POWER TO THE PEOPLE

HOW SMART GRIDS CAN CHANGE THE WAY WE LIVE
PAGE 12

The day after a deal with IRAN

THE LOST GENERATION in Syrian refugee camps

A long fight for DIVERSITY
1. Sleep Tight!
Sleep disorders are estimated to cost U.S. businesses more than $150 billion per year in absences, accidents, and lost productivity. What’s driving this lack of sleep, and can public policy help solve this problem?

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RAND Europe examines which countries are experiencing the most significant changes in levels of intolerance and against which groups, and considers implications for policy.

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MORE AT www.rand.org/t/CT419
The Day After a Deal World leaders are working toward a nuclear deal with Iran. But then what?

Power to the People What the coming smart grid means for you, your home, and your privacy.

POV Raynard Kington on the need for diversity in biomedical science.

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Syria's Simmering Crisis Refugee children without access to quality education are becoming a lost generation.

at RANDom We’ve got answers, you’ve got questions—and a daily double.
The power of drones to target and kill someone from the sky by remote control is unprecedented, and unsettling to many observers here and around the world. But drones have been “fundamentally misunderstood,” RAND experts wrote in a recent series of papers aimed at debunking some of the most persistent drone myths:

**Myth 1: They will transform how war is waged globally.**
Drones have proven to be deadly against groups like al Qaeda, and their ability to circle a target and strike with precision has changed the battlefield by enabling targeting that would otherwise be too risky or too costly. But the reality is that states with even basic air-defense systems, such as China or Iran, could shoot them out of the air in moments—greatly limiting their usefulness in conventional warfare.

That same vulnerability makes drones less attractive to terrorist groups as well. Suicide attacks or conventional bombs are simpler and much easier to deploy than a drone.

**Myth 2: It’s counterproductive to develop international norms.**
Like it or not, America’s use of armed drones has set a precedent that other nations are watching. As the RAND experts wrote, “this genie cannot be put back in the bottle.”

Because of that, America should not hesitate to take the lead in pulling together an international agreement on the use of drones, the experts wrote. In particular, the international community must define the legitimate use of armed drones—against al Qaeda fighters, for example—and illegitimate uses, such as to target political dissidents.

Such a proactive approach might also help the Obama administration defuse domestic and international opposition to military operations where drones are needed, the experts noted.

**Myth 3: Global proliferation demands new arms-control initiatives.**
Not so, according to the experts. Only a few countries are likely to develop sophisticated armed drones, and most are U.S. allies. Adversaries will likely decide that piloted aircraft and other weapons are better military bets, and more cost-effective, than long-range drones.

That will limit the global proliferation of armed drones, nullifying the need for new arms-control efforts. If anything, the sale of drones to allies and partners will make them more effective in their fight against terrorist groups.

Drones have their strengths, the RAND experts concluded, and have been decisive in limited circumstances. But they have not been a transformative leap from conventional weapons like aircraft.
Ebola Hot Zones

As the Ebola virus snaked through the villages of West Africa, spreading death and terror in an unprecedented outbreak, RAND researchers worked to identify the next potential hot zones.

They developed the first version of a tool to weigh potential risk factors for future outbreaks. It looks for signs of political instability, poverty, social unrest, and inadequate medical care to identify countries that might be vulnerable to an outbreak, and unable to contain one.

Those factors helped explain why Ebola exploded through impoverished, volatile countries like Guinea and Liberia but not their better-developed and wealthier neighbors like Nigeria and Senegal.

RAND’s conceptual tool identified similar high-risk conditions in six countries in sub-Saharan Africa (Burkina Faso, Central African Republic, Chad, Cote d’Ivoire, Ethiopia, and Mali). It also suggested reason for concern in such fragile states as Afghanistan and Somalia, as well as in the rocky tribal regions of Pakistan—within striking distance of major cities and international airports.

Researchers at RAND have also worked in recent months to improve the global response to threats like Ebola. They developed a simple framework to help emergency managers in the thick of a crisis effectively share their progress, failures, and lessons learned, greatly enhancing their real-time communication.

RAND also created a color-coded scorecard to help emergency managers and policymakers quickly judge the merits and pitfalls of different interventions as they prepare for—or scramble to contain—the next outbreak. In the Ebola-ravaged villages of West Africa, for example, it would have identified safe and proper burial techniques as far preferable to the forced cremations that Liberia initially ordered.

MORE AT
www.rand.org/t/PE146

Kids’ Race

Minority parents preparing their children for preschool often take on an extra responsibility, RAND researchers found in a recent survey: starting a conversation about race and unfair treatment. Most of the parents said even children that young need to understand how to manage race-based differences to succeed in school. They considered “racial socialization”—promoting cultural pride and other positive messages while protecting against bias—a critical part of getting children ready for school.

About 44 percent of the parents in the survey said they had already prepared their children by age 4 to face unfair treatment because of their race. The numbers were highest among Spanish-speaking Latinos, two-thirds of whom had already had those talks with their preschool-aged children. About a third of the African-American parents and a fifth of the Korean parents in the survey had also spoken with their young children about race.

Mothers were more likely to address race issues with their children. But fathers were more likely to describe institutional forms of racism, especially those related to law enforcement, the researchers found.

The findings could lead to better programs to help minority parents navigate those early-childhood talks and encourage healthy racial socialization, the researchers wrote. That could better prepare minority children for school and help narrow the persistent achievement gap between minority and white children.

MORE AT
www.rand.org/t/EP50568
Statistics can help you explore the data, sometimes discovering what you might not have even known you were looking for.

Marc Elliott holds the distinguished chair in statistics at RAND. He was identified, along with two other RAND researchers, as one of the world’s most cited scientists in the October 2014 Thomson Reuters ScienceWatch report, The World’s Most Influential Scientific Minds. In recent years, he has studied an impressively wide range of topics including, among many others, racial and ethnic disparities in quality and patient experience within Medicare plans; the health experiences and outcomes of lesbian, gay, and bisexual adults in the United Kingdom; the design of pay-for-performance programs; smoking cessation advice; and weight loss and obesity among fifth graders.

The Statistician Is In

Q What does being RAND’s distinguished chair in statistics mean to you—practically and symbolically?

A Receiving this recognition was a great surprise and honor. The funding has enabled me to do things that I was previously unable to do—to spend more time mentoring, to publish work that is important to me, and to develop new research in areas where I think evidence is lacking.

How did you get into statistics?

My dissertation adviser’s adviser was statistician John Tukey, who once said, “The great thing about being a statistician is that you get to play in everyone else’s sandbox.” Statistics is a great fit for someone who has broad-ranging interests in real-world problems.

I had actually planned to become an academic psychologist. In fact, I was halfway through a Ph.D. in psychology when my focus started getting narrower and narrower. First, it was memory; then it was short-term memory; then it was certain aspects of short-term memory. I realized that something that allowed me to look at a whole range of different problems would suit me better.

When I learned about RAND, I was excited by the breadth of work that is performed here.

Why do you love your work?

There are two things that I get to do on a daily basis at RAND: I get to learn things, and I get to make a difference. There are things that are intellectually interesting, where I think, I would do this even if it didn’t matter. And there are things that I find important enough that I’d do them if they were boring. The fact that I get these two different kinds of rewards, on a daily basis in the same job, feels almost unfair.

What role do you see statistics playing in policy analysis?

Statistics is one of the fundamental tools in quantitative policy analysis. It helps you understand the answer to the question you investigated and how confident you can be in that answer. It can also help you explore the data that you’re collecting in a policy context, sometimes discovering what you might not have even known you were looking for.

How have you seen your work at RAND impact real people’s lives?

For the last 20 years, I have been working on how to measure patients’ experience of health care, and how to convey this information to patients, so that they can make active and informed decisions.

Twenty years ago the idea that health care was a two-way conversation between a physician and a patient was a somewhat unusual one. Things have not completely turned around, but now patients’ perspectives and participation in health care is seen as an important goal by most U.S. and UK policymakers and others in the health field. I am very proud of playing a small role in helping to bring this about.

Elliott’s recent article Sexual Minorities in England Have Poorer Health and Worse Health Care Experiences: A National Survey is available at www.rand.org/t/EP50525
Scientific Workforce Diversity

A Conversation with Raynard Kington

Raynard Kington has spent his career working to improve diversity at the highest levels of biomedical science—"and it’s not getting easier," he says. He currently serves as president of Grinnell College; he previously worked as a senior scientist at the RAND Corporation before becoming a division director at the Centers for Disease Control and Prevention and then deputy director and acting director at the National Institutes of Health.

He recently spoke at RAND about the need for—and reality of—diversity in the biomedical scientific workforce.

On breaks in the career pipeline
This is very clear: underrepresented minorities are less likely to attend college, less likely to receive Ph.D.’s and to be assistant professors. What’s also very clear is that there are certain transition points where the big shifts occur. As you move from high school to college, you see this drop-off in the percentage of African-Americans and Hispanics; then to graduate school, another drop-off; and then another at the assistant professor level.

On disparities in research funding
We looked over years and years, and we never had—at any point in time—more than 2 percent of principal investigators of NIH grants who were African-American. Probably the most important cause for this is different career trajectories related to factors such as differences in access to mentoring networks. Bias in the review process may also play a role, but certainly not a major role. When we raised this last issue, there was a big hoopla. There was an NIH task force, there were all sorts of commentary, letters to the editor, and repeatedly, scientists saying, “I don’t discriminate.” And that’s it. The whole notion that maybe, just maybe, they may not be aware of biases in their behavior—whether in review or in choosing which young people to mentor—was just completely lost on a big chunk of the scientific community.

On the elephant that’s never discussed
I have a picture of my family from 100 years ago. It’s 1914, and those are my grandparents, who were the children of slaves. I raise this because you would think the history of the United States began in 1965 based on the conversation about current diversity issues. It’s as if there’s no recognition that what we see has been a long time coming. We’ve had 300 years of slavery and then intensive legalized oppression. And we have a huge evidence base about intergenerational transfer of advantage and disadvantage. It’s going to take us a long time to address these problems. But we won’t get anywhere unless we actually talk about the real pathways and impediments to achievement.
The Day After a Deal

Even as world leaders worked to piece together a nuclear deal with Iran, RAND experts were focused on the future. **What would change**, they asked, on the day after a final deal?
That question launched a yearlong project within RAND to give policymakers a clear-eyed view of what a nuclear deal would mean. The work that resulted has appeared in Capitol Hill briefings, top-level policy conferences, national op-eds, and even Persian radio broadcasts, helping to inform the global debate.

The leaders of six countries (the United States, Russia, China, the United Kingdom, France, and Germany) have given themselves until June to forge a final deal with Iran. A framework for the deal, announced in April, promises Iran some relief from economic sanctions in return for long-term limits on its enrichment of uranium, an effort to restrain its ability to make a nuclear weapon.

President Obama called it an “historic understanding” and said, if fully implemented, it would “resolve one of the greatest threats to our security.”

The deal presents new opportunities but still faces great challenges, RAND’s Middle East experts and foreign-policy analysts concluded. It must overcome entrenched politics, caustic rivalries, and a fierce undercurrent of suspicion on all sides.

How those obstacles are met will help shape the days after a deal with Iran.

Would a deal signal a larger thaw in American relations with Iran?

Not any time soon. At best, American officials are waiting to see whether Iran holds up its end of any deal—and warning that the consequences will be swift and strong if it reneges. They’ll want proof of Iranian compliance before they broach the possibility of further engagement or concessions.

That’s the safest bet for American policymakers. Iran’s own history of dodging nuclear inspectors and hiding nuclear equipment offers plenty of reason for hedging. American allies in the region—especially Israel—are deeply troubled by any deal that doesn’t strip Iran of all nuclear capabilities. Such a deal would also be a hard sell for U.S. politicians at home, especially heading into a presidential election.

But that approach may miss an historic opportunity to engage Iran and push it toward a more moderate future. A nuclear deal cracks the door for the two countries to emerge from a prolonged deep freeze in their relationship. That could eventually allow the United States to shift resources and military forces that have been committed to containing the Iranian threat.

Lynn E. Davis, a senior political scientist at RAND, has identified two possible policy scenarios that would encourage a new and improved dynamic between the United States and Iran. They hinge on Iran’s complete cooperation with the terms of a nuclear deal; anything less, and harsh consequences such as tougher sanctions or possible military action could be in play.

- The United States could move to reduce and refocus its permanent military presence in the region as a positive signal to Iran, but hold off on any further diplomatic engagement until there are more signs of positive change in Iran’s regional behavior.

- The United States could open up further talks with Iran and hold out the possibility of future...
The Deal

U.S., with P5+1 group of world leaders, promises Iran relief from economic sanctions.

Iran agrees to long-term limits and transparency of its nuclear program.

Challenges

The United States must make clear—both to its allies and to Iran—that any slip in Iran’s compliance with a deal will be met with harsh consequences.

At the same time, the United States must signal to Iran that compliance will be rewarded, such as by lifting sanctions.

Any further change in the U.S.-Iran relationship will face strong political opposition inside the United States.

U.S. Secretary of State John Kerry, flanked by U.S. officials and advisers, sits across from Iranian Foreign Minister Javad Zarif and other Iranian officials before resuming negotiations in Lausanne, Switzerland, about the future of Iran’s nuclear program.
Key Players

Any deal will face strong opposition from Israel and Saudi Arabia, but both countries are likely to adapt to the new reality of a deal rather than actively work to overturn it.

Israel
- has strongly opposed the deal
- considers the deal an unacceptable threat if it leaves Iran with any capability to enrich uranium that could be used for a weapon
- will support congressional efforts to delay lifting of sanctions in a bid to undermine a final deal.

Iran
- has a president who has promised “prudence and moderation,” but who actually has limited room to maneuver because old-guard conservatives—led by Ayatollah Ali Khamenei—hold the real power
- fears, as does the U.S., a Taliban victory in Afghanistan.

Saudi Arabia
- is threatened by rise of Shi’a Iran
- may attempt to roil the region—by stepping up its support of Sunni Islamists, for example—to complicate any further opportunities for engagement with Iran.

Opportunities

A deal would reduce a serious point of tension in Iranian and U.S. relations and open the door for potential cooperation in other regional hot spots.

The relief of economic sanctions would help improve the quality of life for Iranians.

Left: An Iranian oil worker rides his bicycle at the oil refinery south of Tehran. Below: Attendees talk at Iran’s booth at the International Tourism Trade Fair in Berlin, March 2015. A lifting of economic sanctions freeing the sale of oil from this region promises to improve the standard of living in Iran.
incentives—such as greater easing of economic sanctions—while still maintaining a strong military presence to put regional allies more at ease.

Any path the United States takes will be razor-thin and risky on all sides. Anything less than a hard line against Iran would alarm U.S. partners and almost certainly face strong opposition at home. But a hard line also jeopardizes Iran’s acceptance of a deal, and possibly even its cooperation in meeting its promises.

“There is no question that the easiest way ahead ... is to adopt a ‘wait-and-see’ attitude and make no changes in policies,” Davis wrote. But, she added, “The stakes are too high not to give these alternative policies much more serious consideration than has been apparent to date.”

Would a deal lead to a more moderate Iran?

Iran’s new president, Hassan Rouhani, has promised a government of “prudence and moderation.” He has dialed back the rhetoric on Israel, reached out to neighboring countries, and even made a personal phone call to President Obama during a visit to the United Nations—all of it unheard-of during the past decade of Iranian isolation and bluster.

But there’s one problem. Old-guard conservatives hold the real power in Iran, especially Supreme Leader Ayatollah Ali Khamenei, and anti-Americanism is an article of faith for them. Any turn toward America would undercut their authority.

As Alireza Nader, a senior international policy analyst at RAND, put it, that part of Iran’s leadership “needs the United States as an enemy.”

A nuclear deal—and, more importantly, the lifting of some economic sanctions—would give Rouhani a boost and may buy him some freedom to pursue his domestic and foreign-policy reforms. But Khamenei and his conservative allies will still maintain a tight grip on Iran’s economy, military, and security forces.

That means any improvement in Iran’s relationship with the United States after a nuclear deal will be neither sudden nor dramatic. It also means a deal will not likely lead to any great breakthrough in Iran’s anti-Israel stance or in its strained relationship with Saudi Arabia, both major drivers of regional unrest.

But a nuclear deal may offer a sliver of opportunity for the moderates in Iran’s government to push for even more engagement with the United States and the West. This would be baby-step diplomacy, and if there’s any common ground where it might happen, it would be Afghanistan and, maybe, Iraq.

In the schism that divides the Islamic world, Iran is the Shi’a power, which makes it a natural enemy of the Taliban in Afghanistan and the extremist militants fighting in Iraq, all of whom are Sunni.

Iran’s leaders have hinted that they may be open to greater cooperation in Afghanistan, especially as the United States draws down its troops there. Both the United States and Iran also will likely need to cooperate in any future negotiations to end the civil war in Syria, although Iran has allied itself with the Syrian regime while
the United States has supported some of the insurgency.

A final nuclear deal “cannot be expected to greatly diminish the U.S.-Iran rivalry,” Nader wrote. But it does open up the possibility—after a decade of stalemate—of limited engagement on some regional issues. He quoted Ayatollah Khamenei: “The Islamic Republic will negotiate with the Satan on specific issues that are of interest.”

Will Israel and Saudi Arabia intervene?

Israeli Prime Minister Benjamin Netanyahu has been blunt in his assessment of the proposed nuclear deal with Iran: “This is a bad deal,” he told a joint session of Congress in March. “It’s a very bad deal. We’re better off without it.” He and other Israeli leaders have warned that any deal that falls short of stripping Iran of all nuclear-enrichment capabilities will pose an unacceptable threat to Israel.

Saudi Arabia also has reason for concern. As the leading Sunni power in the Islamic world, it views the rise of Shi’a Iran as a direct threat to its security and regional leadership.

Both countries could attempt to sabotage a final nuclear deal with Iran; Israel has even threatened military strikes in the past. But RAND’s analysis concludes that they are more likely to adapt to the new reality of a deal—grudgingly, and not without making waves—than to actively try to sink it.

Israel, for example, is unlikely to go it alone with a military offensive after the rest of the international community accepts a nuclear deal with Iran. Instead, it may ratchet up its military interventions against Hezbollah and, possibly, the Syrian regime, both closely tied to Iran.

More likely, Israel will encourage the U.S. Congress even after a deal to maintain economic sanctions against Iran. Israeli officials have made it clear that they have zero confidence that Iran will abide by the deal. As one adviser to Netanyahu said, “There will be an understanding that Israel was not crying wolf.”

Saudi Arabia, meanwhile, lacks the military strength to strike Iran on its own. Its most troubling response—not especially likely—would be to announce plans to acquire its own nuclear bomb to counter what it sees as a threshold nuclear threat in Iran. That could provoke a regional arms race.

The Saudi kingdom views the proposed deal with Iran as evidence of the United States’ wavering resolve in the Middle East. Its most likely response will be to try to shut down any further diplomatic openings that might bring Iran into other regional issues, and work to spoil the chances of any greater thaw in U.S.-Iran relations.

The opposition to a deal from two of the region’s most important players means that the United States will have to keep the lines of communication open at the highest levels as a nuclear deal goes forward. Among the greatest challenges: assuring both Saudi Arabia and Israel that any failure by Iran to live up to the terms of its agreement will be met with strong consequences brought by an international coalition.

“Getting to a final nuclear agreement will not be easy,” wrote Dalia Dassa Kaye, director of the RAND Center for Middle East Public Policy, and Jeffrey Martini, a Middle East policy expert at RAND. “But it is critical for U.S. policymakers to begin preparing now for the days after a deal.”

Lynn E. Davis is a senior political scientist at RAND. From 1993 to 1997, she served as under secretary of state for arms control and international security affairs.

Alireza Nader is a senior international policy analyst at RAND. His most recent RAND report is Iran’s Influence in Afghanistan: Implications for the U.S. Drawdown (2014). Prior to joining RAND, he was a research analyst at the Center for Naval Analyses.

Dalia Dassa Kaye is director of the Center for Middle East Public Policy and a senior political scientist at RAND. She publishes widely on Middle East regional security issues.

Jeffrey Martini is a Middle East analyst at RAND. He spent four years living in the Arab world, including three as a Peace Corps volunteer in Morocco and one in Cairo, Egypt, where he was a 2007–08 fellow in the CASA Arabic language program.
Chattanooga, Tennessee, July 2012: A powerful storm thundered toward the city, darkening the summer-blue skies and then snapping branches, rattling power lines, and bending old willow trees toward the ground. Warning alarms chimed inside the control room of the regional power company as the storm hit. Soon, the clamor of beeping alerts was constant as system maps flickered red and green with downed wires, blown circuits, and lights going out all across the city.

And then the system began to restore itself, sensing where the breaks were and automatically flipping switches to isolate them and reroute power back into homes. Nearly 80,000 customers lost power that evening; the power company, EPB, estimates that half of them got it back within a second or two.

That’s the promise of a modernized, “smart” grid: An electric future where circuits talk to each other, transmission lines monitor their own loads, and new meters provide an unprecedented look at the energy use of every home. In the coming years, it could change how much you pay for electricity, where it comes from, and how likely you are to lose it in a summer storm.
JUST THREE MONTHS BEFORE THE BIG STORM HIT IN CHATTANOOGA, TENNESSEE, EPB TECHNICIANS CONNECTED HIGH-VOLTAGE ELECTRIC WIRES TO A SMART SWITCH THAT WOULD HELP EPB REDUCE POWER OUTAGE DURATIONS BY 40 PERCENT.
**Smart, but at What Cost?**

Some telltale patterns emerge when you zoom into a home’s energy use. Measure the demand waves closely enough, and you can see the rhythmic bump of a refrigerator’s cooling cycle, the sudden spike of a hair dryer.

Scientists and entrepreneurs have spent decades trying to tease such patterns out of the overall electric buzz of any given house. Such a feat—known as “disaggregation”—has been called the Holy Grail of energy efficiency because it would allow consumers to track every electrical hiccup of every appliance in their home.

Sophisticated smart meters, already installed in millions of U.S. homes, have raised the stakes and introduced a new level of privacy concern. Economist Christopher Guo said the day is coming when analysts can look at a stream of smart-meter data and infer household habits, for good and for bad.

“I think it will be here in a matter of years,” he said. “Unless you have everything battery powered and just sit in the darkness, they can figure out what you’re doing.”

The idea is not science fiction; at least a handful of patents have already been issued for disaggregation tools. Scientists have written algorithms that can sort the electrical signature of a refrigerator from a microwave, for example. German researchers claimed they could identify light and dark scenes on a television based on the tiny ebbs and flows of meter readings.

Those attempts to disaggregate residential data have required meter readings every few seconds to make any detailed sense of the overall electric hum. Today’s smart meters, by comparison, typically sample the electricity use of a home no more frequently than every minute, and often much less.

But as the technology improves, Guo sees the potential for an entirely new market of home goods and services. Companies could offer a detailed analysis of a home’s meter data, for example, identifying wasteful appliances and suggesting ways to save money. A utility could see in the data an old and inefficient washing machine and send the homeowner a money-off coupon to replace it.

It doesn’t take much imagination to see reasons for concern as well. Police could put a house under surveillance by tapping into its energy stream, monitoring the comings and goings of its residents by the lights they turn on. Thieves could hack into the data to learn when people are home and what valuable appliances they have.

The electric power industry and the federal government have been working to develop privacy and cybersecurity standards for the smart grid. And some industry experts say there are real-world limits to how much data a power company can collect before it gets snowed under, and they’re far below the level needed for disaggregation.

Nonetheless, Guo said now is the time to think through the implications of the surge of household data that smart meters make possible. “I don’t think most people in the United States have an understanding of how available their energy data is,” he said.

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**Winners and losers**

But the reality of the smart grid has not kept pace with the promise, Christopher Guo, an economist at RAND, found in a recent study. Industry analysts place the potential value of smart-grid improvements in the billions of dollars; and yet the process of modernizing the nation’s antiquated grid has often been slow and piecemeal, held back by regulatory hurdles and the hobble of unmet expectations.

“The modernization effort will be worthwhile,” Guo concluded. But, he added, it also will “create winners and losers across households and other consumers.”

The electric grid that powers today’s iPads and electric cars is a holdover from an era when high tech meant box televisions. The U.S. Department of Energy likes to say that the grid has undergone so little structural change that Thomas Edison would still recognize its fundamentals.

It’s a one-way pipeline, delivering electricity from huge power plants, across hundreds of miles of transmission lines, down neighborhood power lines, and into your home. It’s proven to be so reliable that you don’t even think about it when you flip a light switch. But it’s inefficient, with extra generators running just to cover any spikes in demand, and vulnerable to brownouts and blackouts.

A smart grid works more like a two-way street, relaying not just energy, but also information from countless sensors and smart home meters. That allows power companies to measure and respond to demand in real time, to incorporate less-predictable sources of energy like solar and wind, and to respond faster to any outages.

But Guo’s research identified some critical roadblocks on the way to that smart future.

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**“Overstating the benefits”**

The grid has been called the largest machine ever built, and bringing it into the 21st century will not be cheap. Power companies will try to pass the costs on to consumers, Guo found, but there’s no guarantee they’ll always be able to recoup their investments. That’s because their rates are often set by regulators trying to minimize costs to consumers rather than maximize system-wide benefits.

At the same time, there are no national smart-grid technology standards, so utilities can’t be certain that the equipment they install today won’t be obsolete by tomorrow.

And then there are the smart meters.

For most customers, that’s where the smart grid begins and ends, in a little box bolted to the side of their house. By the end of this year, an estimated 65 million of the new meters will be installed in the U.S., accounting for more than a third of all electricity customers. Smart meters can measure a home’s energy use at least every hour, rather than the once-a-month meter reads of old.
But Guo found that one of the major selling points of the new meters—lower electric bills—has too often failed to materialize. Utilities have promoted the meters as a first step toward “real-time pricing,” with rates that rise and fall by the hour to better track demand. In theory, consumers could use the readouts from their smart meters to better monitor their daily energy use and shift some of their activities—washing dishes, drying clothes—to lower-demand, lower-cost hours.

But it doesn’t always work that way, Guo found. Some customers have seen their bills increase when they wouldn’t or couldn’t change their household habits to take advantage of the lower rates. Consumer complaints and concerns about the new meters have prompted lawsuits, fed headlines, and opened a credibility gap that has slowed the rollout of the smart grid, Guo found. “It’s a big inconvenience for these people,” Guo said. “People are very different. Some are sensitive to prices, some are not. People complain, ‘How come I’m not getting passed down the savings?’ And the answer is (for some), we are overstating the benefits of the smart grid.”

Consumer complaints and concerns about the new meters have prompted lawsuits, fed headlines, and opened a credibility gap that has slowed the rollout of the smart grid, Guo found. “It’s a big inconvenience for these people,” Guo said. “People are very different. Some are sensitive to prices, some are not. People complain, ‘How come I’m not getting passed down the savings?’ And the answer is (for some), we are overstating the benefits of the smart grid.”

$1 trillion in savings

Billions of federal Recovery Act dollars have paid for many of those smart meters and helped prod the transition from the legacy grid toward a smart grid in recent years. But that money has now been spent. Without other incentives, such as regulatory changes to assure power companies a greater ability to pass through their costs to consumers, the pace of that transition will no doubt slow, Guo said—but it won’t stop. The potential benefits of a more-efficient, more-resilient, smarter grid are too large, both for the electricity industry and for society as a whole, he noted. The Electric Power Research Institute, an industry group, estimates that a fully deployed smart grid would yield more than $1 trillion in savings, efficiencies, and other benefits over 20 years.

Just ask the people of Chattanooga. Their power company saved an estimated $1.4 million that night a storm tore through the city, and the lights came back on by themselves.
Syria’s Simmering Crisis

They may just have fled a war zone, but Syrian children on recess at the Zaatari Refugee Camp in Jordan aren’t so different from kids elsewhere. Boys run around, wrestle, and laugh outside a school made up of tidy portable buildings on flat, rocky desert. Nearby, girls dressed in pink with bows in their hair hold hands and huddle around a book. Kids are resilient wherever they are.
Unfortunately, even with the hardships of living in a camp, these kids are still some of the lucky ones. After all, at least half of Syrian refugee children aren’t even in school. Indeed, if Syrian refugees were a country, they would have the lowest rate of educational enrollment in the world. And, without access to quality education, children here are at risk of not having the skills they need as adults.

All this means that Syria is facing a lost generation. Why is all this happening? Because the civil war is destroying Syrian society. The United Nations announced earlier this month that Syrians are now the largest refugee population in the world—more than 7.5 million Syrians are displaced internally, while another 3.2 million are registered refugees in neighboring countries. That’s nearly half of Syria’s total population.

And while Lebanon, Turkey, Jordan, Iraq, and Egypt have been remarkably generous hosts, the influx is so large that it’s changing some countries’ demographics, with refugees comprising at least 20 percent of Lebanon’s population, 10 percent of Jordan’s, and 10–20 percent of border areas in Turkey, according to the State Department and U.N. Meanwhile, more than 80 percent of the refugees reside in urban areas, not camps, and so rely on urban services, placing high demands on schools.

All this is leaving education in crisis across the host countries. While each country officially allows Syrian children access to the public education system, barriers remain, including school space shortages, having to learn new languages, transportation, the need for children to work for their family’s survival, and bullying. In addition, many are putting off school in the belief that their return to Syria is imminent.

This creates very real risks to the quality of education for both host country nationals and Syrian children. The presence of refugees has meant crowded classrooms and constrained budgets, and it leaves teachers managing students who are at different levels. Continuous investment in these countries’ education systems is therefore important so that the quality of education doesn’t fall backward.

Sadly, there’s no end in sight for Syria’s civil war. And even when peace is reestablished, it will take years before many Syrians can return to their homes, given the destroyed infrastructure and residual tensions within society. This isn’t unique to the current situation: In protracted refugee crises around the world, the average time until refugees can return home is 17 years, according to the U.N.

The responsibility for providing formal K–12 education for refugees lies primarily with the host governments, some of which are taking loans to cover the deficits. But while much of the international assistance response has so far been humanitarian, responding to urgent needs, what’s needed now
is a transition toward development planning, in which longer-term, sustainable solutions for education and other sectors are planned and resourced. This means investing in building capacities of host country governments to provide education to these additional people in the future. Donor funding will dry up over time, and the host governments will need systems to manage the additional children they must educate.

Moving forward, host countries and the international aid community should prioritize investment in access to quality education, with additional attention to building infrastructure to expand school spaces, understanding and addressing other barriers to access, developing transportation options, improving data systems, expanding school monitoring and support, and providing teacher training about refugee needs in the classroom. This will also constitute an investment in the longer-term education development needs of the host countries, meaning they’ll benefit, too.

The suffering that has taken place in Syria since the civil war started in 2011 has been almost unimaginable. But by investing in the country’s future in this way, the international community can help ensure education isn’t another casualty of the war. And perhaps help lay the foundations for a brighter future.

Shelly Culbertson is an expert in public-sector development in the Middle East at the RAND Corporation, where she is conducting studies in support of the Syrian refugee response. She is the author of a forthcoming book about the post–Arab Spring Middle East.

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