able to uncover many irregularities in diagnostic practices.

Finally, some unique characteristics of the case itself proved to be important. These included the fact that litigation already existed in the closely related area of asbestos. But unlike with asbestos, there was no signature, terminal, silica-related disease, the absence of which mitigated the defendants’ concerns about cases coming to trial and about threats by plaintiffs’ attorneys to target defendants who did not settle.

“Silica litigation collapsed because of a combination of actions by defense attorneys, decisions by the judge, and some special features of the litigation itself,” said Lloyd Dixon, a RAND senior economist and a study author.

Beyond showing that the tort system can discover abusive medical diagnostic practices, the study also identified changes that could increase the likelihood that such practices could be uncovered in future mass personal-injury litigation (see the table).

“The pros and cons of the suggested changes warrant further examination and should be evaluated, given experiences in other large-scale personal-injury litigation,” Dixon said. “In particular, it is important to consider what impact such changes could have on the ability of truly injured parties to pursue remedies in the civil justice system.”


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<th>Changes That Could Help Uncover Abuses in Mass Personal-Injury Litigation</th>
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<td><strong>Broad Improvements Targeted</strong></td>
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<td>Improve judicial practices and procedures.</td>
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<td>Consider more-serious sanctions against the plaintiffs’ bar.</td>
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Marshaling the Evidence
How Science Can Help Fight the War on Poverty

THE IMAGES OF DEVASTATION witnessed by the world in the aftermath of the catastrophic magnitude 7.0 earthquake in Haiti on January 12, 2010, put the problem of poverty in the developing world front and center once again. People and nations have since responded by contributing more than $2 billion to the Haitian relief effort.

But how do we know whether such aid is making a difference? “When it comes to dealing with world poverty, some feel that providing aid is the answer, while others feel that such aid is at best irrelevant and at worst a major contributor to dependency and corruption. Unfortunately, the answer is almost impossible to know,” said Esther Duflo, the Abdul Latif Jameel Professor of Poverty Alleviation and Development Economics at the Massachusetts Institute of Technology and a founder and director of the Jameel Poverty Action Lab.

In a talk at RAND in March as part of the RAND Corporation’s Distinguished Speaker Series, Duflo used the example of Africa, which has received billions of dollars in aid over the past 50 years but does not seem to be getting any richer, judging by the gross domestic product per capita of the people. “While such data can support those who feel aid is bad,” said Duflo, “we really don’t know whether Africa would have been far worse off without the aid or perhaps better off without it. There is no counterfactual here—no ‘what if’—because there is only one Africa.”

In the absence of convincing evidence one way or the other about the value of antipoverty programs at the global level, Duflo argued on behalf of scientific experiments to gauge the value of antipoverty programs at the local level. She focused on three types of relief efforts—immunizing children, subsidizing the purchase of bed nets to control malaria, and ensuring that children attend school—all of which aim to alleviate poverty worldwide.

Immunizations, Bed Nets, Schools
Duflo explained that 25 million children a year do not receive immunizations. “Despite the fact that we have the technology, the political will, and money to do it, it still doesn’t get done. It’s what’s called a ‘last mile problem,’” she said, referring to the challenge of transporting children to the closest immunization sites.

Malaria kills nearly 900,000 people a year—with 91 percent of the deaths occurring in Africa and 85 percent of the deaths worldwide being under the age of five. In warding off the mosquitoes that cause malaria, bed nets are effective and inexpensive (about $10 to manufacture one, ship it to Africa, and teach people how to use it), and they benefit even those who do not use them. “But does how we subsidize bed nets make a difference in how or whether they are used?” Duflo asked.
As for getting kids into schools, Duflo noted that there are many ways to do this, such as paying families to keep their kids in school, hiring more teachers, providing meals, paying for uniforms, or educating parents about the benefits of keeping kids in school. “But which option makes the most sense? Which will provide the biggest bang for the buck?”

The Value of Experiments
For each of these questions, science can help provide an answer through the method of randomized controlled trials, which do provide counterfactuals, according to Duflo.

On the question of immunization, she discussed experiments in a village in India where only 1 percent of children are fully immunized. “The ‘last mile’ here involved persuading parents to overcome the natural human desire to procrastinate in getting their kids immunized, a problem compounded by the disincentive of having to walk to an outlying village subcenter, which may or may not be open or staffed.” The experiment tested whether removing the disincentive (by setting up highly localized vaccination camps every month, rain or shine) would make a difference and whether providing an incentive (in this case, a kilo of lentils at such camps) would work even better. “The results were striking: Compared to control villages where there were no camps, the percentage of kids getting vaccinated increased by a factor of three with the camps, and when those camps provided a small amount of lentils, vaccinations increased by a factor of six.”

Similar experiments, such as those done at the Jameel Poverty Action Lab by Duflo’s colleague, Pascaline Dupas, were conducted to address the question of bed net subsidies. In this case, the question was broken into pieces by asking (a) whether people would pay for the bed nets, (b) whether people would use the bed nets more if they paid for them than if they received them for free, and (c) whether people would buy the bed nets in the future if they had received them for free at first. “The experiments showed that cost is a barrier—the rate of purchase goes down as the cost charged for bed nets goes up—but that the usage rates are the same whether people pay or get them for free and that individuals are more likely to buy them in the future if they get them for free or pay only a little at first,” Duflo said.

As for making sure that children attend school, experiments done by Edward Miguel and Michael Kremer, two other colleagues of Duflo, sought to identify the most cost-effective of the many possible options. “Providing extra teachers, school meals, uniforms, and scholarships yielded about one to three years of extra schooling for each $100 spent. But surprisingly, providing deworming medication—so kids were healthy enough to attend and perform well in school—and simply telling families about the benefits of schooling yielded far more substantial gains: nearly 29 and up to 40 extra years of schooling, respectively, for the same $100 investment.”

Taking the Guesswork Out of Relief
Duflo acknowledged that world poverty poses a daunting challenge. “Nine million children under the age of five die every year in the world, which is the equivalent of a Haiti earthquake every eight days.” She stressed that there is no silver bullet for addressing poverty. “The problem in Haiti was visible, circumscribed, and salient; world poverty is not like that.”

She also recognized that experiments such as the ones she described would not help policymakers decide how to set priorities among the many types of interventions needed. “All such areas—be they in education or health or elsewhere—are critical. It is a political decision about where to allocate resources,” she said. “But once policymakers have decided where to invest resources, evidence-based experiments can help them choose the best intervention option to pursue.”

Related Reading
(selected by Esther Duflo)


Pooled Assets

Three Ways for Coping in Hard Times

By Susann Rohwedder, Jinkook Lee, and Craig Evan Pollack

Economist Susann Rohwedder is associate director of the RAND Center for the Study of Aging. Jinkook Lee is a RAND economist focusing on aging and household behavior. Craig Pollack is a physician and RAND natural scientist.

The effects of the global economic crisis continue to dominate the headlines. In the United States, high unemployment rates persist, house values remain depressed, and retirement savings—while somewhat recovered since the onset of the crisis—still are substantially below their pre-crisis levels.

A collection of studies done by RAND researchers has addressed the economic crisis. One ongoing study has sought to understand how American families are faring in these times. Other studies have sought to identify ways that U.S. households might improve their situation, focusing on the promise of credit unions and the potential for public health practitioners to reach homeowners in distress.

Meet the Parents

The economic downturn has left few Americans untouched. As of March 2009, nearly 80 percent of U.S. households said they had been affected, and almost 30 percent reported having been affected "a lot," according to the first two of several nationally representative surveys that RAND has administered to some 2,500 households since the onset of the financial crisis in the fall of 2008. Designed to track how households weather the economic crisis over time, the surveys include questions about patterns of giving and receiving financial help in response to the crisis. Among the key findings so far are that many more households are giving help rather than receiving it and that the help most frequently flows from parents to children.

Nearly 30 percent of the households responding to the nationally representative surveys said they had given more than $500 to family, grown children, relatives, or friends as a means of helping them cope with the economic crisis, whereas only about 13 percent reported having received help of this sort. This discrepancy is most likely due to the fact that help can be received from multiple parties. For example, a younger household is likely to have two sets of living parents—his and hers—and consequently might receive financial assistance from two households.

The older the household, the less likely it was to have received help. The percentage receiving help was largest among the youngest—respondents 18 to 34 years old and people living with them (see Figure 1). The propensity for the younger households to be on the receiving end and the older ones to be on the giving end appears to be related to parents helping their children. Indeed, almost 60 percent of those who reported giving someone financial help said they were parents who had assisted grown children. Likewise, the vast majority of those who received help reported that it had come from their parents (see Figure 2).

Credit Unions, Unite!

In the current financial climate, it is increasingly important that the U.S. public be made aware of the availability of credit unions. As cooperatively owned, not-for-profit financial institutions, credit unions generally offer com-
petitive interest rates and favorable fee structures compared with those offered by commercial banks.

Despite these advantages, the nationwide growth rate of credit union membership has been falling in recent years (see Figure 3). From 1992 to 2006, the market share of credit unions has remained at a constant 6 percent of total assets in America’s financial depository institutions.

In a national Internet survey of more than 1,500 people conducted on behalf of the California and Nevada Credit Union Leagues, a RAND team found that consumers choose their financial service providers based primarily on the convenience of branches, the convenience of automated teller machines (ATMs), and bank fees. While bank users focus mostly on convenience, credit union users focus mostly on prices. However, both are concerned about convenience and prices.

For bank customers, convenience is more important than prices and fees, with almost 50 percent of bank customers naming convenience as their number one priority when selecting their financial institution, compared with only 19 percent of credit union members. Conversely, credit union members were generally more interested in prices. Forty-four percent of credit union members listed fees or the interest rates on savings or loans as their top reason for choosing their current financial institution, compared with only 30 percent of bank customers (see Figure 4).

The survey also found that credit union members stay with their credit unions because they offer

![Repossessed vehicles sit beneath ominous skies in front of the Oregon Community Credit Union in Eugene, Oregon. Car repossessions have risen as owners have lost jobs and faced other financial hardships.](https://www.rand.org)
the general public. Nevertheless, people can qualify for a credit union membership through their employer, through organizational affiliations like churches or social groups, or by living in a particular geographic area that allows them to belong to a community-chartered credit union. Community-chartered credit unions are open to all residents of a given area.

In addition to membership eligibility, credit unions differ from banks and other financial institutions in four other important respects. The first one is ownership. The members who have accounts in a credit union are its owners. Each member has equal ownership and one vote—regardless of how much money the member has on deposit. Unlike most other financial institutions, credit unions do not issue stock or pay dividends to outside stockholders. All earnings and losses go back to the members in the form of often-low fees and the interest rates on savings and loans.

The second important difference is governance. Credit unions are run by volunteer boards of directors elected by and from the membership itself. Members elect their directors in a democratic one person–one vote system regardless of the amount of money invested in the credit union. The elected board determines the interest rates, fees, and other governing policies.

The third difference is a tax-exempt status. Congress exempts credit unions from federal income taxes. The exemption was established in 1937, affirmed by statute in 1951, and reaffirmed in 1998 in the Credit Union Membership Access Act, which states: “Credit unions, unlike many other participants in the financial services market, are exempt from Federal and most State taxes because credit unions are member-owned, democratically operated, not-for-profit organizations generally managed by volunteer boards of directors and because they have the specified mission of meeting the credit and savings needs of consumers, especially persons of modest means.”

The fourth difference is in rates and products. The tax-exempt status, combined with the absence of stockholders who must be paid dividends, allows credit unions to offer competitive rates on an increasingly broad range of financial products.

Yet credit unions are typically smaller than banks. As of 2007, the average U.S. credit union had $93 million in assets, while the average U.S. bank had $1.53 billion. To retain existing customers, to attract new ones, and to offer greater convenience, credit unions should do the following:

low fees, competitive interest rates, and high-quality services. Members leave their credit unions primarily because of a change in residence or because they desire more-convenient branch locations.

A lack of understanding about credit unions is the primary barrier for new members. Bank users are more likely to believe the following three myths: Credit union members must belong to a labor union, credit unions lack data security, and credit unions offer limited services. While these are misperceptions, it is true that, by current federal statute, credit unions cannot serve

The sources of the figures are:

- Figure 3: Since 2000, the Growth Rate of U.S. Credit Union Membership Has Been Mostly Falling
- Figure 4: While Bank Users Focus Mostly on Convenience, Credit Union Members Focus Mostly on Prices and Fees

The notes for the figures are:

- Source: Consumer Use of Banks and Credit Unions, 2009.
- Notes: “Convenience” includes branch convenience, ATM convenience, availability of online services, and availability of a variety of products. “Prices” include fees, loan interest rates, and deposit interest rates. “Reputation” includes image and recommendations from family or friends. “Safety” includes deposit insurance and confidentiality. “Customer service” includes consumer service and communication.
Target members who are moving to a new residence or job. Even satisfied customers are likely to change financial institutions if they change their residence or place of work. This suggests that targeting customers during a move could be an effective strategy. Credit unions could emulate other vendors, such as hardware stores, that advertise through the U.S. Postal Service mail forwarding system.

Build financial networks. Credit unions could work together, ensuring that a member who leaves one credit union because of a move considers another credit union in the new location.

Increase consumer awareness of rates and fees. To attract new members, credit unions could raise consumer awareness of their high interest rates and/or low fees, emphasizing the competitive terms they offer. Many survey respondents—both bank customers and credit union members—cited free checking, in particular, as a reason to consider switching.

Create convenience for consumers. Consumers do not perceive credit unions as having widely available ATMs or branch offices. Credit unions could create a cohesive network to overcome the fragmentation of their industry. For example, they could share the use of ATMs, a strategy that has worked well for commercial bank customers. Credit unions could also share branch offices. Developing ATM and branch partnerships would enhance convenience, heighten awareness of the credit union industry, benefit all participating credit unions and their members, and—with a nationwide network of branch offices—perhaps even surpass the convenience of large banks.

Dispel misunderstandings about credit unions. There are common misconceptions about what a credit union is. To define the term more distinctly, the credit union industry could emphasize that credit unions are “cooperative banks” owned by individual members, rather than by stockholders. In the current climate of bank failure, cooperative banking provides a unique opportunity for credit union members to police the soundness of their own banking practices. The fact that the account holders, not the stockholders, have control will be seen as meritorious.

Don’t Foreclose on Health
Despite the magnitude of the mortgage foreclosure crisis, little is known about the relationship between foreclosures and health status. Previous research has linked
the general community and to determine how many foreclosures were primarily attributable to health-related causes.

The team recruited 250 people into the study. Relative to members of the community sample, members of the foreclosure sample were more likely to be female, to be black, and to have children living at home. The socioeconomic status of the study participants tended to be lower than that of the community at large, with fewer college graduates, more unemployed individuals, and more individuals with household incomes below 200 percent of the federal poverty level.

People undergoing foreclosure tended to report worse overall health than the general population. Rates of asthma, arthritis, and diabetes did not differ significantly between the foreclosure and community samples. However, members of the foreclosure sample were significantly more likely to be told by a physician that they have hypertension, heart disease, or a psychiatric disorder. Furthermore, homeowners in foreclosure were more likely than those in the community sample to report problems in gaining access to health care—problems that included higher rates of being uninsured and higher likelihoods of skipping needed medical care and prescriptions because of the cost (see Figure 5).

When asked about the primary reasons they were facing foreclosure, 53 percent of those in the survey attributed it mainly to a job loss or a decrease in income, while 14 percent attributed it to increased mortgage rates or high utility costs. However, 9 percent of the people did report that their own or a family member's medical condition was the primary reason for the foreclosure, while an additional 6 percent cited death of a family member as the primary cause (see Figure 6).

For those attributing the foreclosures to poor health, the potential roots of the problem are many: Poor health may lead to job and income loss; illness in a family may force wage earners to forgo income to take care of sick loved ones; and high medical bills may cause people to fall behind on mortgage payments. Nearly 30 percent of the foreclosure sample had medical bills in excess of $1,000 that were not covered by insurance, and 28 percent owed money to medical creditors.

Although individuals undergoing foreclosure have higher rates of certain health problems, it remains unknown whether poor health may result from foreclosure. The study suggests that the financial hardship
associated with foreclosure may lead homeowners to cut back on “discretionary” health spending (medications, doctor visits, healthy food). If sustained over time, such cutbacks seem likely to lead to poor health outcomes. Foreclosure is often accompanied by severe stress, which may contribute to health-undermining behaviors as well as physical and mental illness. Although members of the foreclosure sample were not more likely than others to smoke (after socioeconomic factors had been taken into account), a substantial proportion did report an increase in both smoking and drinking after the foreclosure process had begun.

The research team found exceptionally high rates of depressive symptoms among those in foreclosure (47 percent), with over a third (37 percent) meeting the screening criteria for major depression. Because the foreclosure process is lengthy, the stress associated with it is likely to be ongoing in nature. One hypothesis is that the contrast between the dreams of homeownership and the reality of foreclosure may contribute further to the high levels of emotional distress.

If there is an opportunity here, it might be that health care organizations and public health practitioners could leverage the current efforts to connect homeowners with mortgage counseling agencies as a way to increase access to health care. Philadelphia and other municipalities have used letters, telephone hotlines, and advertising campaigns to recruit people into mortgage counseling. Given the medical needs of the population undergoing foreclosure, these efforts should also be used to promote health.

Mortgage counseling agencies and public health practitioners could pool their resources to link people to medical and social services. Mortgage counselors could be trained to give their clients information about the health care safety net, including community health centers and government agencies that may offer enrollment in public health insurance programs. Health crisis counselors or social workers could be placed at mortgage counseling agencies to offer the clients direct assistance and advice. Moreover, physicians and other health care professionals could help direct patients to mortgage counselors approved by the U.S. Department of Housing and Urban Development.

Individuals facing foreclosure are a vulnerable population at risk for poor health. Policymakers need to consider the connection between foreclosure and health as they craft policies in response to the foreclosure crisis.
Energy Resiliency
A New Way for Israel to Tap into the Future

By Steven W. Popper

Steven Popper is a RAND senior economist specializing in critical technologies, science and technology policy, and decisionmaking under conditions of uncertainty.

Discoveries of natural gas off the coast of Israel in the past decade, coupled with the recent start of long-planned deliveries of natural gas from Egypt, have led to a debate about Israel’s energy future. While the recent developments present Israel with the prospect of enhancing its energy self-sufficiency, potential risks remain as the Israeli government prepares to shift to an energy mix increasingly dominated by domestic and imported natural gas.

Israel is very much an “island” in terms of electricity supply. For political reasons, its electrical grid is not connected with those of its neighbors. Until recently, Israel had discovered little in the way of domestic deposits of fossil fuels to generate electricity. As a result, the country has come to rely on imported coal for generating the lion’s share of its electric power (see Figure 1).

But the country’s electric-power system is now running out of capacity to meet the demands of its growing economy. Because of long lead times, Israel will soon need to make expensive, momentous decisions about investing in new generating capacity. Those charged with planning and implementing the nation’s energy policies need to consider likely future levels of demand, the costs and availability of supply, the security of supply, its reliability, the environmental effects, and land use priorities. Decisions about such matters will have to be made under conditions fraught with uncertainty about what the future might hold regarding each of these variables.

A RAND analysis has sought to help the Israeli government exploit the use of natural gas while minimizing the potential drawbacks. The analysis applied an innovative quantitative approach, called “robust decisionmaking,” designed to guide planning in the face of great uncertainty. Rather than trying to find an optimal strategy for some “most likely” future, this approach seeks resilient strategies that are robust—that is, strategies that perform well enough across a large range of plausible futures. Using this approach, we investigated (a) how large a role natural gas should play in Israel’s energy balance and (b) what energy strategy would offer the best guarantee of a reliable supply of natural gas.

The study found, for example, that Israel’s first line of defense for energy security through the year 2030 is to increase energy efficiency as a way to curb growth in energy demand.
to the limits of its existing pipeline capacity. However, it should draw on its domestic sources before investing in infrastructure to import additional natural gas. Meanwhile, the country should plan for a liquefied-natural-gas terminal for increased future imports but should delay constructing this terminal until future demand and costs become clearer.

Israel is not alone in facing difficult questions about its energy security—or, indeed, about other types of large-scale infrastructure investment. The methods used to help answer Israel’s questions for Israel could be helpful for other nations and regions as well.

**Lights Out?**

Israel’s electric-power system is pushing the limits of its capacity. On an exceptionally cold January night or warm July day, peak nationwide demand could (as it has in the past) come within 95 percent of the current nearly 12 gigawatts of total capacity of the Israel Electric Corporation (IEC), the near-sole supplier of electricity to the Israeli grid. Because the country depends solely on itself for all its electricity, even a small decrease in the reserve would threaten the entire system. If just one of Israel’s major electric plants were to go offline during a period of peak demand, the country could be subject to blackouts.

Israel’s Ministry of National Infrastructures warns of a potential shortfall of as much as 8 gigawatts in the next decade unless substantial investments are made in new capacity or unless Israeli households and businesses make extraordinary efforts to conserve electricity. An emergency plan is under way to build new small gas plants quickly while the ministry and IEC seek to build a new coal-fired power plant.

But imported coal brings its own problems. Coal plants are large and expensive and need to be sited next to a source of cooling water and close to a terminal for unloading coal, which means they need to sit along Israel’s densely populated coast. Unless outfitted with expensive pollution-control equipment, coal-fired plants emit large amounts of sulfur dioxide and other pollutants.

Burning coal also releases more greenhouse gases, principally carbon dioxide emissions, per unit of energy than any other fossil fuel. Israel is likely to join the rest of the developed world in seeking to reduce its greenhouse emissions. But adding substantial coal-fired capacity to the electric-power system would make it difficult, if not impossible, for Israel to reduce its carbon dioxide emissions in the next two decades.

**Tapping Supplies, Curbing Demand**

Israel is already beginning to rely more on natural gas as an option for generating electricity. There are three potential sources of natural gas for Israel: offshore reserves, imports from abroad by pipeline (currently from Egypt but potentially from central Asia or other countries in the Middle East), and imports of liquefied natural gas by tanker ship.

Commercially viable quantities of natural gas were discovered in Israel’s coastal waters in 1999 (see Figure 2). For the first time, Israel could claim a significant domestic supply of a fossil fuel. Yam Tethys (the Tethys Sea) is the source of all of Israel’s current domestic production. The Yam Tethys reserves, which were originally estimated at 32 billion cubic meters, can serve for about four more years of total Israeli consumption of about 5 billion cubic meters per year.

The discovery of another large gas field was confirmed in 2009 in what is called the Tamar concession in Israel’s northern territorial waters. This reserve is farther offshore than Yam Tethys and lies in much

---

**Figure 1—Coal Is Israel’s Primary Source of Electric Power**

There are three potential sources of natural gas for Israel: offshore reserves, imports from abroad by pipeline, and imports of liquefied natural gas by tanker ship.
deeper waters, making it harder to tap. Initial estimates for recoverable reserves from Tamar were 80 to 90 billion cubic meters, roughly three times as large as Yam Tethys. Later reports suggest that the reserves might be considerably larger, perhaps twice the initial estimates. A smaller reserve was subsequently located at the Dalit concession. Based on these apparent successes, other offshore explorations are now under way in Israel, and another new—albeit yet unproven—Tamar-scale structure was just announced in February 2010.

Natural gas was also found off the coast of the Gaza Strip at about the same time that Yam Tethys was discovered. The Gaza Marine field has slightly smaller estimated reserves than does Yam Tethys. The government of former Prime Minister Ehud Barak set aside this field as a resource to be at the disposal of the Palestinian Authority or of a Palestinian state that might succeed it. Israel is expected to be a customer for this gas. However, no development work has been undertaken to date for several reasons, including the ongoing political turmoil in Gaza.

Meanwhile, natural gas has begun to flow from Egypt. Eastern Mediterranean Gas and Oil, an Egyptian company with Israeli participation, constructed an undersea pipeline from El Arish in Sinai to the Israeli port of Ashkelon, with a maximum capacity of 7 billion cubic meters per year. In 2005, the IEC signed a contract with the company for 1.7 billion cubic meters of natural gas per year for 15 years, with an option for an additional 5 years. The first imports of this difficult-to-transport commodity began to flow to Israel’s power plants in 2008.

Theoretically, Israel could negotiate with foreign suppliers other than Egypt to purchase natural gas delivered by pipeline. Importing natural gas through a new pipeline, though, would entail constructing it, negotiating transit agreements with intervening states, and signing long-term supply agreements. Israel’s relations with many of the most likely supplier or transit states would mean that major political shifts might also be required for this to occur.

And then there is the prospect of liquefied natural gas (LNG). Natural gas can be pressurized and supercooled to a point at which it condenses into a liquid, occupying just 1/600th of its gaseous volume. With such a significant reduction in volume, enormous quantities can be transported in a single tanker ship. But LNG tankers need to unload their cargo at marine terminals, which are expensive. They require docks, LNG-handling equipment, storage tanks, regasification facilities, and interconnections to regional gas-transmission pipelines.
Once on shore, LNG must be stored at atmospheric pressure in double-walled, insulated tanks. As a precaution against spills or leaks, the storage tanks are generally surrounded by containment tanks, which limit the potential spread of an LNG spill and its flammable vapor cloud. Although storage facilities can be sited in remote locations (or even offshore), they are generally sited near the populations they serve and are integrated with the local gas pipeline network. When needed, LNG from the storage tanks is warmed, regasified, and pumped into distribution pipelines.

Israeli LNG facilities might prove tempting targets for terrorists or other enemies. The hazard may be reduced somewhat if a facility is built offshore, but this would add considerably to the initial costs. The cost of such a facility could also vary greatly, depending on the design.

On the demand side of the equation, Israel consumes electricity at the level of a developed country but has the population and economic growth rates of a developing country. It is not a very efficient user of electricity. Therefore, the country could potentially constrain its growth in electricity demand through active management.

Israeli government ministries have already mounted information campaigns to promote easy ways to reduce demand: closing windows, cleaning filters, using washing machines only when full, replacing incandescent light bulbs with compact fluorescents, turning off electronics when leaving the room, setting air-conditioning temperatures higher, and installing timers on water heaters to take advantage of electricity in off-peak hours. Further reductions in demand could be fostered by a combination of public investment in infrastructure, such as “smart grid” information systems that permit time-of-day pricing, and pledges to match private investment.

Often, the most effective way to curb demand is to raise the cost of electricity to consumers. Historically, Israeli electricity rates have been a bit higher than those in the United States but substantially lower than those in many European countries, some of which are poorer than Israel (see Figure 3). If Israel were to raise household rates to the average of the seven European countries in the figure that charge more for electricity than does Israel—that is, by 30 to 40 percent—then demand for electricity in Israel could fall by 22 percent, according to Israeli economists. Raising energy efficiency would reduce both the amount of energy required to sustain economic growth and Israel’s vulnerabilities to energy-supply shocks. Nevertheless, contrary to the stated wish of the Ministry of National Infrastructures, Israel’s Public Utility Authority recently reduced rates.

**We compared how several energy strategies would perform under widely varying conditions.**

**How Large a Role for Natural Gas?**

Given the uncertainties about future demand, relative fuel prices, possible policies such as carbon emissions charges, and technological changes, we compared how several energy strategies would perform under widely varying conditions. In all cases, we assessed the

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**Figure 3—Israeli Tariffs Have Been Much Lower Than Those in Many European Countries, Some of Which Are Poorer**

<table>
<thead>
<tr>
<th>Country</th>
<th>Residential (in U.S. dollars per kilowatt hour)</th>
<th>Industrial (in U.S. dollars per kilowatt hour)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ireland</td>
<td>0.25</td>
<td>0.20</td>
</tr>
<tr>
<td>Portugal</td>
<td>0.20</td>
<td>0.15</td>
</tr>
<tr>
<td>Spain</td>
<td>0.15</td>
<td>0.10</td>
</tr>
<tr>
<td>Slovakia</td>
<td>0.10</td>
<td>0.05</td>
</tr>
<tr>
<td>Hungary</td>
<td>0.05</td>
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<td>Switzerland</td>
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<tr>
<td>Poland</td>
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<td>Israel</td>
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<td>Turkey</td>
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<tr>
<td>United States</td>
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<td>Norway</td>
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</tr>
</tbody>
</table>

strategies against three criteria of concern: total cost through 2030, greenhouse emissions in 2030, and land area required for generating electricity. We set acceptable thresholds for each criterion and judged the strategies based on how well they performed across 1,400 future states of the world that we generated by varying the assumptions about future demand, prices, technologies, policies, and external developments. The 1,400 scenarios of the future represent the uncertainty facing Israeli policymakers.

We began with simple strategies, observed how they failed in certain scenarios, and modified them to be more robust. We found that making the strategies inherently adaptive—that is, subject to modification based on external triggers—led to more-successful outcomes.

Initially, this process yielded seven strategies. The first (or “baseline”) strategy represents a typical approach to planning: It seeks an optimal outcome based upon forecasts of future demand and is not adaptive. We then tried three adaptive strategies. One (Least Cost) always seeks the least-cost solution. Another (Less Natural Gas) seeks to minimize the effects of possible cutoffs of natural-gas supply. The third (More Natural Gas) is more concerned with utilizing the domestic resource. Each of these three exists in two forms: one that allows for the construction of renewable, non–fossil-fuel generating capacity and for enhanced conservation, and another that does not.

We found strong evidence that managing electricity demand and using several energy sources, particularly non–fossil-fuel alternatives, raised the success rates. When demand is left unchecked and follows the high-growth assumptions of the baseline forecasts, it becomes quite difficult to choose any strategy that will meet the nation’s goals for cost, emissions, and land use.

Figure 4 compares the results of the baseline strategy with those of the three modified adaptive ones. We label the latter strategies LCC (Least Cost + Conservation), LessNGRC (Less Natural Gas + Renewables + Conservation), and MoreNGRC (More Natural Gas + Renewables + Conservation). The figure shows that MoreNGRC—a strategy that does not shy from expanded use of natural gas in Israel—could be both consistent with Israel’s interests and relatively robust across many plausible futures. MoreNGRC succeeds in meeting the cost threshold almost as well as LCC while at least matching the other strategies in emissions and land use. Israeli analysts will have access to the full database of scenario outcomes and will be able to explore this finding in greater detail.

**What Leads to a Reliable Supply?**

The principal objection to greater use of natural gas is that its supply could be less reliable than that of coal or petroleum. To address this concern, we performed a subsequent analysis that compared another four strategies for supplying additional natural gas through 2030 under varying conditions. In particular, we compared strategies that rely on different combinations of domestic deepwater reserves of natural gas and imports in the form of liquefied natural gas.

In the first strategy, Israel draws all additional future supplies of natural gas from its domestic deepwater reserves (DDW). In the second, it first relies on this domestic resource but then adds imported LNG later when needed. In the remaining two strategies, Israel pursues both fuel paths at the same time. In one, it relies primarily on the domestic reserves, with imports as a supplement. In the other, it does the reverse. For each strategy, we crafted several modifications, varying the amounts and types of storage, the amounts and types of backup fuels, the amounts of supply taken from the existing pipeline from Egypt, and the level of “insurance” in the form of infrastructure that Israel might construct to compensate for possible supply disruptions.

As before, we chose three criteria for assessment. In this case, we set acceptable thresholds for supply-system cost, depletion of domestic reserves, and potential unmet demand. Based on these criteria, we assessed the competing strategies across a range of 5,000 plausible futures.

Figure 5 shows that all the strategies do quite well in terms of meeting projected demand. The joint strategy that draws first on LNG does best in conserving Israel’s domestic reserves but fares worst in meeting the cost criterion. In contrast, the joint strategy that draws first on domestic reserves does much better than the rest in terms of cost and also does fairly well in conserving domestic reserves, succeeding more than two-thirds of the time across the 5,000 scenarios on both accounts. We found that this strategy can meet...
demand and also postpone the high capital costs associated with building an LNG terminal—but only if Israel can still rely on an imported supply of up to 7 billion cubic meters of natural gas a year through the existing pipeline.

**What If There Is a Loss of Supply?**

Israel’s policymakers must determine the acceptable costs or depletion rates and whether one is more important than the other. This is ultimately a judgment call, but robust decisionmaking can help make the trade-offs among strategies explicit.

To illustrate this capability, we asked how the four different strategies described above would fare in the face of an abrupt disruption in natural-gas supply. We simulated a one-year shutoff of all supplies through the existing foreign pipeline in 2025. Perhaps surprisingly, while different assumptions about the likelihood of a shutoff certainly led to differences in expected costs, these differences did not change the rank order of preferred strategies. However, something else did.

In this type of analysis, we search for the variables that matter the most in limiting our exposure to future risk. We do not seek to predict the future; rather, we scan the range of potential future outcomes associated with different assumptions about variables that are intrinsically unpredictable. In the case of Israel, the probability of an abrupt supply shutoff ironically turned out to be irrelevant to choosing a strategy for a reliable supply. We then tested other variables to see which had the greatest effect on the choice of strategy. Several of the variables were related to the ratio of future costs of imported LNG to future costs of domestic reserves. We found that this ratio of relative costs between the two supply chains ended up playing a decisive role.

Figure 6 demonstrates the point. The vertical axis shows, in percentage terms, the average expected additional cost of a strategy above the lowest-cost strategy for each set of conditions. The horizontal axis shows different assumptions about future cost ratios between the LNG and domestic fuel paths. As the figure shows, the choice among different strategies depends crucially on assumptions about the cost ratio. If one assumes that the cost of LNG will be high relative to the cost of domestic deepwater reserves, then the least-costly strategy is to rely on the domestic reserves only (red line). However, if one assumes that the cost of LNG will be low relative to that of domestic reserves, then

**The probability of an abrupt supply shutoff ironically turned out to be irrelevant to choosing a strategy for a reliable supply.**
the least-costly strategy is to pursue both fuel paths simultaneously while placing early priority on the domestic reserves (yellow line), because that strategy outperforms the others at the extreme low end of the horizontal axis.

From this perspective, the behavior of the “DDW Then LNG” strategy (green line) in Figure 6 is quite interesting. If one had sufficient confidence about what the price ratio would be, then there is almost no level at which this strategy would be selected. It would be outdone by at least one other strategy at almost every point along the horizontal axis. On the other hand, if one lacked strong confidence in predicting the ratio or was just risk averse and wanted to minimize any potential loss, then it is precisely “DDW Then LNG” that presents itself as a robust strategy. Although it is rarely, if ever, the strategy that promises minimum cost, it almost always runs second best throughout the range, and its failure in terms of cost tends to be more graceful than the other candidates. If it were the case that nothing further could be learned about technical details or planners’ preferences, this would appear to be a strong candidate for a robust strategy.

Figure 6 highlights the value—and purpose—of the robust decisionmaking approach. It is not intended to place the computer in a position to usurp the policy process. Rather, it seeks to give decisionmakers a precise description of the trade-offs among competing strategies. An actual policy decision will result from political processes, political discourse, and political trade-offs. This is as it should be. But insights such as those illustrated in Figure 6 can provide solid parameters around what ought to be the acceptable political trade space.

Concurrent Conclusions

Our analysis suggests that Israel should rely first on its newly found domestic reserves of natural gas and only later should add LNG imports. The final decision on the latter might be left until the full costs and potential benefits of the former are better known. A large infrastructure for imported LNG would provide insurance for Israel, but building it too soon could entail unnecessary costs.

Five additional suggestions flow directly from this strategy. To bolster its energy resiliency, Israel should:

- better manage growth in electricity demand
- shift toward a more integrated and adaptive planning process
- prepare for (but not yet build) an LNG terminal
- maintain a diversified mix of fuels (including renewables) for generating electricity
- store diesel fuel (rather than natural gas) to withstand future supply disruptions.

Curbing growth in demand for electric power is not only Israel’s first line of defense for energy security but also the most effective policy action the nation could take to serve its other key measures of well-being. Israel should be able to achieve further substantial gains in efficiency at relatively low cost through improvements in insulation in residential and commercial buildings, the gradual installation of energy-efficient appliances, and behavioral changes. Once the low-hanging fruit have been picked, higher-reaching and more-expensive improvements are available.

The imperative to conserve is even greater because of two factors that may push up demand in Israel: an increased demand for water and an increased demand for electric power in territories under the control of the Palestinian Authority. A substantial increase in demand for water may have to be satisfied through desalination. If global climate change continues unabated, demand for water is likely to rise. Because

Israel should be able to achieve further substantial gains in efficiency at relatively low cost.
desalination uses large amounts of electricity, future increases in water use imply corresponding increases in electric-power consumption.

Israel delivers power to the Palestinian territories and is likely to continue to do so, at least for most of the years leading to 2030. While delivery to businesses is metered in these areas, for all practical purposes, delivery to households is not. One consequence of economic development in the Palestinian-controlled areas has been a sharp increase in demand for electricity. Clearly, metering and billing according to use would curb growth in demand. However, the Palestinian Authority would prefer not to introduce such changes. This may become a larger issue as demand growth continues.

Second, Israel should adopt a two-stage planning process for decisions on expanding generating capacity. Planning is predicated on assumptions. When it becomes clear that the assumptions are no longer valid, the plans ought to be subject to review and change. However, current planning approaches in Israel do not separate planning from the start of construction. Therefore, we recommend that Israel plan for the period to 2015 in a traditional fashion; at the same time, preparations should be made to employ a more adaptive approach to planning for the period after 2015. Specifically, the planning should consist of preliminary site evaluations and permitting while also determining a set of signposts and guidelines to trigger any eventual construction.

Third, as a first application of this approach, Israel should prepare for—but not yet build—an LNG terminal. The crucial factor in this regard is the cost of LNG relative to that of domestically produced natural gas. These costs could vary considerably with the location of any terminal (onshore or offshore), the costs of recovering domestic reserves from deeper waters, and developments in the international market for natural gas. Preparations for an LNG terminal can be made and approved in advance, allowing faster implementation if the relevant signposts within the two-step planning process suggest doing so.

Fourth, Israel needs to maintain a diversified mix of fuels, including renewable nonfossil fuels, for generating electric power. Simply adding natural-gas capacity without other measures to diversify supplies would leave Israel vulnerable to supply disruptions and abrupt shifts in costs. Consequently, the Israeli government should subsidize electric-power generation from solar power and other nonfossil means. But the subsidies would need to be capped, perhaps at 1.5 times the full recovery cost of gas-fired power plants, because unfettered subsidization of alternative sources of power could impose extraordinary costs on the Israeli economy.

Fifth, Israel should guard against disruptions in natural-gas supplies by storing diesel fuel, not natural gas. We found that the scenarios that depended on storage of natural gas proved more costly than those that emphasized the storage of diesel as a backup fuel. The cost of storage need not be onerous. It would, however, entail more effort than has been exerted so far.

In sum, we found that a strategy that rapidly expands the use of natural gas in Israel can both serve the interest of its people and provide security against various risks, as long as such a strategy is combined with conservation, renewable nonfossil fuels, adequate fuel storage, and other adaptive planning measures. It will be necessary for Israel’s planners and leaders themselves to determine the appropriate goals and thresholds to move beyond the proof-of-principle analysis we conducted. But we believe that the approach we applied could help Israel, as well as other nations and regions, manage what might otherwise appear to be an unmanageable energy future. Our purpose was to build and to apply the tools that would allow them to do so.

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Related Reading


Deep-Seated Entanglements

The Web of Iranian Leadership Can Be Negotiated, Not Unraveled

By David E. Thaler and Alireza Nader

David Thaler is a RAND senior defense researcher with expertise in Iran and the Middle East. Alireza Nader is a RAND international policy analyst focusing on Iranian internal politics.

Initially, President Obama’s offer in March 2009 to engage in constructive dialogue with the Islamic Republic of Iran without preconditions appeared to alter the dynamic within the regime. Obama’s messages, and the change in U.S. policy that they represented, were front and center in the campaigns and debates leading up to the June 2009 Iranian presidential election. The new U.S. policy limited the ability of the Iranian government to portray the United States as a bogeyman bent on destabilizing the regime and to garner popular support through such rhetoric. Obama’s election to the U.S. presidency in 2008 had itself raised hopes among some Iranians, particularly the moderate and pragmatic segments of the Iranian elite, of an establishment of relations between the United States and the Islamic Republic.

However, the conservative factions in Iran remained wary of engaging the United States because such engagement could lead to stronger internal demands for political, economic, and social reforms. The disputed reelection of Iranian President Mahmoud Ahmadinejad in June 2009 swung the balance of power in Iran back to the conservatives, confounding U.S. and international diplomatic efforts to engage with the country.

Since Iran’s Islamic Revolution in 1979, the U.S. ability to “read” the Iranian regime and to formulate appropriate policies has been hampered by a lack of access to the country and by the opacity of decision-making in Tehran. Given the difficulty in assessing Iranian political dynamics, U.S. leaders should avoid trying to manipulate the domestic politics of Iran and instead accept the need to deal with the government of the day as it stands. U.S. leaders should also recognize that dealing with Iran does not necessarily mean dealing with a unitary actor.

A Web Tossing in the Wind

The shifting political winds within Iran over the past year have highlighted the country’s extraordinarily complex political system. It is a system built on an intricate web of personalities, informal networks, and formal institutions.

A number of key individuals (including, first and foremost, the supreme leader) have dominated the political elite in Iran roughly since the 1979 revolution and certainly since the death of the father of the revolution and first supreme leader, Ayatollah Ruhollah Khomeini, a decade later. These personalities draw on

Factional competition and informal maneuvering have trumped the formal processes of policymaking.
multiple networks of various commonalities—interleaved family, experiential, clerical, political, financial, and other relationships and interests—that serve as levers of patronage, wealth, mobilization, and dissent. The more powerful, influential, and well connected the individual leading an institution, the greater the weight the institution gains in policymaking and implementation. It is the combination of key personalities, networks, and institutions—not any one of these elements alone—that defines the political system of the Islamic Republic.

Typically, factional competition and informal maneuvering have trumped the formal processes of policymaking since the 1979 revolution. The 2009 election and its aftermath demonstrated the power of these informal lines of influence, with Ahmadinejad’s faction prevailing through the machinations of the Supreme Leader and the Islamic Revolutionary Guard Corps (IRGC).

But the web remains in flux. Previously a consensus-driven system with the supreme leader acting as an arbiter above the factional fray, Iran seems to be moving toward a more authoritarian system in which the supreme leader and his inner circle of advisers and senior members of the IRGC make key decisions. Today’s supreme leader, Ayatollah Ali Khamenei, is 70, however, and rumors have surfaced about his deteriorating health. Given these cross-currents, U.S. leaders will need to monitor three determinants of Iran’s future direction: the evolving role of the IRGC, the relationship between the older and younger generations of leaders, and the succession of the next supreme leader, who is appointed for life.

**Gridlock as the Norm**

The convoluted nature of the Iranian government is partly the result of Iran’s history with the United States. The 1953 Anglo-American coup that ousted Iranian Prime Minister Mohammad Mossadegh and returned Mohammad Reza Shah Pahlavi to power cemented a perception in Iran of the United States as the successor to British imperial rule. This perception is still an important factor in shaping and driving Iran’s strategic culture and worldview. To this day, the Islamic Republic views the United States as its main adversary and existential threat.

After leading the revolution that brought down the shah in the spring of 1979, Khomeini sought to consolidate his power. He and those who supported him were keenly aware of Iran’s experiences with foreign domination of the country’s internal politics. In response, an impenetrable and complicated system of overlapping authorities emerged. The result has been termed a state of “suspended equilibrium” that has taken the shape of a peculiarly Iranian style of checks and balances, ensuring that no one faction becomes so dominant as to challenge the supreme leader or to gain ultimate power within the system.

The supreme leader sits atop Iran’s formal power structure (see the figure on page 26). He is appointed by the 86 senior clerics who constitute the Assembly of Experts. The president is ostensibly the second-highest-ranking official. According to the constitution, he is elected by popular vote; however, all presidential candidates must be approved by the Guardian Council, which is composed of 12 appointed jurists, both clerical and lay. In fact, the Guardian Council also approves the
candidates for the Assembly of Experts, which appoints the supreme leader. The Guardian Council embodies the duality of theocracy and republicanism in Iran.

But these formal institutions serve merely as a playing field for the more influential informal processes of politics and decisionmaking. For instance, Khamenei holds the most powerful and influential position in Iran. His power derives from his own broad networks of representatives, appointees, and confidantes; his role as commander-in-chief; and his position as supreme leader. However, lacking the iconic status and charisma of Khomeini, Khamenei must balance a multitude of competing interests to ensure that no single faction or group becomes so dominant that it threatens his power and prerogatives. This means perpetuating a relatively dysfunctional political system that tends toward stasis.

The overlapping and factional nature of the regime is a source of its very stability and survival. At the same time, it is a recipe for gridlock because the multiple power centers tend to neutralize one another. Paralysis is normal, innovation abnormal; the lowest common denominator often rules.

A characteristic of such a rigid and immobile system is the prevalence of negative power: The power to block is widely dispersed, but the power to initiate is scarce.

But as Iran’s conservative elites, including those of the IRGC, have expanded their dominance over state institutions and resources, the traditional equilibrium among Iran’s political factions has eroded. Iran’s 2009 election and its aftermath appear to have accelerated this erosion, prompting reformist and even conservative fears of an ongoing militarization of Iranian politics.

**Foreign Policy as a Domestic Tool**

Because the competition among Iranian elites is as much about power as about principles, foreign policy is often used to bolster domestic stature or to weaken factional rivals. Rivals can be discredited for endangering the system and for “selling out” revolutionary precepts. Ahmadinejad, for example, has ushered in the rise of a “principlist” government in Tehran (principlists advocate a return to the “pure” principles of the revolutionary era). The principlists have used foreign policy to paint their reformist and pragmatic conservative rivals as weak, defeatist, and insufficiently revolutionary. Meanwhile, Ahmadinejad has posed as the leader of Iran’s resistance against so-called arrogant outside...
powers (especially the United States) that seek to keep Iran down. This policy of provoking deliberate confrontation is rooted in a domestic calculation of benefit. The president has not been disappointed in the effects of his policy, having been openly supported by the supreme leader, who endorsed pro-Ahmadinejad candidates in the 2008 parliamentary elections and Ahmadinejad himself in the aftermath of the 2009 election.

Factional competition has driven several foreign policy developments within the Islamic Republic, notably those pertaining to its Middle East policy, its nuclear program, and its relations with the United States. A prime example of behind-the-scenes competition emerged in early 2002 following the overthrow of the Taliban in Afghanistan. Under the reformist presidency of Mohammad Khatami, Iran was cooperating with U.S.-led international efforts in Bonn to form a successor regime in Kabul. By all accounts, this cooperation was critical to the success of these efforts. Moreover, Iranian diplomats expressed interest in cooperating with the United States on issues other than Afghanistan. A breakthrough in U.S.-Iranian relations appeared possible.

Then, in January 2002, Israeli vessels in the Red Sea captured the Karine-A, a merchant ship loaded with 50 tons of weapons destined for the Palestinian Authority. It was discovered that Hezbollah, an ally of Iran, had funded the purchase of the weapons—and that the weapons had been loaded onto the ship on Iran's Kish Island. Days later, U.S. President George W. Bush added Iran to the "axis of evil" in his State of the Union address.

In the words of Ali Ansari, a leading expert on Iran, it was "remarkable that a regime hitherto experienced in shipping arms and munitions overseas should choose to do this particular delivery via slow boat journey around the Arabian Peninsula." To us, the Karine-A incident appears to be a clear example of one faction in the Iranian elite undermining the policy of a competing faction.

Factional competition is a driving force behind the Iranian nuclear program. The shifts in Iranian nuclear policy are epitomized by two phases of recent Iranian history associated with two competing factions: the Khatami period (1997–2005) and the Ahmadinejad period (2005–present). During the first period, a reformist government responded to the nuclear crisis by embracing diplomacy and engagement with the United States but found itself under fire from domestic critics who demanded that Iran make fewer concessions and take a tougher stand. During the second period, a principlist government suspicious of diplomacy has adopted a policy of resistance by largely ignoring the United Nations Security Council and its resolutions.

The principlists have increasingly appropriated the nuclear issue for their domestic, partisan advantage. Having accused the previous Iranian nuclear negotiators of retreat and compromise, Ahmadinejad has since attributed the Security Council's failure to stop Iran's enrichment program to his own administration's steadfastness. Although the reformists and the pragmatic conservatives do not necessarily view the nuclear program as a zero-sum game, the principlists fear that compromise on this issue represents a generalized retreat in the face of Western pressure—a retreat that would entail a loss of legitimacy for the Islamic Republic. Ahmadinejad has also exploited a nuclear populism to divert attention from Iran's growing economic woes.

The Karine-A incident appears to be a clear example of one faction in the Iranian elite undermining the policy of a competing faction.

Khamenei and the Guard Corps

In light of Khamenei's clear support of Ahmadinejad and the president's allies during the 2009 election—and the apparently widespread electoral fraud that occurred—the supreme leader can no longer claim to be above factional politics. In fact, he has overseen the marginalization of key personalities and factions that heretofore had served to balance the more conservative elements among the elite. While this course may strengthen his personal position in the near term, it also sows the seeds for weakening the position of supreme leader in the longer term.

The IRGC has conspired with Khamenei to ensure conservative dominance and to upset the balance in Iranian politics. In recent years, the IRGC has acquired all the trappings of a state within a state, accountable only to the supreme leader and increasingly present or even dominant in many facets of society. Today,
The only pattern is that there is no pattern.

Two clerics stand at left as Iran’s Jamaran guided-missile destroyer and navy members prepare for an exercise in the Persian Gulf on February 21, 2010. Two days earlier, Iran launched the Jamaran, the country’s first domestically built destroyer, calling it a major technological leap for its naval industries.

The IRGC oversees or owns important interests in numerous sectors of the Iranian economy, including oil, construction, agriculture, mining, transportation, defense, and imports and exports. It has retained its primary role as defender of the revolution, a role that continues to be defined expansively, especially in the context of domestic politics. This role includes active, often clandestine, involvement in other states in the region in support of militias and terrorist groups and, increasingly, participation in the domestic politics of these regional states. The rise of the IRGC has also been accompanied by the emergence of core security issues at the forefront of Iranian policy debates.

The degree to which Khamenei controls the IRGC’s foreign and domestic activities remains unclear. One can rightly point to the fact that Khamenei is commander-in-chief and has the power to appoint and to fire the IRGC’s leadership, both of which suggest top-down control of IRGC activities. The reality is probably less black and white. As suggested by Karim Sadjadpour of the Carnegie Endowment for International Peace, the relationship between Khamenei and the IRGC is “increasingly symbiotic, politically expedient for the Leader and economically expedient for the Guards.”

Iran’s Politics and Policymaking

The opaque nature of decisionmaking in Tehran, the parallel institutions, the bifurcation of the government between elected and appointed officials, the informal networks, the undercurrents of factional maneuvering—all lead the analyst to look for some key to unlock the secrets of regime policymaking. That such a key exists appears doubtful. The institutional duplication, informal politics, factional disputes, and resulting stalemate preclude coherent, forward-looking policies.

Consultation in Iranian decisionmaking is not a process that can be mapped in advance. Questions of whom to consult, when, and on what issues are decided in an ad hoc manner depending on the subject matter and the supreme leader’s proclivities, preferences, and whims. The only pattern is that there is no pattern. Consequently, the coalescence of major players on a given decision is virtually impossible to verify or predict, especially at a distance.

The principlist policies of nonengagement and defiance suit the current supreme leader but pose a challenge to the Obama administration’s efforts to open a dialogue with the regime. A different supreme leader, working with a like-minded Iranian president, could shift the country’s foreign policies. However, this would entail taking on the Iranian constituencies and interest groups that benefit from the status quo. For now, the Iranian policy of defiance is perceived by the country’s principlist leaders to have been successful and not to be in need of serious adjustment.

But there are three key political trends in Iran to watch. The first is the expanding role of the IRGC, which also manages key nuclear facilities. An energized, adventurous, nuclear-armed IRGC with a weak supreme leader as commander-in-chief could propel Iran toward a more-militarized future, posing a greater threat to U.S. regional interests. Alternatively, an increased focus on economic power could lead the IRGC to become greedy and bloated, less flexible, and more risk averse. Such a business orientation could cause the IRGC to see greater utility in regional stability and in reduced tensions with the United States and the West.

A second trend to watch over the next few years is the evolving relationship between the older generation of leaders, who helped Khomeini overthrow the shah and establish the Islamic Republic in 1979, and a younger cohort of lay leaders (with some clerical allies) who were shaped primarily by the Iran-Iraq War of the 1980s and are less beholden to the establishment.

Third, the next supreme leader will be a primary determinant of how the other two trends evolve. A
strong leader could uphold the status quo or steer the country toward gradual change, whereas a weak leader could be exploited or dominated by other power centers, such as the IRGC. In the latter case, the very nature of the Islamic Republic could change drastically and in potentially destabilizing ways. This is especially worrisome given the increasing militarization of Iranian politics. In our view, the internal discussions and activities surrounding the succession of the supreme leader constitute the most important development for U.S. and Western policymakers and analysts to watch as a harbinger of the future direction of the Islamic Republic.

The Challenge for U.S. Leaders

The United States is the key antagonist and source of policy debate and formulation in the Islamic Republic. One could even submit that the Iranian elite are obsessed with U.S. statements, actions, and reactions and that perceptions of potential U.S. responses drive the major foreign and, at times, domestic policy decisions. In fact, Washington’s responses to posturing from Tehran can exaggerate the importance of an issue beyond its inherent relevance, and Iranian factions use this phenomenon to their advantage. It is therefore incumbent on U.S. policymakers to couch their communications with and about Iran in ways that bear in mind how such statements might be perceived in Tehran (and by whom).

The ability of the United States to determine the effects of its efforts to shore up the moderates in Iran is extremely limited, and the strategy could backfire if it undermines the very people it seeks to support. An example of a cautious approach was Obama’s initial hesitation to harshly criticize the Iranian government’s crackdown on protesters in the wake of the 2009 election. Such criticism could have been characterized as U.S. interference and used against reformists by the hard-liners.

Normal relations with the United States would be a radical departure for Iran’s elites, who would need to perceive such relations as necessary for both Iran (the survival of the Islamic Revolution) and their own power and influence. Increased engagement with the United States and the West would create domestic winners and losers, the latter of whom would not necessarily acquiesce willingly, even if the supreme leader fully supported such engagement. There are entrenched political, economic, social, and religious interests that see great merit in the status quo and a great threat in opening Iran to the United States. Therefore, the United States should expect that powerful interest groups in Iran will attempt to torpedo efforts toward a rapprochement between the two countries, and the United States should plan accordingly.

The competing government structures and power centers in Iran also make U.S. negotiations with the Islamic Republic unusually difficult. Iranian negotiators may or may not have the authority to reach agreements. Ensuring that Washington is dealing with the right representatives of the Iranian regime will be a critical task for any U.S. negotiating team. Iranian negotiators may reflect contradictions and indecision within the regime. These difficulties do not mean that negotiations on nuclear or other issues are not worthwhile. But it is crucial for the United States to enter such discussions with a nuanced view of the complex system of government and politics that the Iranian interlocutors across the negotiating table represent.

Related Reading

The Perils of Polarization
When Ideology Trumps Analysis

By James A. Thomson

James A. Thomson is president and chief executive officer of the RAND Corporation.

When President Obama appealed for bipartisanship during his State of the Union address in January, many observers doubted his ability to break the partisan gridlock. I sympathize with both the appeal and the doubts.

I’ve been involved in public policy analysis for 90 percent of my professional life. Over that time—the past 35 years—Washington, D.C., has become a less analytical and more ideological place.

There’s a role for ideology in public policy. But decisionmakers first need to get the facts straight before overlaying them with political outlooks and worldviews. Unfortunately, we have seen less and less of that in recent decades. Among our elected representatives, the founding fathers’ ideal that public problems should be solved by deliberation seems a distant prospect.

Political scientists Keith Poole, of the University of California at San Diego, and Howard Rosenthal, of New York University, have found that in critical policy areas—the role of the government in the economy, abortion, guns, immigration, crime, and national security—congressional Republicans and Democrats have now coalesced into completely separate conservative and liberal ideological camps. Voting on these diverse issues is now aligned. In other words, it is possible to predict fairly confidently a representative’s vote on nuclear arms or immigration, for example, if one knows his or her voting record on the government’s role in health care.

In the early 1970s, the two parties substantially overlapped on the ideological scale. Now they are entirely detached. The primary victims of this process, among elected officials, have been moderates, who have largely disappeared from both sides of the aisle.

The principal reason behind this polarization has been a geographic sorting of voters into congressional districts, states, and counties that are increasingly conservative or liberal. Oddly, the American electorate as a whole is not all that polarized—there is a substantial middle ground. But it is becoming harder to find places on the map that are in the political center.

Why has this happened? In The Big Sort, Bill Bishop and Robert Cushing argue that generational change and internal migration are producing communities that are increasingly homogeneous in terms of education, race, income, and way of life. In choosing new communities, people seek out places with people like themselves.

The implications of polarization are profound. They also hit home for us as analysts. If certain policies are deemed off limits for ideological reasons, then institutions like RAND are in deep water. We need the intellectual and analytical freedom to study all options, to determine if “off-limits” policies are effective or if “within-limits” policies are not, and to make policy recommendations based on those findings. America’s leaders and the American public deserve no less.

Related Reading

The American electorate as a whole is not all that polarized—there is a substantial middle ground. But it is becoming harder to find places on the map that are in the political center.
READING THE MIDDLE EAST

Mullahs, Guards, and Bonyads
An Exploration of Iranian Leadership Dynamics
David E. Thaler, Alireza Nader, Shahram Chubin, Jerrold D. Green, Charlotte Lynch, Frederic Wehrey

The Islamic Republic of Iran poses serious challenges to U.S. interests in the Middle East, and its nuclear program continues to worry the international community. The U.S. ability to “read” the Iranian regime and to formulate appropriate policies has been handicapped both by a lack of access to the country and by the opacity of decisionmaking in Tehran. To improve understanding of Iran’s political system, the authors describe Iranian strategic culture; investigate Iran’s informal networks, formal government institutions, and personalities; assess the impact of elite behavior on Iranian policy; and summarize key trends.

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Lowell H. Schwartz, Todd C. Helmus, Dalia Dassa Kaye, Nadia Oweidat

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LEADERSHIP IN EDUCATION AND HEALTH SERVICES

Improving School Leadership
The Promise of Cohesive Leadership Systems
Catherine H. Augustine, Gabriella Gonzalez, Gina Schuyler Ikemoto, Jennifer Russell, Gail L. Zellman, Louay Constant, Jane Armstrong, Jacob W. Dembosky

Improving the nation’s public schools is one of the highest priorities of federal, state, and local government in America. Recent research has shown that the quality of the principal is, among school-based factors, second only to the quality of the teacher in contributing to what students learn in the classroom. This study documents actions of Wallace Foundation grantees to create more cohesive policies and initiatives to improve instructional leadership in schools and describes how states and districts have worked together to forge such policies and initiatives.


The Role of Faith-Based Organizations in HIV Prevention and Care in Central America
Kathryn Pitkin Derose, David E. Kanouse, David P. Kennedy, Kavita Patel, Alice Taylor, Kristin J. Leuschner, Homero Martinez

Faith-based organizations (FBOs) have played an important role in delivering health and social services in developing countries; however, little research has been done on their role in HIV prevention and care, particularly in Latin America. This volume assesses the advantages of FBO involvement in addressing HIV/AIDS in Belize, Guatemala, and Honduras (such as the diverse presence and extensive reach of churches) and the challenges to FBO involvement (such as the unwillingness of some FBOs to discuss condom use and their lack of experience in evaluating the impact of programs). The authors conclude with possible ways that FBOs can increase their efforts, both independently and in collaboration with other organizations, such as government ministries of health.

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“Happy 40th Anniversary, Pardee RAND Graduate School! I am delighted to support an institution that contributed significantly to my intellectual and career development. The broad vision and skills that I gained at the school have helped me bring about extensive change in the public sector, private sector, and with nongovernmental organizations (NGOs) to improve quality of life. The anniversary theme, ‘Be the answer,’ resonates deeply with me as the chairman of ARGE Consulting, which encourages every employee to volunteer one day a week with NGOs. This policy has helped us contribute to the development of civil society for Turkey’s transition to participatory democracy.”

—Yilmaz Argüden, Pardee RAND Graduate School (PRGS) Class of 1985, is chairman of ARGE Consulting, a management consulting company in Istanbul, as well as chairman of Rothschild investment bank in Turkey. ARGE Consulting has been recognized by the European Parliament for its commitment to corporate social responsibility and for its impact on society. PRGS, the world’s leading producer of Ph.D.’s in public policy analysis, is located at RAND’s headquarters campus in Santa Monica, California.

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