nationalgrid

The Democratization of Energy

Climate Change, Renewables and Advancing the American Dream



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Flipping the Switch

Building a New Energy Delivery Model, Democratizing Energy, and Advancing the American Dream

Many Americans who follow climate change – the great challenge of our time – have rallied around a target year of 2050 for a decarbonized energy infrastructure in the U.S. As the leader of one of the nation's largest electricity and natural gas utilities, you can count me in.

Getting the transition right, of course, will be no small feat. No one knows this better than I. My first few years in the energy sector have made it clear that, while we've built extraordinary networks over the last century, it's no longer "business as usual." We need to accelerate the pace of change. Now.

I believe we can get from our current mix of renewable and hydro power – which makes up a small percentage of the energy consumed in New York and New England – to a decarbonized energy network. But it will take the entire energy supply chain. System operators, generators, distributors, and customers – as well as policy makers, technology companies, and climate change activists will all need to collaborate at a level our nation has never seen before.

At National Grid, this desire for a decarbonized energy network isn't wishful thinking. It's been our motivation for years. We serve the energy needs of 20 million people across New York, Massachusetts, and Rhode Island, so we know that as we build a solution to navigate this transition over the next several decades and beyond, our touchstone should always be customers, large and small, commercial and residential.

Above all, energy must be affordable. Right now, electricity and gas customers are being whipsawed by monthly bill volatility in a number of regions. For instance, after years of low-cost electricity, New England saw prices surge in 2013 due to the interdependency between natural gas and electricity prices. Over the last three years, natural gas constraints cost electricity customers in the region an extra $7 billion.

In Upstate New York, from cities such as Buffalo, Syracuse, and Albany, to small communities like Fredonia, Watertown, and Saratoga Springs, one in eight of our customers are more than 60 days behind on their electricity bills.

Again, the prerequisite of our transition solution must be affordability. If not, we will strand working middle-class families and capital-challenged communities. This, in turn, will risk crippling local economies in a downward spiral of high energy costs, decreasing investment and business competitiveness, and increasing unemployment. That means more community needs chasing fewer and fewer community revenue sources.

This concept of affordability combined with easy accessibility came to life in the U.S. in the 1930s and 1940s with FDR's Rural Electrification program and the Tennessee Valley Authority Act, among other policy efforts. The democratization of energy proved fundamental to the U.S. economy and, by extension, the American dream.

How do we transition to a decarbonized energy network by 2050 while growing local economies and ensuring our families' long-term economic and environmental health? How do we do this while building a solution that engages everyone with a stake in our energy future?

The remedy must start with our utility companies and our policymakers.

First, we must put customers in charge.

Consumers will make the right choices if they have the right tools and information. More web-based, big-data solutions will be transformational. Increasing the use of such smart technology will make choosing energy efficiency and productivity easier for all customers. (Today, 57 percent of our energy in the U.S. is wasted through heat loss, leaks, and inefficiencies.) We have seen a small number of smart grid installations scattered across the U.S. with technologies like wireless meters and web-based thermostats. In this eBook, you'll read about the smart grid pilots we have in the works, each with enormous potential for long-term energy savings and carbon reduction.

Second, we must turn the grids into innovation playgrounds.

The legacy of our electricity and gas networks is that utilities were incentivized to become generally reactive and risk-averse to innovation. That must stop. We need to open our networks to high-tech partners focused on efficiency, energy storage, and distributed generation such as solar, wind, and biogas.

Embracing our technology partners will propel the type of market-based advances that lifted the telecommunications and personal computing industries decades ago.

Last, yet most important, we must change how we regulate and finance the industry.





The energy industry must become a sector of innovators.

Our fragmented industry in the U.S. – 1,100 electric distribution companies plus 1,600 local natural gas delivery companies – answers to an array of state and local regulators.

While that regulatory relationship encourages a form of accountability, it hasn't traditionally prioritized aggressive investments in innovation and infrastructure. But there are signs of change. In New York, for example, the Public Service Commission (PSC) put energy innovators on notice with its 68-page call-to-action, "Reforming the Energy Vision."

They get it right, calling for a transformation of the regulator-utility-customer relationship. Instead of a narrow focus on just next month's bill, they've widened the aperture to include solving for greater capital investing, increased energy efficiency programming, and facilitating connections to maturing renewable sources.

Perhaps the PSC's most significant paradigm-busting idea is redefining utilities as a kind of smartphone for energy distribution, with energy generators, service providers, and technology partners delivering a range of energy solution "apps." At National Grid, we're aligning ourselves with this vision through what we call Connect21, and our New Energy Solutions division: a team dedicated to driving our plan for the energy company of the future.

That includes neighborhood solar, microgrids, smart grids, offshore wind energy, green transmission, and many other opportunities that advance our electricity and natural gas networks so that our 21st century digital economy is sitting atop a truly 21st century energy infrastructure.

And while technology is crucial, there's another side of the story that no one is talking about: Who's going to drive this decarbonized innovation? We need to re-examine the way we lead – where traditional utilities represent the classic top-down corporate model, the leaders creating the future of energy must model a raft of new behaviors, from becoming more transparent and collaborative with our customers, partners, and other stakeholders, to delegating decision-making to more employees, thereby bringing critical choices closer to customers.

That's especially important in light of the workforce crisis our industry is facing. More than half of energy employees are nearing retirement age, and that number increases every day. We need to find ways to transfer the tremendous knowledge of these workers to a new cohort of millenials and gen-xers, while building a culture of engagement, productivity, and customer focus.

The chapters that follow tell that story and more: neighborhood solar for working families in Buffalo's Fruit Belt neighborhood; the Newtown Creek direct-to-grid biogas project; green transmission for large scale renewables across New York and New England.

These initiatives signal the transition to a decarbonized energy network. At the same time, they reinforce our fundamental approach to energy in the U.S.—we find ways to ensure our communities' long-term economic and environmental health. And we do this while building a solution that engages everyone with a stake in our energy future, including – and especially – our neighbors across the planet.

The Transition Blueprint

Designing the Future of Energy in the Northeast

The way I see it, the roadmap to a cleaner, more secure energy future isn't complicated. In fact, while there are differences between the regions we serve, our strategy is remarkably similar for both New England and New York. It's a common-sense, reality-based approach that includes renewable energy, energy efficiency and demand reduction, increased natural gas supplies, and electric transmission to connect us to remote resources.

Policymakers in both regions have embraced the challenge of climate change and have enacted laws and regulations to help mitigate its effects. The states where we operate – Massachusetts, New York, and Rhode Island – have made ambitious commitments to significantly reduce greenhouse gas emissions by 2050. They also have adopted innovative approaches to transform the energy sector to better serve customers.

Now is the time to **increase energy innovation**, not erase possibilities from the list.

New England

So what's included in National Grid's balanced approach for New England? In Rhode Island, we built the undersea cable that connects customers to the nation's first offshore wind installation off the Rhode Island coast. We're also developing transmission that delivers wind power from Maine and New York, paired with Canadian hydro power. Our large-scale solar program in Massachusetts locates photovoltaic farms near centers of demand.

While these investments are a key part of our common-sense approach, it's important to recognize that they are not enough to provide New Englanders with the clean, affordable, reliable energy they need. New England suffers from a severe lack of natural gas pipeline capacity. We've seen an increased reliance on natural gas due to a shift away from coal-fired electricity generation over the last 15+ years. That's coupled with a surging demand in gas as a heating fuel and little change in the region's gas transmission infrastructure.

Natural gas shortages are caused by capacity constraints on the pipelines that tap into low-cost gas sources just a few hundred miles away, which is why New Englanders – including our customers – pay some of the highest electricity prices in the country. They also put communities at risk for service disruptions, and even brownouts or rolling blackouts.

No near-future increases in renewable energy and efficiency programs could replace the lost generating capacity that would result from failing to ease constraints on gas transmission. This is especially true now that other generating plants across the region, such as the Pilgrim Nuclear Power Station, are retiring.

There is a natural gas project currently in the works that can help make up the difference and fill out the balanced approach New England needs. Access Northeast, a project proposed by Spectra, Eversource, and National Grid, would

A balanced approach includes large-scale renewables, energy efficiency, and natural gas infrastructure.

provide 900 million cubic feet of gas per day, enough to save New Englanders between $1 billion and $2.5 billion annually.

New York

New York's transformational energy program, Reforming the Energy Vision, or REV, calls for an acceleration to a clean energy delivery system that includes development of more resilient, agile energy networks; integrating clean energy; harnessing new technologies; ensuring data security; and delivering new options for customers.

National Grid has responded with a host of REV demonstration projects across New York that will:

- Increase solar and energy efficiency in communities that might not otherwise have access to these options
- Determine whether a large customer's energy infrastructure (such as a solar installation or gas-fired generator) can be a benefit to – and benefit from – the larger electric grid
- Test the feasibility of building an underground microgrid that would enable renewable energy to add resiliency and efficiency to the electricity grid in northern New York
- Offer smart energy solutions to customers and explore various ways customers can control and reduce electricity demand

We recognize that solar will continue to play a critical role in New York. Along with other state utilities and three of the nation's leading solar developers, we've formed the innovative Solar Progress Partnership. The partnership is designed to encourage more renewable energy across the state at a reasonable cost for customers, and in a way that maintains the safety and reliability of the electricity grid.

One of New York's most significant challenges is alleviating "bottlenecks" on its power grid that cost customers millions of dollars annually by hampering the delivery of low-cost electricity to population centers where it's needed. National Grid has proposed two electric transmission projects that would significantly improve that situation. One, in western New York, would unlock and deliver low-cost hydro power to customers across the region. The other, in eastern New York, would reduce north-south bottlenecks along lines that serve New York City and Long Island, enabling the flow of lower-cost power to those areas.

Also in downstate New York, National Grid has proposed three REV demonstration projects that, if approved by state regulators, would begin this year. These projects involve flood zone protection packages, micro-scale combined heat and power and home energy management solutions, commercial demand response, and a geothermal energy pilot on Long Island.

In many ways, the various parts of our balanced approach are interconnected. The expansion of natural gas, for instance, enables the increased use of wind and solar by providing a safety net of generation on calm or cloudy days. At the same time, natural gas is a fossil fuel that must be burned to create power, whereas renewables are emissions-free. And the cheapest, cleanest unit of energy you can find is the one you never use in the first place, thanks to energy efficiency.

Now is the time to *increase* energy innovation, not erase possibilities from the list. To advance our customers' clean energy future, we need it all.

The New Buffalo

A Case Study in
Energy Innovation

For many years, Buffalo, N.Y. was the symbol of Rust Belt economic decline in the northeast. A once-thriving industrial powerhouse, the city and region suffered through a decades-long slide that seemed to have no bottom.

Not anymore.

Today, construction cranes dot the skyline. Long vacant buildings are being repurposed. Old industries have stabilized, and new industries are taking root. Troubled neighborhoods are seeing new investment. The previously desolate waterfront area is a beehive of activity, even in the dead of Buffalo's infamous winters. In fact, since 2012, Western New York has seen more than $19 billion in development, more than half of it in the city of Buffalo.

I am proud to say that National Grid is quietly at the heart of it. We have an obligation to serve, of course, but through Connect21, we're leading, not following. Under the old utility paradigm, developers would have made their plans, come to us for service, and then been forced to wait while we proceeded with engineering and, if necessary, installed new infrastructure to meet their needs.

For today's Buffalo, that just won't work. We need to be quicker and more flexible. To do so, we've taken an approach that gathers customer intelligence before the shovel hits the ground, integrating our planning with that of our customers. No better example exists than the burgeoning Buffalo Niagara Medical Campus (BNMC).

The BNMC is an economic engine unto itself. A collection of hospitals, life science research and educational facilities, medical offices, and even a hotel, it encompasses 120 acres just north of the downtown

business district. It's currently home to 500 doctors and 200 PhDs.

When the current round of construction, a $200 million investment, is complete, more than 12,000 people will be working and learning there. The pace of growth has been remarkable and so has the demand for energy.

For a time, we struggled to keep up. Every new building, every renovation, every new computer put a strain on aging energy infrastructure that was already near capacity. We were at risk of being a barrier to progress. So, we found a better way. We became a part of the BNMC's planning, giving us a view of where they were going, and where we needed to go to meet their needs.

The result? Together we developed a comprehensive energy strategy – EnergizeBNMC – that allows us to meet energy needs today and tomorrow, and allows the campus to better manage its energy use and meet its goals of development and sustainability. We put money in the ground, adding electrical capacity in the Michigan Ave. corridor *before* it was actually needed. BNMC leadership, taking some risks, has invested in everything from electric vehicle charging stations to parking lot lighting that is powered by both wind and solar, completely off-grid with its own battery storage.

I need to emphasize how special this is. Historically, utilities DO NOT do this. But it's a sign of change; we're transitioning to a new way of doing business.

National Grid and the BNMC are bringing energy innovation to the surrounding neighborhood, as well. This area, known as the "Fruit Belt" with its Lemon, Peach, and Grape Streets, is an underserved corner of the city immediately east of the campus. But it's on the cusp of a turn-around.

As part of New York's Reforming the Energy Vision (REV) proceeding, we're bringing the benefits of neighborhood rooftop solar to the Fruit Belt. Unlike traditional solar installations, which generate electricity only for one resident or business who can afford it, we'll aggregate the power from 100 neighborhood solar installations and share the benefits with residents who otherwise might not be in a position to install solar on their own.

We're also at work on a second REV demonstration with the BNMC. We will be creating a campus microgrid, linking the various energy and energy management resources arrayed on the campus and creating a portal that will allow that mini grid to interact with the external market.

It's an exciting time in Buffalo and the region, and not just on the medical campus. You should hear about Larkinville, Canalside, Outerharbor – names being identified with the rebirth of a once and soon-to-be great city. Riverbend is now the site of the largest solar panel manufacturer in the Western Hemisphere, ground zero for the city's burgeoning clean energy industry. To get ahead of the demand we see in this area, we could invest more than $74 million in energy infrastructure. These are stories for another day, but we're excited to be a part of them all.

No One Left in the Dark

A Solar Solution for
Every Community

Harnessing the sun to generate clean, homegrown electricity is brilliant. We know it is an important piece of a balanced energy portfolio. But after conversations with customers and other stakeholders, it has become clear to me that we must not be blinded by the benefits of solar energy – it must still be affordable and accessible to all.

A decade ago, the solar energy industry in the northeast was in its infancy. Building solar installations and getting them connected to a local utility was cost-prohibitive. In an effort to support this clean technology while achieving the goal of slashing greenhouse gas emissions, policymakers set out to implement incentives that would make solar economically feasible. From Massachusetts to New York, solar gained popularity quickly, creating jobs and giving birth to a robust industry. It worked.

National Grid in Massachusetts was named one of the top five utilities connecting the **most megawatts** of solar energy in the United States.

We've connected hundreds of megawatts of customer-owned solar to our networks in the states we serve. In fact, in 2014, National Grid in Massachusetts was named one of the top five utilities connecting the most megawatts of solar energy in the United States by the Solar Electric Power Association. And this is a state that's not exactly known for its reliable sunshine. To keep pace with increasing demand, we have more than doubled the size of our team that helps customers get their projects online.

Here we are, years later, with a fairly mature solar industry. According to Berkeley Labs, the actual costs of building an installation have drastically decreased each year since 2010, and more residents, businesses, and communities are jumping at the opportunity. Despite this growth and maturation, in some states solar is still receiving those same lucrative subsidies. At the same time, solar owners and developers typically avoid paying for the distribution system they use to sell power into the grid or to get electricity back when it's dark or cloudy, leaving non-solar customers to pick up the whole bill.

To be clear, this state of affairs does not affect our bottom line as a utility – all of the costs of purchasing customer-generated electricity and maintaining the grid are, by law, collected through the rates customers pay on their bill.

But it does affect the bottom lines for the vast majority of our customers who do not or cannot own solar. In Massachusetts, for example, subsidies for solar energy, including net metering, renewable energy credits, and use of the grid, add up to millions of dollars in bill increases each year– likely totaling more than $4 billion from 2016 to 2025. Across the state's western border, our New York customers receive 17 or 18 cents per kilowatt hour as reimbursement versus the 45 cents per kilowatt hour our customers pay owners of solar in Massachusetts.

Those numbers just won't work when the prerequisite of our energy transition is affordability. That's why we have encouraged policymakers across our U.S. footprint to adopt policies that are more fair and sustainable in the long term for all families and communities.

Focusing on energy costs does not mean losing sight of a decarbonized future that includes solar. Just the opposite: creating a sustainable system today will enable renewable energy to truly flourish tomorrow.

That's why we're putting our money where our mouth is: In January, we announced a $100 million investment in Sunrun, the largest dedicated residential solar company in the U.S. This partnership will give us firsthand experience in working with residential solar customers across 15 states and exploring the potential for these small-scale systems to keep the energy grid running smoothly. Ultimately, teaming up with Sunrun will help us find new ways to exceed the expectations of the 20 million people we serve.

We're also taking the lead on innovating ways to make interconnections easier and more affordable. To maximize the benefits to our customers, we are building large-scale solar, owned by National Grid and strategically located near centers of high demand. We have also positioned these solar installations southwest – rather than the traditional "due south" – to maximize the value of the sun's rays for customers later in the day, when the demand on the system is highest.

National Grid is committed to achieving the benefits of solar for the lowest possible cost. This journey to a clean, reliable and affordable energy future must be accessible for all of our customers.

To ignore the issues of affordability and accessibility would leave us with a future of renewable energy that divides customers between the haves and the have-nots. We refuse to leave customers behind in our pursuit of a clean energy future. Instead, we will continue to support a long-term sustainable solution for all.

SolarCity's brand new factory in Buffalo will be the Western Hemisphere's largest solar panel manufacturer.

The Most Important Clean Energy Technology

How Battery Storage Will Empower Energy Customers

As I talk to experts inside and outside of National Grid about the developments that will shape our industry over the coming years, one technology always stands out: energy storage. Batteries have more potential to accelerate the transformation to a clean energy supply chain than almost any other innovation.

Why would National Grid, a utility that's operated traditionally for so many years, want to promote battery storage?

Because it's a game changer for our customers, large and small.

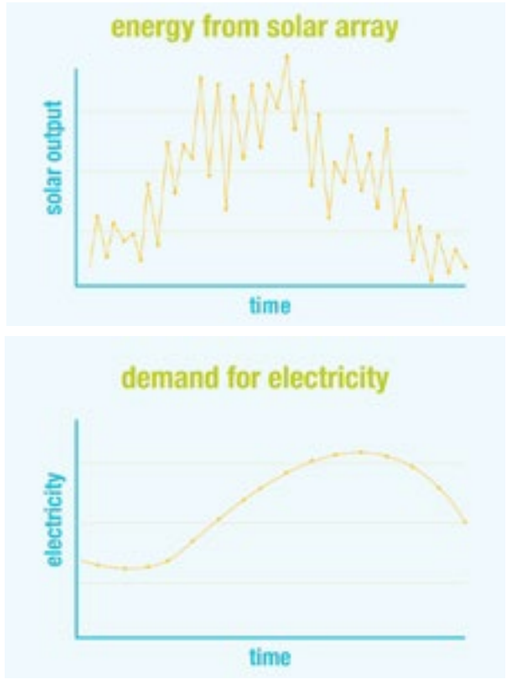
Picture a graph showing the amount of energy generated by a solar array over the course of a typical afternoon here in the Northeast. Rightly imagine the jagged line, with peaks and valleys every time a cloud passes over.

Now picture the same graph for the energy you use at home. It's a smooth, rolling line that heightens hours after the solar array's high point.

These graphs are clearly mismatched, and they reveal that by not closely tracking generation to customer demand, the solar array isn't helping you much. Say we broaden the scope to look at an entire community. A utility like National Grid still needs to build enough infrastructure to hit the top of that rolling hill of demand. And the intermittency of solar power means we have to generate as much power as we did before the array was built, because we can't rely on the consistency of sunny days.

Now, what if we could store up all the power generated by the solar panels and then release it in a way that matches the demand? Or, better still, save it until tomorrow when rain is in the forecast? Suddenly the solar panels become exponentially more valuable. Thanks to energy storage, they've become as reliable as a traditional on-demand power plant (albeit at a much smaller scale).

Battery technology has a ways to go before this picture becomes a reality, and we're working to speed up the process. Here's a glimpse of the future: In Massachusetts, we're building three energy storage projects using two different technologies – "flow" batteries and lithium-ion.



Note: Graphs are for illustrative purposes only

Worcester's Holy Name High School is home to a 600 kW wind turbine. Soon it will also host a 500 kW flow battery. This battery would be able to power an average residential home for about six months on a single charge. And on a windy night, instead of electricity generated by the turbine going to waste as the students are home in bed, it can charge a battery for use the next school day.

Two of our large-scale solar installations will also be home to energy storage technologies. Our solar array in Everett will host another 500 kW flow battery. And at our installation in Shirley, we're experimenting with something else entirely: a 500 kW, lithium-ion battery, the same technology you'd find in a Tesla, but more than 10 times the size.

The Northeastern states, and the state of California, are leading the nation in progressive legislation to promote clean energy. Still, resources like scattershot solar installations have diminishing returns. We need to pair distributed energy sources like solar and wind with battery storage. Storage enables more solar and wind without adversely impacting the operation of the grid, transitioning these clean energy resources from cool tech to valuable long-term assets for all: the democratization of energy in its most basic sense. Resiliency. Lower demand. Affordability. Fewer infrastructure projects. Benefits to customers throughout the network.

That equation only gets simpler as the costs of batteries come down. Energy companies can't just dip their toes in the water anymore – it's time to take a leadership role and do more to understand how and where energy storage is the most valuable for customers. At National Grid, we are doing just that.

The Future of Storm Resiliency

Building a Community Microgrid in New York State's North Country

The North Country of Upstate New York is home to some of the nation's most severe storms. As global climate change continues to increase the frequency and intensity of these storms, we must improve crisis preparedness and response. We need to ensure that emergency services have the power they so critically need and that companies like National Grid can focus on getting customers and businesses back up and running as quickly as possible.

I am keenly aware that one of our biggest challenges while responding during these storms is mobilization. With trees down and power out, it is difficult – if not impossible – to move equipment into the area faster.

Some impacted areas must rely on generator backup systems to provide partial power until proper resources arrive. To address this critical delay we need to "harden" the electric grid to maintain a supply to essential services like hospitals and first responders and energize key local businesses: a bank, grocery store, pharmacy and gas station.

That's why we're teaming up with Clarkson University, SUNY Potsdam, GE Global Research, and the Village of Potsdam to create a system that we believe will maintain essential electric service for a safer, more efficient, and more timely restoration.

The initiative, one of our demonstration projects under New York's Reforming the Energy Vision (REV) is formally known as the "Potsdam Resiliency Project." Informally, many in the community call it the Potsdam "Microgrid."

What is a microgrid? In essence, it's a localized grouping of electric sources that normally connect to the traditional centralized power network (macrogrid), but can disconnect and function autonomously like an island of energy during storms.

The key element of the microgrid will be a new underground distribution loop that interconnects critical energy supply and generation in the village with National Grid's overhead primary distribution system. In the event of an outage, the underground system will separate from the overhead system, becoming the islanded microgrid that will deliver power to connected emergency service providers. This microgrid can provide power to essential services for up to two weeks following an extreme weather event, servicing not only the immediate area but also enabling the town to act as a regional hub for restoration activities.

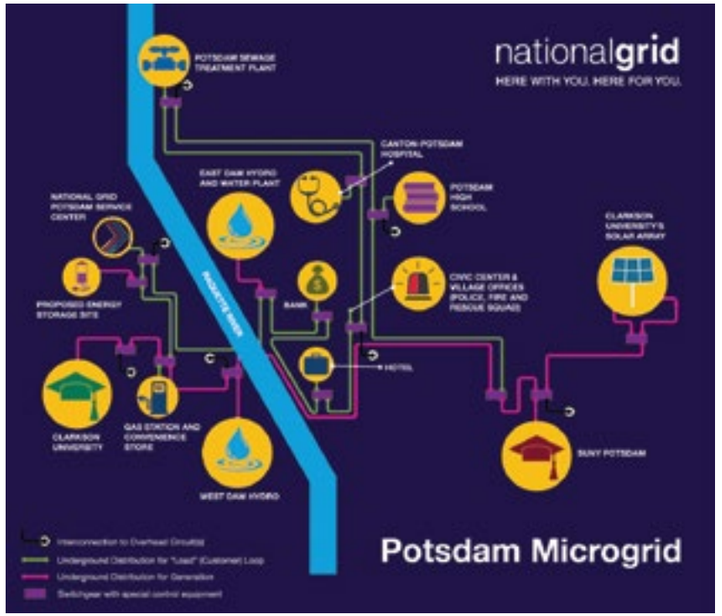
Since the Potsdam Microgrid is a demonstration project, we're also looking at it as an opportunity to advance technology by involving multiple interconnected electric power customers and a variety of generation systems that promote resiliency for our customers. Potential sources include a hydroelectric facility on the Raquette River, a two-megawatt solar installation at the Potsdam Municipal Airport, and a combined heat-and-power (CHP) generation system at the State University of New York at Potsdam.

All combined, these generation sources could supply five to ten megawatts of power to the microgrid during extreme weather events.

This program is a chance for National Grid, the communities we serve, and the energy industry as a whole to envision the future. Do microgrids belong in every municipality? What's the right mix of generation sources to protect against a wide range of extreme weather events? How should the microgrid be controlled and financed?

These key questions about the transition to the electric grid of the 21st century remain unclear, but with the Potsdam Microgrid, we intend to begin answering them.

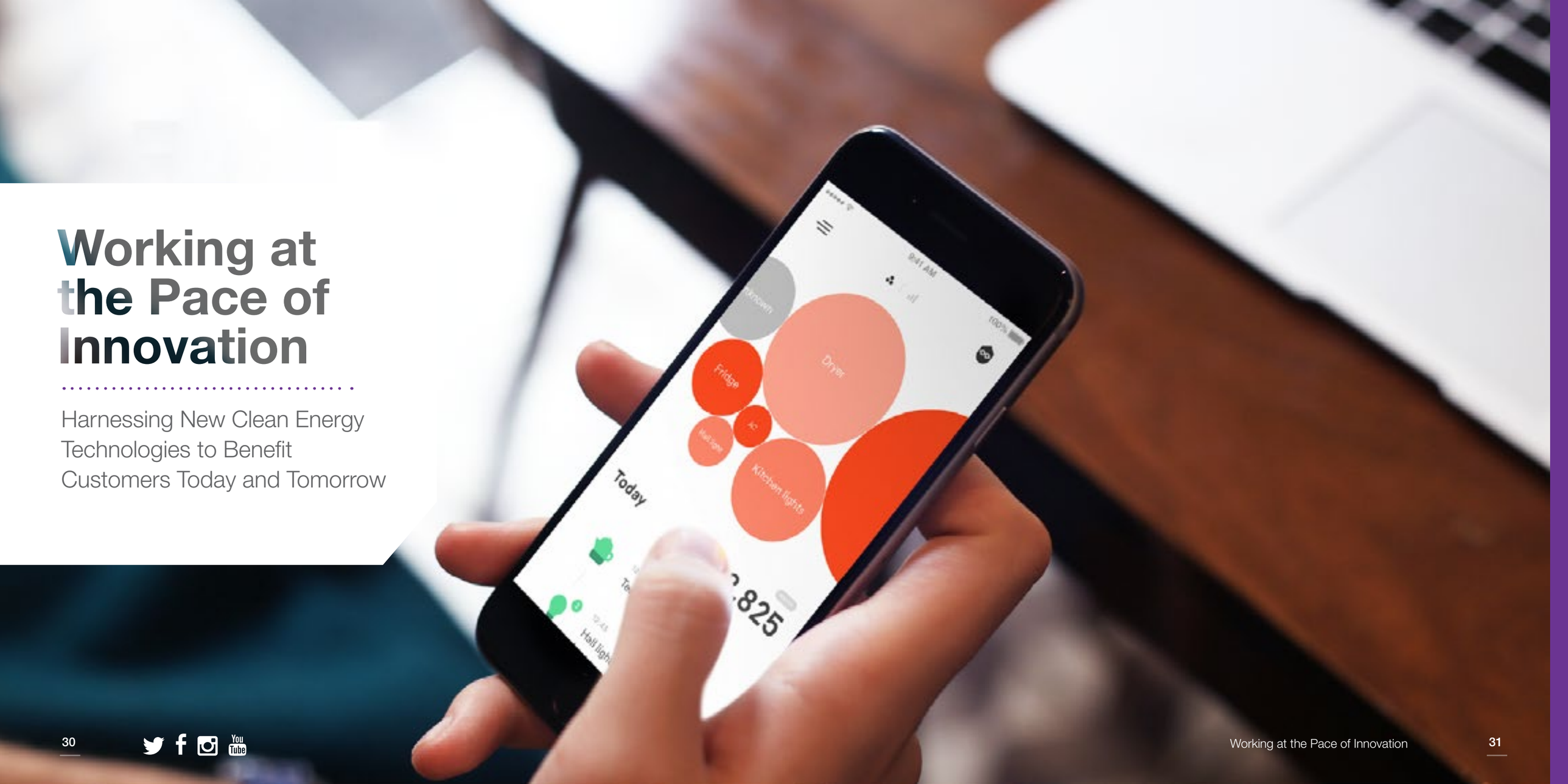
And in the meantime, we're addressing a significant need for our customers in the North Country of Upstate New York and other geographically remote communities.



The microgrid is an opportunity to try new technologies while creating a regional storm restoration hub.

Working at the Pace of Innovation

Harnessing New Clean Energy Technologies to Benefit Customers Today and Tomorrow



It's now hard to imagine a world without the Internet, social media, tablets, and smart phones – yet these technologies have all been around for less than 20 years. Society embraced these innovations and they are now part of our daily lives.

It's also hard to imagine a world without the energy that makes these modern marvels possible. As I've mentioned previously, though, the technology behind the electric grid has not improved much since its inception about a century ago. That's all changing now at a pace our industry – and our customers – have never before experienced.

Do we know exactly where all this change will lead us? Absolutely not. But history tells us that the moments of greatest uncertainty are the most important times to innovate.

That's why we're collaborating with new partners to investigate the next wave of energy technologies. Creating a playground of innovation means we have to take some risks – not every technology will be a game-changer – but I'm confident that it will help us find some answers for how to transform our energy networks and deliver a decarbonized future.

That approach has already connected us to new technologies that will help meet the needs of today's – and tomorrow's – energy customers:

- **Grid-scale energy storage systems,** such as batteries, that help us enhance the existing grid and avoid massive infrastructure projects. They also enable an efficient grid that can handle more variable renewable energy resources.

- **Robots** that inspect or repair pipes, lines, towers, or substations can improve safety and our response to power outages. We're currently testing a robot that can inspect and make minor repairs to transmission lines.

- **Unmanned aerial systems**, also known as drones. These devices, which we currently are testing on our high-voltage lines, have the potential to lower costs and increase safety by performing visual inspections and maintenance, without needing to deploy helicopters.

- **Automated substation controls** that enable us to operate electric substations remotely for the first time, improving our response to power outages, reducing costs, and allowing us to shrink the size of our facilities. Automation also will enable us to hook up more distributed energy resources like solar and wind.

- **Online monitoring and data analytics** enable real-time monitoring of our equipment, giving us a better understanding of conditions in the field. In turn, this enhances our ability to predict when upgrades or replacement are necessary. When coupled with data analytics, monitoring becomes a powerful tool to help us manage important energy equipment.

National Grid is a founding utility in Energy Impact Partners (EIP) - a novel venture capital firm launched in 2015 to fund companies developing emerging technologies like these. Our participation in EIP will increase our understanding of high-tech advancements and allow us to bring innovative energy technologies to our customers.

We're already seeing some early success with EIP investments, including: **AutoGrid** – a company whose software enables energy companies to deliver cost-effective, clean and reliable energy by managing networked distributed energy resources such as solar and wind in real time on a large scale.

We're also working with **Sense**, whose app lets you track the energy you use at home like a grocery receipt – item by item, so you'll know where your money is going. You can also use Sense to control and automate everything from your garage door to your dishwasher.

And **Opus One Solutions** is a startup that envisions a connected energy internet providing real-time energy management to the grid. You heard in our "New Buffalo" chapter how National Grid and Opus One are developing a first-of-its-kind demonstration that will integrate backup generators and other energy resources from the Buffalo Niagara Medical Campus with National Grid's electricity distribution system.

We must embrace the changing landscape and keep pushing the **innovation envelope**

EIP has introduced National Grid to dozens of other companies innovating in areas such as energy storage, smart grid, big data and analytics, and the "internet of things." Access to these companies is helping us rapidly deepen our knowledge of trends, technologies and capabilities so that we can work at the pace of innovation.

I'd be willing to bet that the energy system 20 years from now will offer far greater flexibility, choice, and control than the systems we have today. I know that technology and innovation will play a key role in building energy networks of the future. So we are embracing the changing landscape and pushing the innovation envelope to anticipate and meet the changing needs of our customers and communities.

Customer Empowerment

Smart Grid Programs in Worcester and Beyond

Let's be honest. Most of our customers believe energy prices are too volatile and too expensive. Reliability might have been a differentiator for high-performing utilities in years past, but today, keeping the lights on is table stakes.

Advancing technologies, the need to stay constantly connected, and personal choice in all areas of their lives are driving our customers to want more control over how and when they use energy.

And I couldn't be more proud of the communities we serve for embracing this trend. Why? Because in the end, it will drive a more sustainable long-term model.

In Massachusetts, we rolled out Smart Energy Solutions, a program designed to provide customers the information they need through an integrated package of smart electric meters, in-home technology and new variable energy rates.

As we begin our third year, we're exploring opportunities to apply our learnings and develop this "Smart Grid" concept further with additional customer programs and services.

Leveraging the power of advanced smart meters, nearly 15,000 customers in the city of Worcester, Mass., were given detailed access to their own personal usage information through in-home technologies that communicate directly with the meters on their houses.

In real-time, customers can now closely examine how much energy they use and the financial impact of that usage at different times of day.

Smart Energy Solutions also enables us to communicate directly with customers during critical periods when the demand on the electric grid is high, called "peak events."

On the day prior to these events, customers receive automatic alerts (via email, text, or phone) and can pre-set smart thermostats to save both energy and money. They can also access "load control" devices that can be scheduled to prevent electric water heaters and pool pumps from operating during the expensive peak events.

Customers also have the opportunity to get a more comprehensive look at an entire day's usage, including during peak events, by visiting our "Worcester Smart" web portal.

The opportunity to see in detail how their usage changes throughout the day, especially during these peak events, helps to empower customers to use energy more strategically or lower their usage overall, saving on their bills in the process.

The summer of 2015 saw our first peak events in Worcester. What did we learn? Customers are taking action and feel that the technology is helpful for both understanding and controlling their usage.

Using Worcester as the blueprint, we're now looking at new opportunities to enhance the customer experience by taking the pieces that worked (smart meters, in-home technology, and new rates) and eliminating issues that our customers identified as participation hurdles.

Future programs and services may help tackle other customer issues such as weather-related bill fluctuations or high upfront costs for investments such as solar panels.

With New York's regulatory leadership through REV, the Empire State will be our next stop for a smart grid pilot. The communities that we're exploring provide us with the opportunity to test new smart grid features such as combined electricity and gas "simple bills," that stay at one flat rate for the entire year.

REV allows us to consider an enhanced portfolio of customer-owned generation opportunities, such as new solar and wind, and new strategic partnerships with technology and appliance partners.

Enhanced street lighting that reduces energy consumption and provides better lighting quality, as well as Volt/VAR Optimization, which you can read more about in our chapter titled "An Efficiency Game Changer," are also being considered for new pilots.

As we continue to evolve the range of choices we're offering customers using Worcester's Smart Energy Solutions as a model, future programs will increase the adoption of smart home technologies through education, ease the impact on upfront investments, and improve customers' understanding of how energy markets work, especially during the periods of highest demand.
All of these solutions optimize the customer experience, increase savings for the community, and protect the environment. Equally important, they enable the demand for energy to keep pace with local economic growth.

In real time, customers can now closely examine how they use their energy and at what cost.

An Efficiency Game Changer

Saving Energy Along the Poles and Wires

While having your lights come on every time you flip the switch is almost an afterthought today, I've learned that what happens behind the scenes – and what affects the service customers see every day – is much more complex.

The electricity industry is one of the few to master "just-in-time" manufacturing. Electricity is produced exactly when it's needed. Unlike many products we use every day, electricity cannot be stored at a large scale, put on a shelf, and delivered at a later date (at least not yet). Instead, there is a comprehensive 24/7 effort nationwide to monitor and generate electricity on-demand. There are many challenges to delivering electricity in real-time and meeting fluctuating energy needs.

Now, consider the fact that the electric grid dates back more than a century. This combination of a complex industry, supported by an aging infrastructure, has resulted in some real challenges, including wasted energy as it's transported from one location to another over miles of cable.

The U.S. is dead last among developed nations when it comes to energy productivity. Shockingly, as a nation, we waste more energy than we use. A whopping 57 percent of the energy flowing into our economy is lost as heat, noise, or leaks.

However, it doesn't need to be that way. Understanding where, why, and how energy waste occurs is now possible thanks to advanced technology. In Rhode Island, we are deploying Volt/VAR optimization equipment as a cost-effective way to limit energy loss on our distribution network.

Volt/VAR helps to reduce losses as electricity travels from generating plants, through the transmission network, into substations,and ultimately to homes and businesses by monitoring what we call "power factor."

Think of a draft beer. Some would tell you there is an art and science to pouring it. It's all about getting the right ratio between the head and the actual beer.

Now imagine the beer is the electricity that powers our appliances, charges our phones, and meets our energy needs. It is the power that does all of the work.

Our electricity also contains something called "reactive power" (the head of the beer), which takes up space. If the head of beer in this example had been double in size, it would leave less room in the glass for the real power that does all of the work.

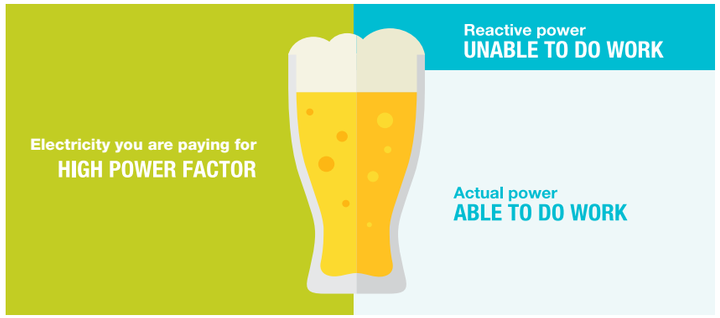
So what does all of this mean? Customers pay for both reactive and actual power. The goal is to limit the wasted reactive power and create the right ratio of power factor for the grid to operate most efficiently and affordably.

Volt/VAR is a smart technology that monitors the power factor in real-time, helps to regulate it, and thus limits line losses. Volt/VAR also helps our customers' devices – from TVs and electric stoves to industrial machinery – function more effectively, reducing their monthly bills. In short, it is a high-tech energy efficiency tool.

For starters, we're investing $6.6 million in Volt/VAR technology in Rhode Island to benefit 16,000 customers.

As a result of this investment, we are expecting a three percent reduction in energy demand.

While many of our customers might never know (or care) about Volt/VAR technology, they will see the impact of it at the end of the day: more reliable power, less expensive power, and a cleaner, more efficient electric grid. Imagine that three percent savings multiplied by the 20 million people we serve. Now we're talking about real money, a real impact on the environment, and a real 21st century electric grid.



If your electricity is a draft beer, "reactive power" would be the head. Volt/VAR gives you a perfect pour.

The Great Transition

Moving to a Decarbonized U.S. Energy Infrastructure

A future without carbon emissions – one that would have seemed impossible just a few decades ago – is now visible on the horizon. In this future, climate change has been slowed to a standstill and we've succeeded in preserving the planet for future generations. And our global society no longer needs to release carbon into the atmosphere to generate all of the affordable, reliable energy we need.

At the start of this eBook, I told you that I believe in this future. National Grid employees live, work, and play in the communities we serve. What better way to protect our communities than to take the lead in creating decarbonized energy networks that keep them healthy while also delivering smart, sustainable economic development?

Looking out to 2050, many frame the future in terms of renewable resources. When will all of our energy needs be met by wind and solar? These renewables will be vital to creating a sustainable economy, but it's more useful to examine what we actually want that future to look like – a world with significantly decreased carbon emissions.

All three of the states National Grid serves — Massachusetts, New York and Rhode Island — have established 2050 goals of 80 percent reductions in emissions versus 1990 levels. New York has gone so far as to propose an interim goal of "40 by 2030." These states have already made significant progress toward these targets. Since 1990, the amount of electricity generated from coal has fallen by 81 percent in New York and 72 percent in New England, leading to declines in carbon emissions of 54 percent and 41 percent, respectively.

So where is this new electricity coming from? While renewable energy sources grew, they still make up less than five percent of the electricity generation in the region. The real game changer was natural gas, which went from less than a quarter of the power generation in the 1990s to about half today.

There's still a long way to go. Almost all of the emissions reductions in the Northeast to date have come from cleaning up power generation. Meanwhile, the region's largest polluter, transportation – emissions from the tailpipes of trucks, trains, planes and all of our cars – hasn't budged since 1990.

Our next step toward creating a decarbonized energy network should be to broaden our reach, using the same model that cleaned up power generation – a

Since 1990, the amount of electricity generated from coal has fallen by

81% in New York and 72% in New England

balanced approach of renewables, energy efficiency, and natural gas – to enable an electric transportation sector.

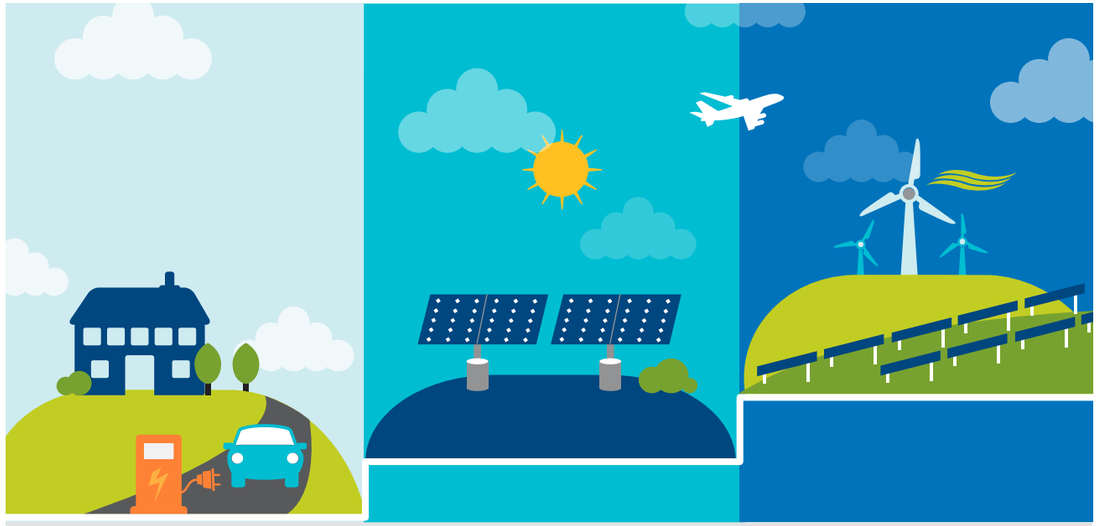
At the same time, we will continue to decrease heating emissions for homes and businesses by converting from oil to natural gas, just as the Veterans Affairs Medical Center in Northport, N.Y. did. The Northport VA's conversion prevents 5,000 tons of carbon from escaping into the atmosphere every year, the equivalent of taking 3,500 cars off the road. And the medical center's $2.5 million in savings can be invested back into programs that directly benefit veterans.

We've worked with the White House, Google, and the Environmental Defense Fund, state regulators, and others on efforts to reduce methane emissions and make natural gas an even cleaner transition fuel. National Grid is also part of One Future, a coalition with the goal of achieving a methane leak rate of no more than one percent across the natural gas supply chain.

You can imagine how natural gas helps take us to a decarbonized future. It displaces dirtier oil from our energy supply chain and serves as a backstop to bring on more intermittent renewable energy generation until large-scale energy storage technologies become available. And we're already coming up with new and fascinating ways to make gas even cleaner.

Take Newtown Creek, where National Grid teamed up with the largest water treatment facility in New York City to produce renewable biogas from the waste stream and inject it directly into the local gas network. By converting a potentially harmful byproduct into a valuable source of cleaner heat, we're scoring an economic and environmental victory.

While aggressive, our strategy sets the table for eliminating significant emissions from the energy supply chain without triggering economic disruption in local communities. Frankly, we can't wait.



HOW WE GET THERE

The Near Term:

Investing in natural gas infrastructure, green transmission, and energy efficiency today to prepare us for the electrification of transportation and cleaner home heating tomorrow.

The Mid Term:

Achieving an 80 percent reduction in emissions in all three of the states we serve by 2050, driven primarily by cleaning up the transportation and heating sectors (and once again fueled by renewables, efficiency and innovative technologies).

And the Long Term:

A future economy that is powered by an integrated decarbonized energy system.

Green Connections

Electric Transmission and the Clean Energy Future

National Grid customers will soon receive energy from Deepwater Wind's Block Island Wind Farm, the first offshore wind installation in the U.S.

By now it's clear that I'm an ardent supporter of developing significant new clean energy resources, and doing it in a way that's affordable for all customers.

At National Grid, we are very fortunate to operate in states that share the desire to green our energy portfolio in a major way, and our policymakers have enacted ambitious and commendable energy policies to do so. These policies require utilities to purchase ever-increasing amounts of clean energy to deliver to customers.

But here's the challenge – there isn't anywhere near enough supply to meet these requirements today, never mind down the road, when they will increase exponentially. And it's next to impossible to build large-scale solar facilities or wind farms – let alone hydroelectric dams – near the highly-populated areas where the renewable power is needed.

To fill the gap, utilities purchase renewable energy credits or certificates, commonly called RECs. A REC represents the property rights to the environmental, social, and other non-power qualities of renewable electricity generation.

And they can be purchased separately from the physical electricity produced by a renewable generator.

While the REC option works on paper, at least for now, it has not resulted in new clean generation resources in the significant quantities the region needs. What we need is a paradigm shift in our thinking about the transmission grid. Our power grid is widely considered to be a marvel of the 20th century. It was initially built to deliver electricity from power plants to local communities. Later, as the industry evolved, it was modified and expanded to accommodate interstate and interregional electricity transmission.

Now, it needs to evolve again to meet the needs of our growing 21st century digital economy, in particular to deliver remote large-scale clean energy resources to population centers where demand is high – and to do so in a way that is affordable for customers.

In 1990, National Grid flipped the switch on a nearly 1,000-mile high-voltage direct-current, or HVDC, transmission system that runs from northern Quebec to central Massachusetts. This project has delivered many thousands of megawatts of carbon-free Canadian hydropower to New England over the past 25 years. When it came online, it was the first project of its kind, and to this day remains one of only a handful worldwide.

Our customers will receive energy generated by the **first offshore** wind farm in the entire United States.

Fast forward to today, as we recently completed the historic "sea2shore" project that interconnects Deepwater Wind's Block Island Wind Farm, the nation's first offshore wind installation, to the mainland power grid. This monumental achievement marks a sea change in the energy industry and means our Rhode Island customers will be the first in the U.S. to power their homes and businesses with this clean, renewable resource.

In addition to connecting the wind farm, sea2shore will enable Block Island to wean itself from the diesel generators that, to date, have provided its electricity, and instead take power from the wind farm and the regional power grid.

National Grid's UK business is a leading developer of large-scale HVDC transmission projects that link to other parts of Europe. A greater level of interconnection improves the diversity of potential energy sources, facilitates competition in the European market, and supports the transition to a low-carbon energy portfolio by enabling the integration of more renewable sources from other countries.

Currently we are part owners of HVDC submarine interconnectors to the Netherlands and France. There is a push in Europe towards a more integrated energy market so that more countries can increase their use of clean energy. To that end, we are developing interconnectors to Norway, Belgium, and a second one to France. We're also exploring other projects that would connect with Iceland, Ireland and Denmark.

Building on our long history and significant experience in developing transmission to meet the needs of our customers and our region, we have been working with Anbaric Transmission to develop long-haul HVDC transmission projects to deliver a combination of abundant,

cost-effective onshore wind and hydropower from northern New York, Maine, and Canada to population centers in New England. This clean energy “two-fer” solves the intermittency issues often associated with renewable energy by combining the cost- effectiveness of onshore wind with the reliability of hydropower, which can serve as a backstop when the wind isn’t blowing. We have initially proposed two projects: the Vermont Green Line and the Maine Green Line, both of which are hybrid land and submarine HVDC cable systems.

We have submitted two proposals in response to a need identified by the New York Independent System Operator to relieve congestion on the bulk power system in western New York, which in turn will lower costs for customers and allow for increased imports and output of low-cost hydropower from the New York Power Authority’s Niagara Power Station.

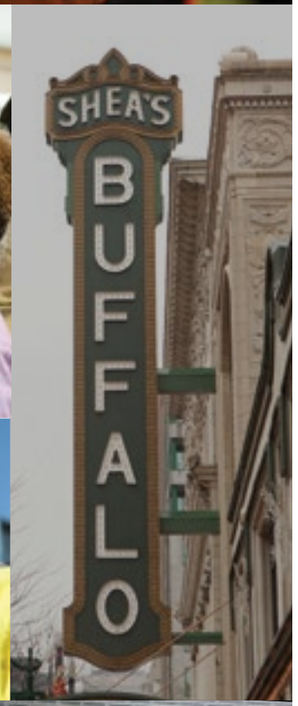
National Grid is also an investor in Clean Line Energy Partners, a developer of long-haul transmission lines to connect wind energy resources in the Midwest to cities and communities that lack access to new, low-cost renewable power.

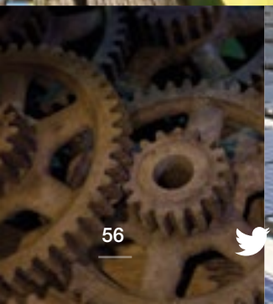
The various processes and reviews that precede construction for these and other clean transmission projects take time to complete. so we will keep forging ahead. There is no doubt that it’s the right thing to do for our customers and communities. Clean transmission is a critical component of the balanced portfolio of solutions that are needed to secure our long-term, decarbonized energy future.

The Block Island Wind Farm under construction

Investing for Impact

Energy-Driven Economic Development in Upstate New York





It's no secret that upstate New York – once recognized nationwide as a manufacturing leader – has yet to fully stake its claim in a globalized economy. What might still be a secret to some is how close the region is getting to reclaiming that leadership position.

I won't pretend to be an expert in the emerging fields getting us there: nanotechnology, advanced manufacturing capabilities, or anaerobic digesters converting waste into electricity, to name a few. But I can tell you, from my travels throughout our service regions, our customers understand them. In fact, they'll tell anyone who'll listen.

At National Grid, we've made listening part of our mission. Across the 24,000 square miles of our diverse upstate New York footprint, we've listened – and beyond that, we've heard. We've heard about industrial parks making products in demand around the world. About abandoned brownfield properties burdening communities and taxpayers, yet teeming with potential. About untried startups that, with the right support, will have no limit to their reach. About established businesses – large and small, urban and rural – primed to innovate and grow. And about jobs – good jobs, lasting jobs. The key, of course, to real sustainability in these communities.

Decades of hearing about our customers' visions have made us visionaries too. We believe in our customers' goals, their workforces, and the communities and futures we all share. And we invest in them, in every way that matters.

Take a look at the nanotechnology boom happening all the way from Albany to Buffalo. Running parallel with the

New York State Thruway, and the Erie Canal before that, New York's growing Nano Corridor is poised to yet again transform business across – and beyond – the state.

Attracting the semiconductor industry to New York has been a 20-year process, and National Grid has been keenly involved from the start, investing millions and providing critical engineering and planning support for the sophisticated electricity transmission infrastructure that today's intensely high tech firms demand. From the NANO Utica initiative in the Mohawk Valley – where the 450-acre Marcy site broke ground in 2016 – to the developing 1,250-acre Western New York Science and Technology Advanced Manufacturing Park (STAMP) "mega site" in Genesee County, our support of these and similar projects will help add thousands of vital new jobs across the regions we serve. And that's just the beginning. Since 2003, we have invested over $75 million in projects that have helped to create or retain more than 40,000 jobs in upstate New York. Our funding has also leveraged a total of $8.2 billion in other private and public investment.

Since 2003, we have invested over **$75 million** in projects that have helped to create or retain more than **40,000** jobs in upstate New York.

Food processing and agribusiness industries are among the fastest-growing sectors in the upstate economy, and National Grid grant programs play a major role in that growth – funding electric infrastructure upgrades for the new $40 million, 60-employee Agrana fruit processing facility in Onondaga County, enabling the Intergrow

Greenhouses operation in Orleans County to undertake a $15 million expansion, and more. In the past year alone, our matching grants for lean manufacturing and other productivity and growth support provided funding for 35 small and medium-sized manufacturing businesses across 15 upstate New York counties.

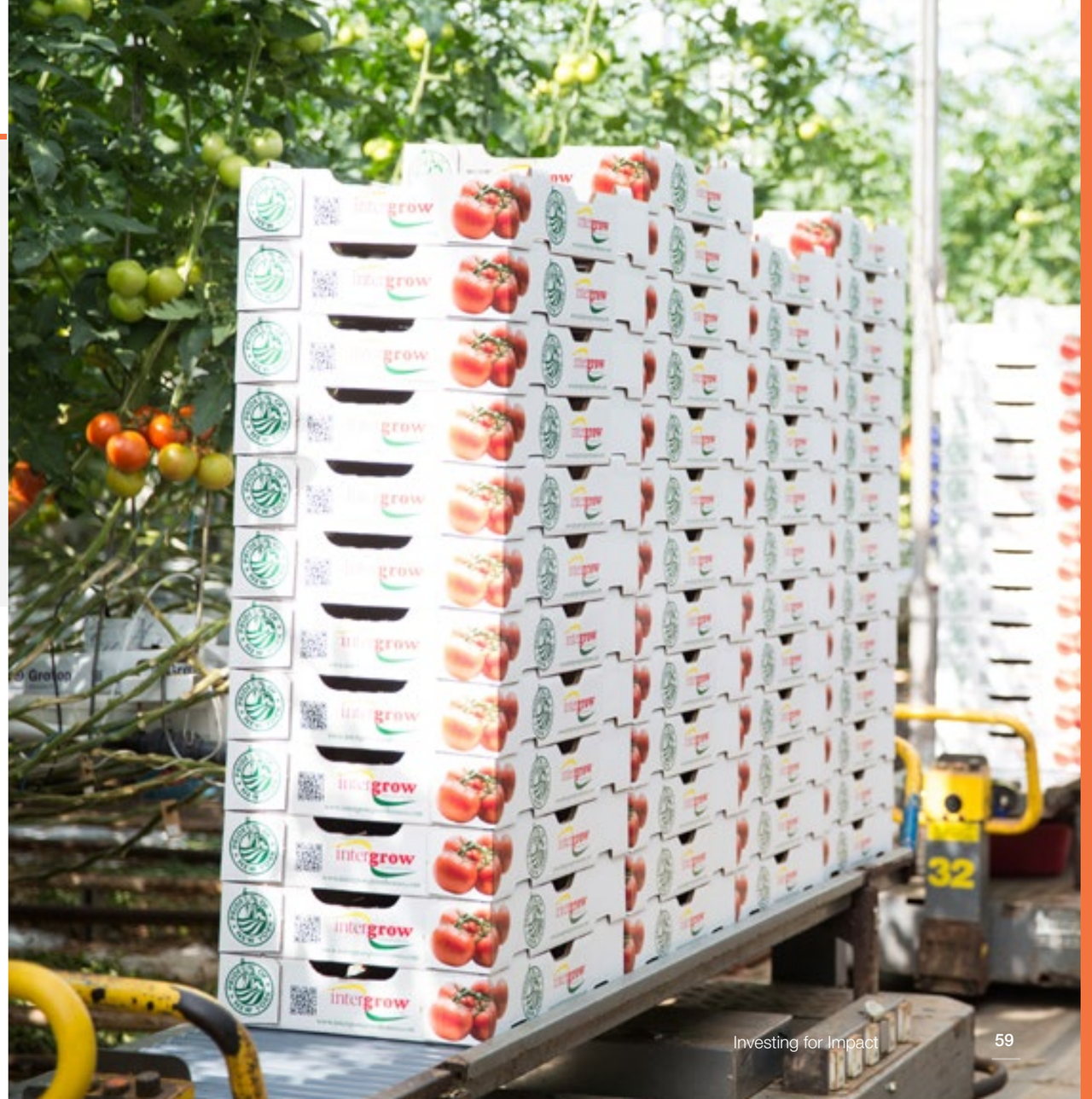
At the same time, family farms and other smaller rural customers are using our power incentive grants to realize expansion plans that depend on upgrading to three-phase electrical service – helping revitalize the region's economy even at hyper-local levels.

Across the region, our upstate New York customers have much more success to share. While National Grid may not always make the headlines, we're often part of the story – and we're proud to have earned a place as our customers' strategic partner. It's our responsibility, our challenge, and our privilege.

My prediction? Businesses will continue to discover, or rediscover, upstate New York. Because we are ready.

Strength in Numbers: The Impact of National Grid Economic Development in FY 2015:

- In 2015 we provided over $11 million in economic development grants to customers statewide, our highest ever level of funding.
- Since 2003 we have invested over $75 million in projects that have helped to create or retain over 40,000 jobs in upstate New York. Our funding has also leveraged a total of $8.2 billion in other private and public investment.



Clean Energy Economic Development

Triple Win of Lower Bills, Less Carbon, More Jobs

As this book comes to a close, you've seen the enormous challenges the energy industry must overcome to decarbonize the supply chain. Affordability, innovative regulation, advances in technology, unprecedented partnerships, natural gas – all must be implemented on a large scale and at the local level. What does that mean? How, exactly, does that macro vision translate to micro stories in the communities we serve?

There's a lot of economic benefit that comes with having a large utility in your backyard. For one, we bring billions to bear in local investment – $15 billion over the next five years, in fact. And that's just in infrastructure upgrades. This number does not take into account the state and local taxes we pay, the jobs we provide, and the capital we invest to move our systems into the 21st century – with the proper regulatory support, of course.

Remember, we're not selling widgets. We're transporting energy – a volatile commodity whose needs must be met with 24/7 oversight. I can only speak for National Grid, but as a multinational energy delivery company with a hyper-local customer focus, there are a number of examples of clean energy leadership I'm proud to lean on.

Our new approach to large-scale solar in Massachusetts is one of them. By strategically targeting installations – more than 20 megawatts of solar panels in projects across the state, with 15 more megawatts on the way – National Grid is looking to provide additional energy to communities that need it *when* they need it, vastly improving the value of solar projects to customers. And the local economic benefit? In addition to the powerful impact these installations will have on the energy grid, the projects will create jobs in our communities and, in some locations, help to transform marginal existing space into something far more beneficial. Further, the solar projects will provide information to help us determine if infrastructure can be retired and removed in certain locations. There's that triple win—lower bills, cleaner energy, and more jobs.

We are also innovating how we bring clean energy to customers through on and offshore wind projects. Our Green Line transmission projects tackle the issue of intermittent energy from wind power by linking wind farms with hydro generation. When wind generation slows, we ramp up hydro – and vice versa – to create a stable stream of electricity that will be delivered from New York, Maine, and Canada via efficient HVDC transmission lines to population centers in southern New England.

And if that doesn't get you excited, consider this: the first offshore wind installation in the U.S. has risen out of the waves here in Rhode Island. Deepwater Wind's Block Island Wind Farm connects Rhode Islanders with clean electricity, and I'm proud to say that National Grid built the undersea cable that connects Deepwater Wind to mainland electricity customers. Again: the triple win.

There is no silver bullet when it comes to a decarbonized energy future – that's why we believe in a balanced approach to getting us there. Enter the natural gas-to-renewables transition story – the one that few talk about. The facts remain: yes, natural gas is a fossil fuel. But it's the cleanest, most abundant and affordable option we have that can supply reliable energy over the next several decades in the way we have come to expect. No other resource can deliver on that promise. It will allow us all to make the best decisions for our communities. No customer or community can be left behind, so the solutions must be the right ones the first time.

Climate change threatens nearly every aspect of our society. From health, food supply, businesses, the environment—all the way up to national economies and security. Our industry, and the U.S. as a whole, must continue to advance renewable energy sources while also lowering demand through energy efficiency.
Given the region's growing electric-gas interdependency, we must invest in natural gas capacity today to stabilize electricity prices and prepare for the electrification of transportation and home heating tomorrow. And we must continue to build the resilient electricity transmission networks that underpin and enable the economic prosperity of our communities.

There's no denying what our customers already know: tomorrow's power grid and energy supply chain must look much different than today's.

I admit that we don't have all the answers yet, but I can guarantee we are committed to finding them. We *do* know we must put customers in charge, embrace technology partners, and see real change in how the industry is financed and regulated. It's time for all utility companies—and our policy and tech partners—to bring the full weight of our power to bear, killing our 20th century infrastructure paradigm in order to have one that works for the 21st century, and beyond.

About National Grid

FTSE 350 Climate Change Disclosure

Leadership Index Member

—Carbon Disclosure Project

All three states we serve:

Top 5 for Energy Efficiency

—ACEEE

Top Green Utility in the World, 2015 and 2016

—Newsweek

Top 5 for Energy Efficiency

—Ceres

People we serve: More than

20 million in the US

US Investment: $15 billion over the next 5 years

About the Author

Dean Seavers joined National Grid in December 2014 as President of National Grid in the U.S.

Dean's long career has included leadership roles at GE, United Technologies, and Tyco. He led GE Security, a $2 billion product and technology group, and he also led a $4 billion global services portfolio for United Technologies.

At Red Hawk Fire & Security, Dean's most recent venture, he was a founder and served as President and CEO. Red Hawk quickly became the second largest independent fire and security platform in the U.S., providing integrated security solutions to large and mid-sized commercial customers.

Dean has a strong background in financial strategy, performance improvement, and operational leadership. At National Grid, his focus is on continuing the performance progress that underpins the company's U.S. business while driving its Connect21 agenda of building the advanced natural gas and electricity networks that are the foundation of our 21st century digital economy.

A native of Sandusky, Ohio, Dean graduated summa cum laude with a bachelor's degree in business from Kent State University and earned an MBA from Stanford University's Graduate School of Business.

Dean and his family have a home in Boston.

nationalgrid

About National Grid

National Grid (LSE: NG; NYSE: NGG) is an electricity and natural gas delivery company that connects more than 20 million people to energy sources through its networks in New York, Massachusetts, and Rhode Island. It is the largest distributor of natural gas in the Northeast. National Grid also operates the systems that deliver gas and electricity across Great Britain.

Through its U.S. Connect21 strategy, National Grid is transforming its electricity and natural gas networks to support our 21st century digital economy with smarter, cleaner, and more resilient energy solutions. Connect21 is vital to our communities' long-term economic and environmental health and aligns with regulatory initiatives in Massachusetts (Grid Modernization), New York (REV: Reforming the Energy Vision), and Rhode Island (Infrastructure, Safety, & Reliability).

Special Thanks to:

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