Operating as a Whole

2010 REGIONAL ELECTRICITY OUTLOOK

ISO new england

ISO NEW ENGLAND is the independent, not-for-profit corporation responsible for providing the day-to-day reliable operation of New England's power generation and transmission system, overseeing and ensuring the fair administration of the region's wholesale electricity markets, and managing comprehensive regional power system planning.

Its board of directors and 470 employees have no financial interest in any company doing business in the region's wholesale electricity marketplace. ISO New England serves the six-state region of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

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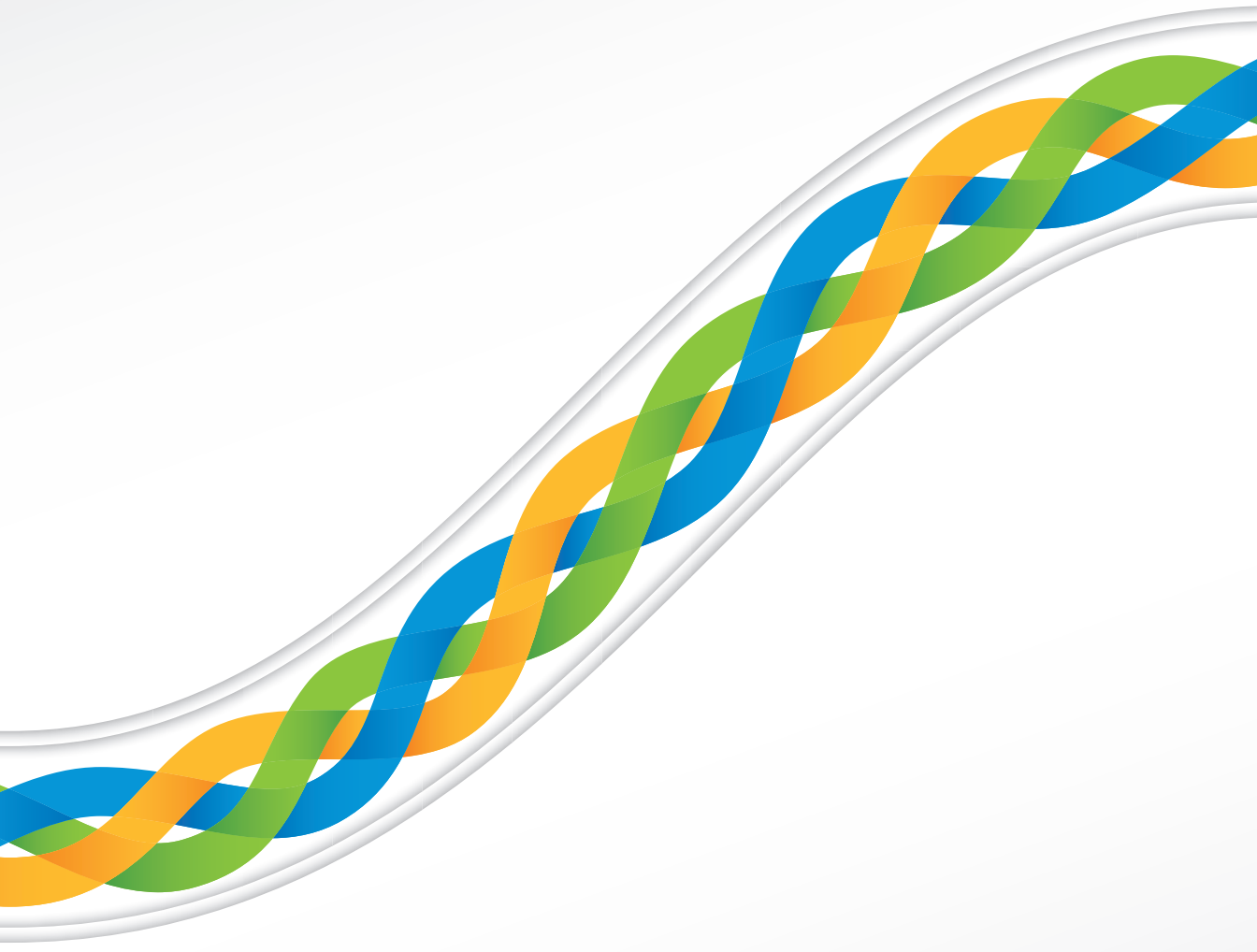
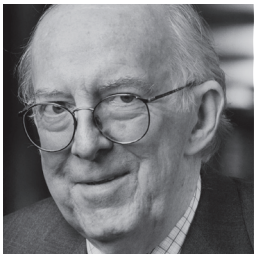


This year's Regional Electricity Outlook illustrates how our three core responsibilities, like the core elements of the power system, are interconnected and interdependent.

From the Chairman and CEO



Vincent M. O'Reilly
Chairman of the Board

Gordon van Welie
President & CEO

In the late 1990s, federal and state policy changes set New England on the path to create competitive wholesale electricity markets that would revolutionize a long-established electric power industry and yield efficiencies in how electricity is produced, bought, sold, and transported. It was an ambitious agenda. At that time, ISO New England was formed to help carry out this promise. We were assigned three primary responsibilities—operating the power system, administering the wholesale electricity markets, and conducting power system planning—that together would ensure New England residents and businesses can count on a reliable supply of competitively priced wholesale electricity.

Over a relatively short period of time, we've seen a dramatic, positive impact on the performance of New England's power system and the pricing of wholesale electricity. Billions of dollars in private investment in new, cleaner, more efficient power plants and demand resources have boosted the region's supply by more than a third, new transmission lines have improved the flow of power throughout the region, and significant efficiencies and savings have been realized.

Today, policy changes are setting New England on a new course—one that emphasizes the importance of renewable resources and advanced technologies to reshape how electricity is produced and delivered, while providing numerous incentives to transform the way electricity is used.

Once again, it's an ambitious agenda. From an economic and engineering perspective, the magnitude of change is potentially enormous. Our past experience has shown that a comprehensive, holistic approach is needed to fulfill these objectives.

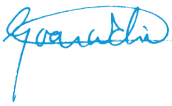
This year's *Regional Electricity Outlook* looks at some of the issues the region faces in integrating low-carbon-emitting resources, implementing the "smart grid," and harnessing the power of the customer, and defines how these challenges have an impact on each one of the ISO's core responsibilities. The report describes how solutions developed by industry participants, policymakers, and the ISO must consider grid operations, markets, and planning as a whole to effectively balance reliability and cost while meeting policy goals.

ISO New England has set numerous priorities for 2010 and beyond to begin tackling some of these challenges. As always, we will strive to complete these priority projects and meet our extensive day-to-day responsibilities while ensuring that our business operations are well-managed, fiscally responsible, and responsive to New England's industry participants, state officials, consumers, and other electricity stakeholders.

Today, policy changes are setting New England on a new course...

Sincerely,

Vincent M. O'Reilly



Gordon van Welie

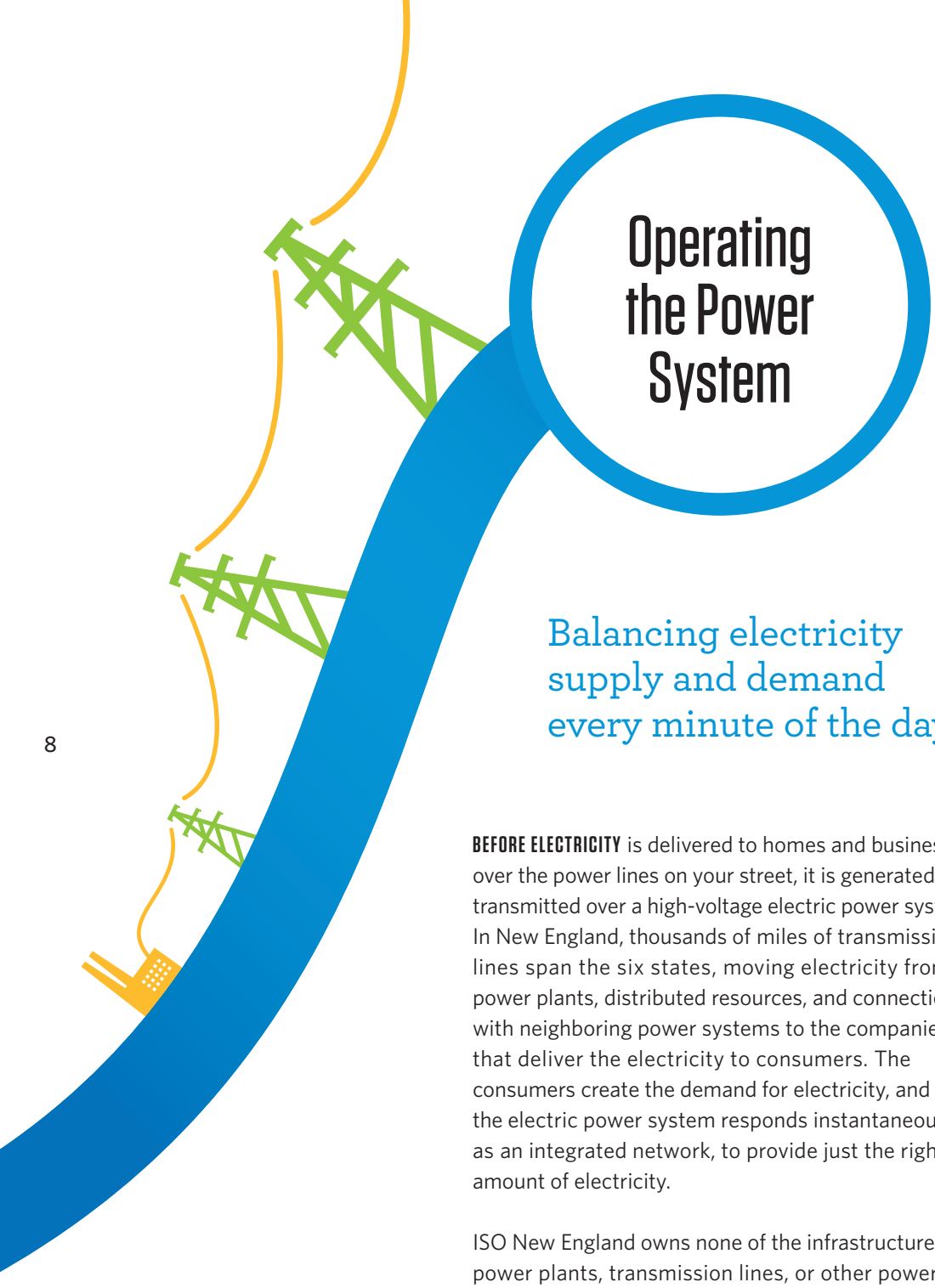
Our Core Services

A dependable, reasonably priced supply of electricity is essential to the quality of life of New England's 14 million residents. It is the lifeblood of the region's $700 billion economy. Without it, businesses cannot operate productively, hospitals and schools cannot provide essential services, and residents cannot depend on the amenities of daily life in our modern society.

While electricity is a basic necessity, it is also a commodity—a product that is produced, sold, and transported for profit by hundreds of companies. And like most commodities, electricity is sold on both a wholesale and retail level.

ISO New England is the independent, not-for-profit organization responsible for overseeing the *wholesale side* of the electricity industry in the northeastern states of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

Our 470-person workforce of power system engineers, economists, and computer scientists fulfills three critical responsibilities that together ensure New England has reliable, competitively priced electricity today and into the future.



Operating the Power System

Balancing electricity supply and demand every minute of the day

BEFORE ELECTRICITY is delivered to homes and businesses over the power lines on your street, it is generated and transmitted over a high-voltage electric power system. In New England, thousands of miles of transmission lines span the six states, moving electricity from power plants, distributed resources, and connections with neighboring power systems to the companies that deliver the electricity to consumers. The consumers create the demand for electricity, and the electric power system responds instantaneously, as an integrated network, to provide just the right amount of electricity.

ISO New England owns none of the infrastructure—power plants, transmission lines, or other power resources. Our job as an independent entity is to centrally operate this integrated network. From our state-of-the-art control room, our certified system

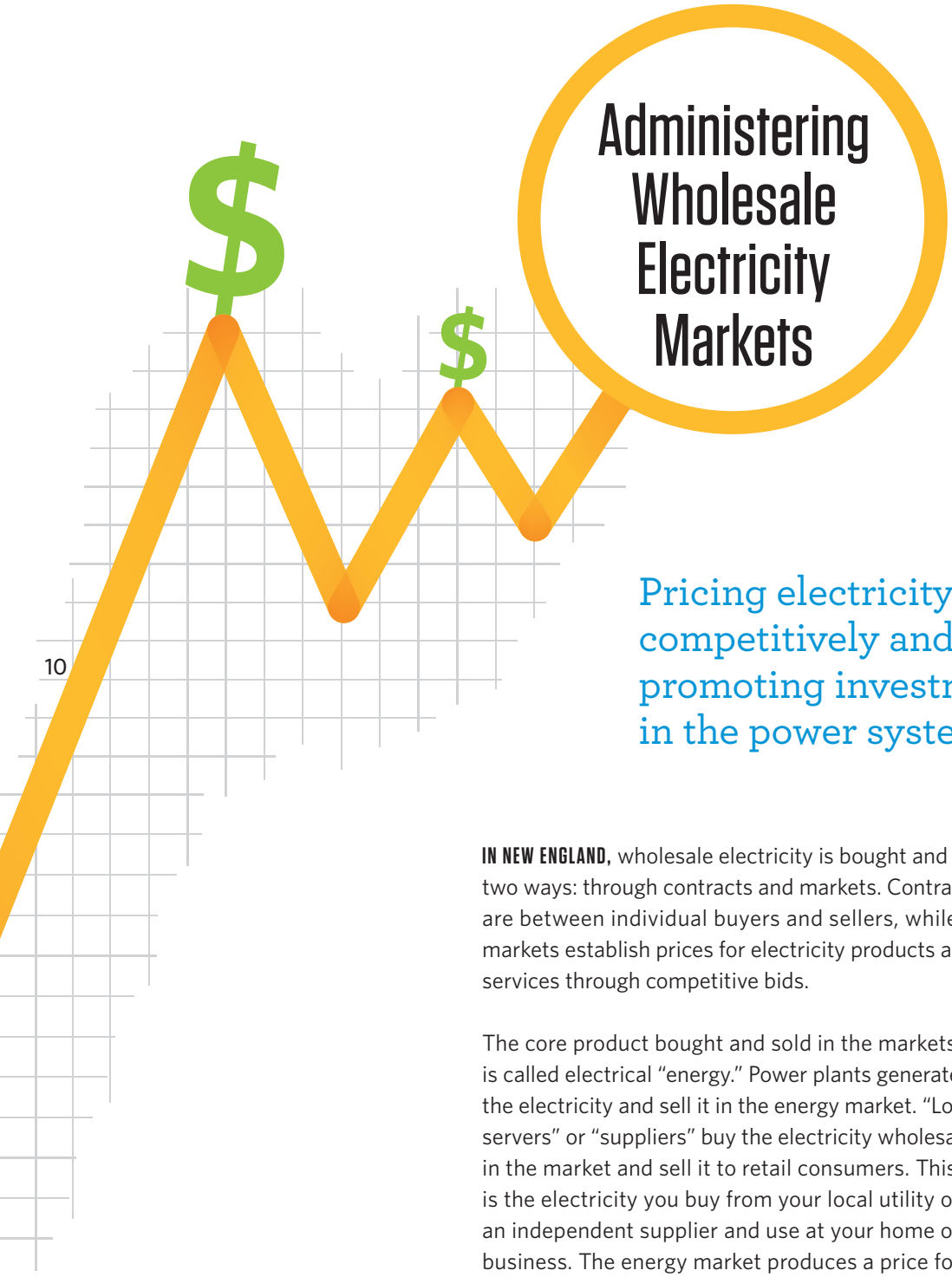
operators direct power plants across the regional grid to produce electricity, balance the amount of power flowing into and out of the system, and direct the flow of power around the region to ensure electricity supply meets demand every minute of the day.

Electricity can be stored only in very small amounts, so it must be produced the instant it is consumed. Therefore, our operators must consider a large number of variables that can at any moment affect the production and flow of electricity across the grid to ensure enough power is generated and gets to where it is needed. We monitor power plants for unexpected outages and transmission lines for overloads. We also track weather and other events to forecast electricity demand. In case of an emergency outage or increased demand due to changes in weather, the operators also can call on reserves—power plants and resources on standby and ready to produce power at a moment's notice. We also can call on manufacturers and businesses to cut their electricity use temporarily, and we can limit exports to neighboring grids if power supplies are tight within New England. We coordinate the schedule for thousands of transmission line and power plant maintenance outages to ensure these outages do not compromise power system reliability.

To be reliable in the short term, the system must have enough power plants producing electricity, plants in reserve, and plants on line that provide services to keep the physics—the voltage and frequency—of the system in balance. To be reliable over the longer term, these resources and the transmission lines that make up the power system must adapt to keep pace with changing consumer demand for electric energy, retiring plants, and the addition of new resources and technologies. The products, services, and infrastructure needed to maintain reliability are procured and developed through our two other functions: wholesale electricity markets administration and power system planning.

Coordinated Scheduling of Transmission Line Maintenance Saves Millions

In addition to measuring the impact of proposed repair or maintenance outages of transmission lines on the reliability of the system, we also gauge the probable economic effects of these outages. Inadequate transmission capacity in an area of the grid may prevent the least-cost electricity from being transmitted to meet demand in that area. This is called a congestion cost and is a component of the price of wholesale electricity. In 2008 and 2009, we rescheduled 18 outages based on economic evaluations, reducing wholesale electricity costs by an estimated $84 million.



Administering Wholesale Electricity Markets

Pricing electricity competitively and promoting investment in the power system

IN NEW ENGLAND, wholesale electricity is bought and sold two ways: through contracts and markets. Contracts are between individual buyers and sellers, while markets establish prices for electricity products and services through competitive bids.

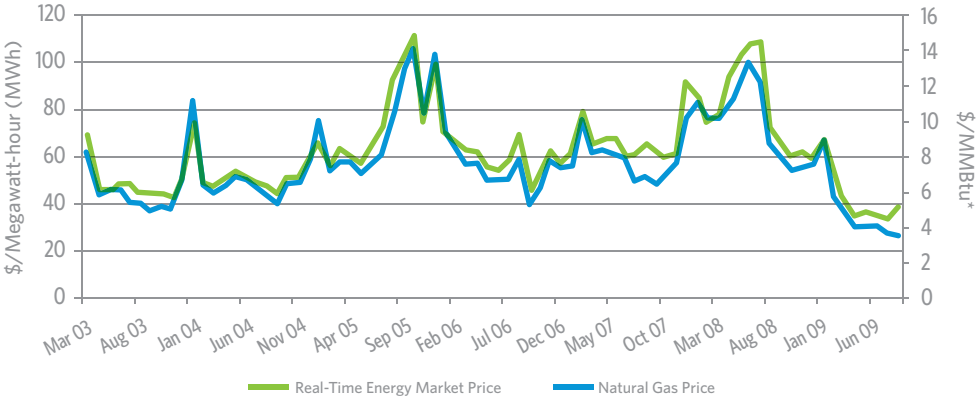
The core product bought and sold in the markets is called electrical "energy." Power plants generate the electricity and sell it in the energy market. "Load servers" or "suppliers" buy the electricity wholesale in the market and sell it to retail consumers. This is the electricity you buy from your local utility or an independent supplier and use at your home or business. The energy market produces a price for every hour of every day during the year at over 900

locations across the region's grid. The price fluctuates throughout the hours of the day, seasons of the year, and locations in New England. The prices fluctuate as a result of changing prices of the fuels that power plants use to make electricity (such as natural gas or oil); the amount of consumer demand, which varies greatly throughout the day and year; transmission constraints that can prevent the least-cost electricity from flowing freely in certain locations; and small amounts of energy that are lost on the transmission lines when electricity travels across long distances.

Several other wholesale electricity products are bought and sold through wholesale markets to ensure real-time and long-term reliability of the power system. "Capacity" is a market product that ensures that the power system has adequate resources to meet demand for electricity now and in the future. "Ancillary services" are a group of market services that ensure reliability of the power system at all times and especially during periods of heavy demand or system emergencies. Load servers and suppliers must buy these products, along with the electric energy, from power plants and other resources. The costs of these products and services plus some administrative costs (including ISO New England's services) make up the overall cost of wholesale electricity. The largest

Wholesale Electricity Prices Track Natural Gas Prices

Natural gas power plants produce more than 40% of our region's electricity, closely tying the prices of natural gas and electricity. In 2009, natural gas prices were down significantly—and the region saw a 50% decline in wholesale energy market prices from 2008 to 2009. In other periods, such as during summer 2005 when hurricanes devastated natural gas delivery systems in the Gulf of Mexico, increases in natural gas prices drove up energy market prices.



** MMBtu stands for millions of British thermal units.*

portion of the wholesale cost is the energy price, which is largely determined by the price of fuel.

The goal of these markets is twofold: to price wholesale electricity competitively and to promote investment in new power system resources to maintain reliability. Markets accomplish these tasks by providing an environment that encourages buyers and sellers to find more efficient and cost-effective ways of producing, delivering, and even using electricity, resulting in competitive prices for these products and services. Areas on the system where prices are higher point to inadequacies in the system. For instance, transmission constraints preventing the least-cost electricity from flowing to an area will result in higher prices in that area. These price signals reveal the potential need for additional investment, such as a new power plant or demand-side resource.

ISO New England has numerous responsibilities in running and overseeing the markets. Our complete financial independence from any company doing business in the marketplace is crucial to making sure the markets are fair and competitive.

MARKET DESIGN: We oversee an extensive, open stakeholder process for developing the rules that govern the markets. New England's markets are designed to produce accurate and transparent price signals, while providing a level playing field that encourages participation by a mix of diverse entities and interests. The ISO regularly modifies the market rules to enhance the efficiency of the markets and to stay in step with technological and resource advancements as well as government policy goals.

The cost to provide our essential services was $124 million in 2009. That's about 79 cents per month for each customer in New England.

ADMINISTRATION & BILLING: We process and produce vast amounts of data (most notably, day-ahead and real-time energy prices) for hundreds of locations across the grid, every five minutes and hourly. We clear the markets and provide weekly billing services to the buyers and sellers of wholesale electricity. In 2009, we billed approximately $9 billion: nearly $6 billion for energy, $2 billion for ancillary services and capacity products, over $1 billion for transmission charges, and $124 million to run and operate the ISO. In addition, we ensure that proper measures are in

place to mitigate participants' exposure to credit risk should a participant default in the markets.

ANALYSIS & MONITORING: We issue weekly, monthly, quarterly, and annual markets reports that describe the performance of the markets. This information helps industry participants make decisions about their participation in the markets and also points to the potential need to improve the market design. We also monitor market behavior and performance to ensure participants' compliance with the market rules and that the markets are fair and competitive.

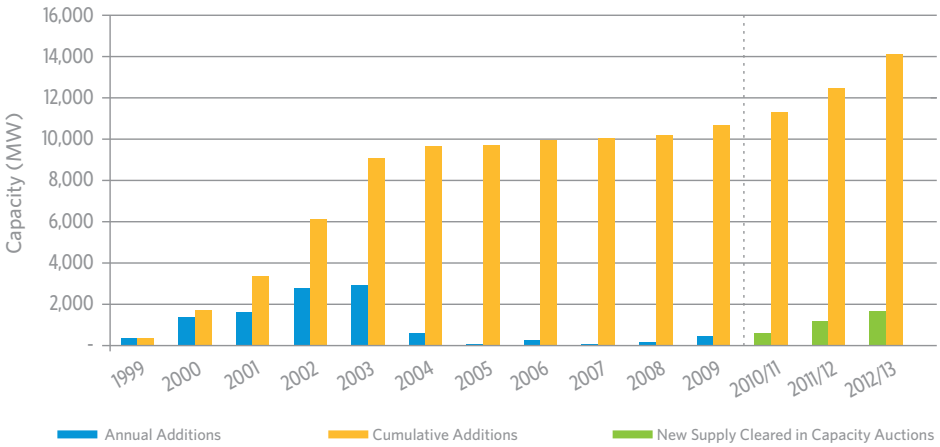
TECHNICAL SUPPORT: Our customer support department helps companies do business in a highly sophisticated and complex marketplace. Each year, we publish newsletters, issue hundreds of Web-based notices, and respond to thousands of inquiries. We also offer extensive training on the markets.

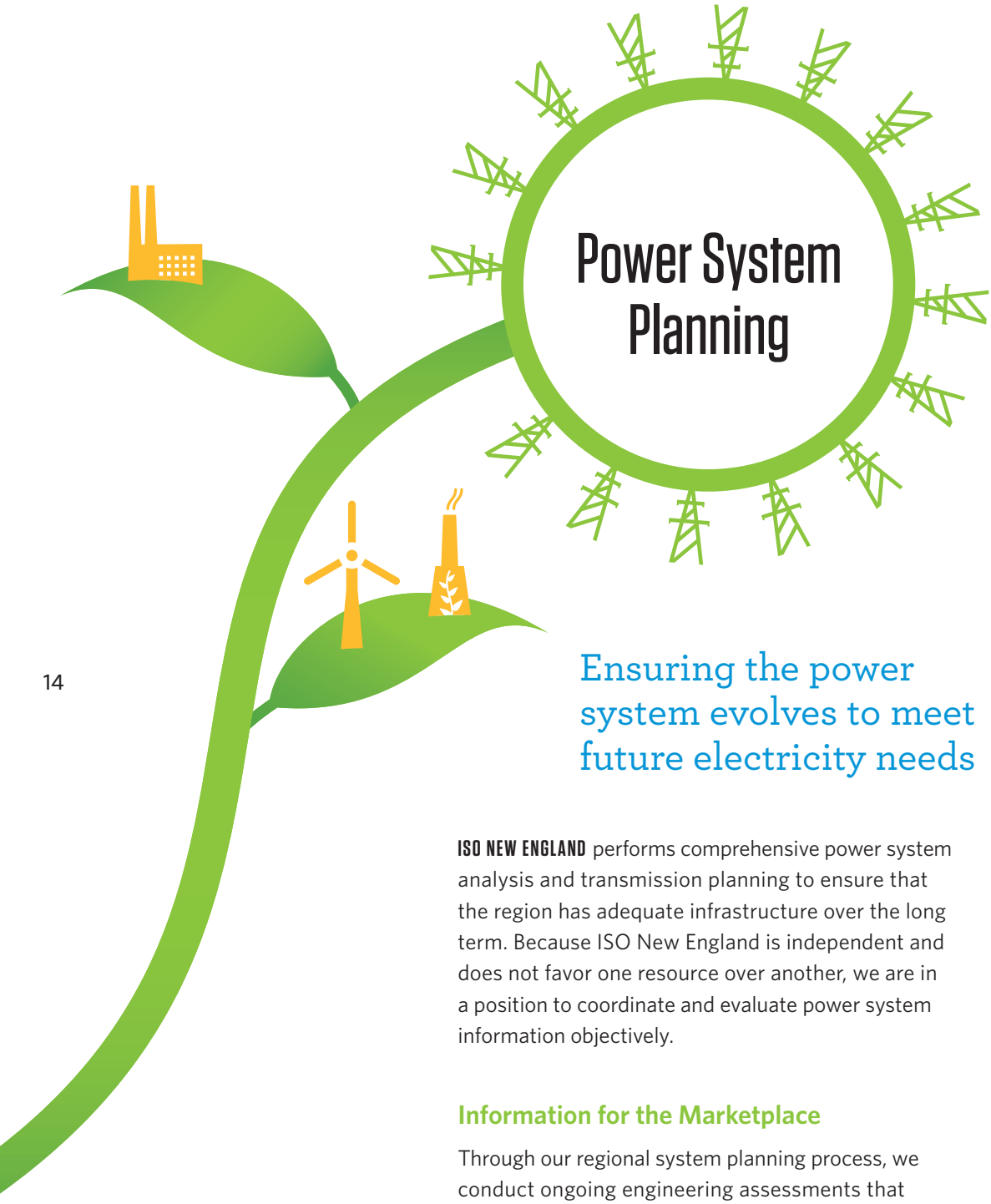
Economic Dispatch Ensures Reliable and Lowest-Cost Supply

The ISO calls on power plants to run starting with the least expensive resources needed to meet demand. In this way, the cost of producing electricity is minimized as much as possible while still maintaining power system reliability. All resources receive the same clearing price in the energy market. This provides market participants with the incentive to submit the lowest bid possible as a way to ensure that they will be selected to run.

Continuous Investment in New Generation Resources in New England

10,800 megawatts (MW) added since 1999; 3,500 MW committed for 2010-2012





Power System Planning

Ensuring the power system evolves to meet future electricity needs

ISO NEW ENGLAND performs comprehensive power system analysis and transmission planning to ensure that the region has adequate infrastructure over the long term. Because ISO New England is independent and does not favor one resource over another, we are in a position to coordinate and evaluate power system information objectively.

Information for the Marketplace

Through our regional system planning process, we conduct ongoing engineering assessments that analyze and estimate New England's power system requirements 10 years into the future. We identify electricity consumption patterns and growth;

adequacy of resources to meet demand; and issues related to power plant fuel supplies, fuel diversity, environmental requirements, and integration of new technologies. We also respond to requests for economic analysis of various resource-expansion scenarios.

The process culminates each year in a Regional System Plan that serves as a roadmap of system needs. This information, combined with pricing signals from the markets, enables participants in the marketplace to make sound business decisions about investing in the power system. Informed decision-making is critical to participants who, under this market-based environment, carry all the financial risk of these large-scale investments.

Backstop Transmission Solutions

New England relies first and foremost on projects proposed from the marketplace to solve power system reliability needs. To the extent that market responses are not forthcoming or adequate to meet these needs, the ISO is required to identify the appropriate transmission infrastructure solutions.

The development of transmission infrastructure faces many obstacles. It is expensive to build, construction requires long lead times, proposed locations for lines and substations often face opposition, and projects involve numerous decision makers. For example, transmission owners draft proposals in collaboration with the ISO and stakeholders. But decisions such as whether and where lines will be sited are made by state government.

New England has been successful in developing new transmission infrastructure for two main reasons. First, our planning process is conducted through an open, public forum. The regulators and siting authorities from the six states are highly involved, providing a sound foundation for their decision making. Second, we have a well-defined funding mechanism that provides the financial certainty for projects deemed essential for maintaining power system reliability. The cost of these transmission

Offsetting Costs

Enabling wholesale electricity to move more efficiently within and between regions provides greater access to lower-cost power, reduces transmission congestion costs and line losses (both components of energy market prices), reduces the need for costly reliability agreements between the ISO and certain power plants, and improves the region's ability to import and export electricity. So while building transmission is expensive, the infrastructure can help reduce energy prices, therefore offsetting the costs. For example, recent transmission upgrades have reduced congestion costs by almost 80%, from $121 million in 2008 to $25 million in 2009.

projects is shared by consumers across the region on the principle that all consumers benefit when the reliability of the highly interconnected regional network is improved. The costs are allocated to each state based on the amount of electricity each state uses.

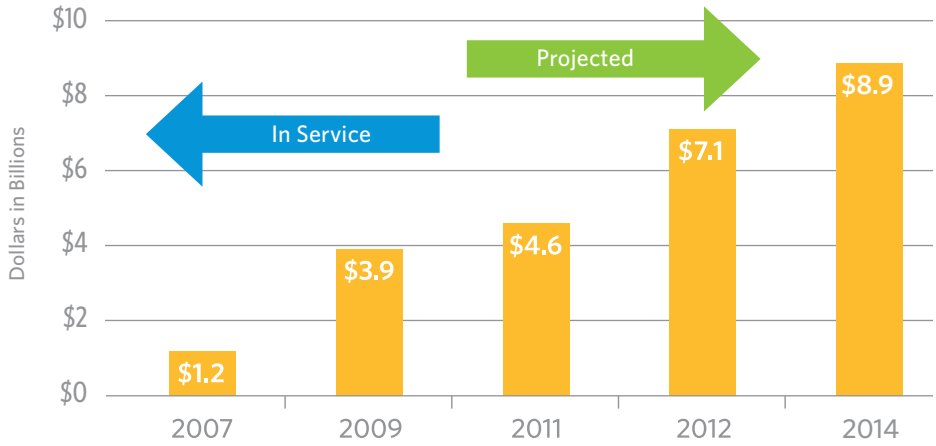
The power system is never static. Therefore, we annually update the Regional System Plan to reflect the latest system conditions, forecasts, and investments in the power system.

Connecting to the Grid

ISO New England has other responsibilities in coordinating how power plants, transmission lines, and other resources connect to and operate on the grid. For example, we administer the complex process for adding new power plants and power plant upgrades to the grid. Through extensive engineering studies, we determine whether interconnecting a proposed plant to the tightly integrated system would be feasible without adversely affecting reliability and how this should be done. We also monitor plant construction schedules to ensure that resources are placed in service in time to meet the identified need.

Since 1999, more than 60 generating projects have become commercial, adding more than 10,800 MW of capacity to the grid. Our Generation Interconnection Study Queue is updated monthly as resources are added and withdrawn. It is available on the ISO's website.

Actual and Projected Cumulative Transmission Investment in New England



Our role recently expanded with the introduction of a new capacity market. We now have a team to study and determine which generation and demand-resource proposals are qualified to participate in each annual capacity auction. We also monitor the resources selected in the auction to ensure they will be on line by the commitment date.

Registration and Performance Auditing

To have a clear understanding of the capabilities of each asset on the grid, all resources on the power system must be registered with ISO New England. In 2009, we processed 1,800 registrations and updates for new and existing power plants, load assets, and tie lines, and received 1,250 registrations and updates for demand-resource assets. Our team also evaluates and audits the capability and performance of resources to ensure they are able to operate as expected. We provide hands-on training for new resource owners.

Enhancements Take Region Off DOE List

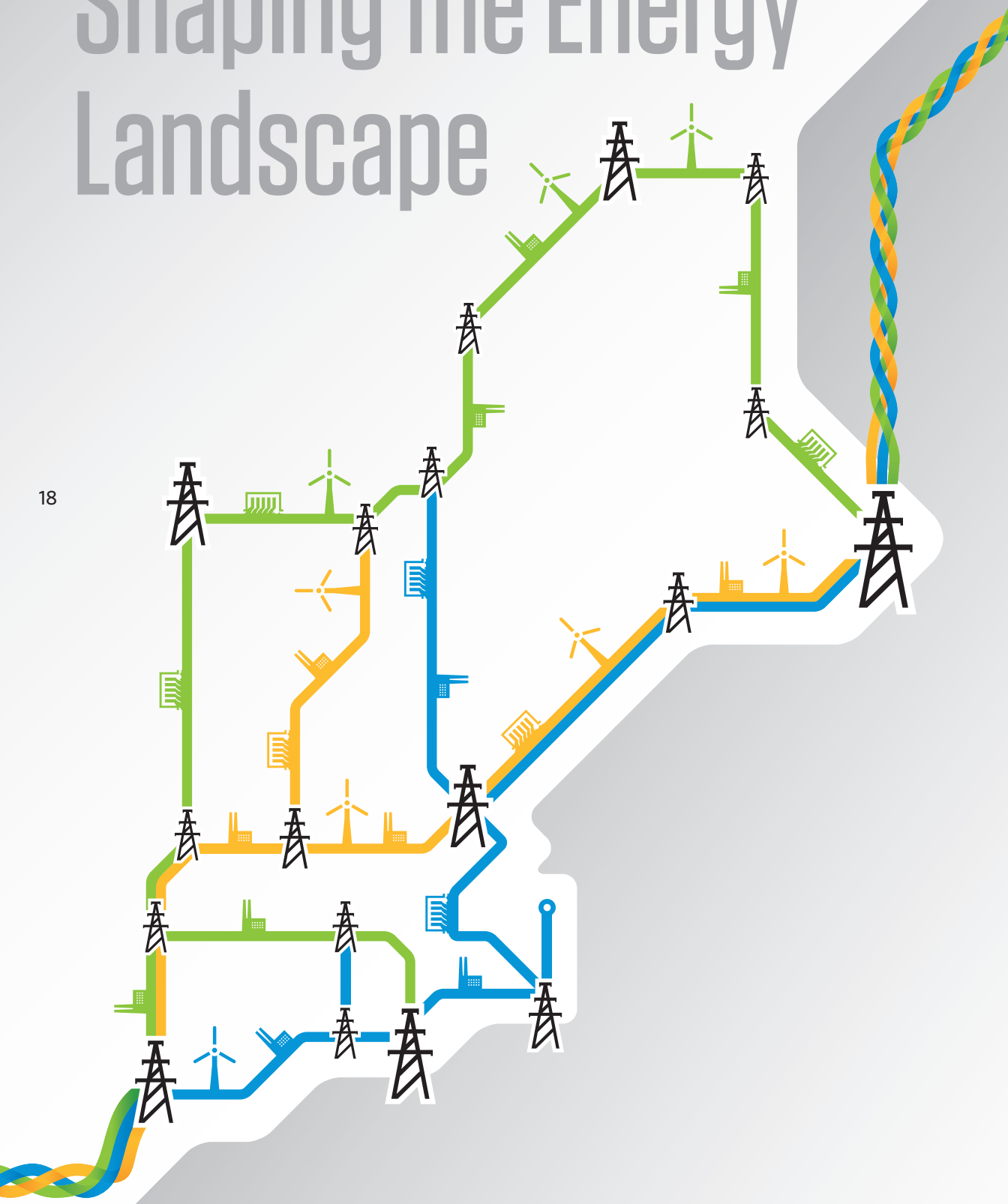
As a result of recent transmission upgrades, combined with robust investment in generation and growth in demand resources, the U.S. Department of Energy (DOE) dropped New England from its list of "congestion areas of concern" in April 2010. The department placed the region on the list in 2006 because of significant congestion in southwest Connecticut and the Boston area.

WORKING TOGETHER AS A WHOLE

Just as the electric power grid is an interconnected network, so too are the people who operate it, own its parts, set policies around it, and benefit from it. To provide the best possible results for the region, ISO New England counts on the active involvement of and collaboration with stakeholders in all areas of our work—whether we're coordinating an outage, developing new market rules, or conducting an in-depth planning analysis. Stakeholders represent a wide variety of constituencies, technologies, and interests.

They include the **New England Power Pool**, the voluntary association of the participants in New England's wholesale electricity marketplace; state regulators who form the **New England Conference of Public Utilities Commissioners**; state and federal legislators, attorneys general, consumer advocates, and environmental regulators; and the six governors, primarily through the **New England Governors' Conference** and **New England States Committee on Electricity**.

Shaping the Energy Landscape



In New England, the wholesale electricity industry is working well, fulfilling the dual goals of maintaining reliable electricity service at competitive prices. It does so because the industry has certainty of purpose and is guided by solid rules and standards.

Rules and Standards Define It

In fulfilling each of our three roles, the ISO abides by the standards and requirements established by the Federal Energy Regulatory Commission (FERC), the North American Electric Reliability Corporation (NERC), and the Northeast Power Coordinating Council (NPCC). We are regulated by FERC, which defines our authority and the services we provide. NERC, which is subject to the commission's oversight and approval, develops and ensures compliance with mandatory standards for planning and operating the power systems around the country and can levy fines of $1,000 to $1 million per day for violations. NERC coordinates its activities with eight regional entities that develop, implement, and enforce reliability criteria on a regional level. New England is part of the NPCC region.

GRID OPERATIONS: Over the years, we have developed procedures to meet these numerous, stringent regional

Culture of Compliance, Safety, and Reliability

A 2009 NERC/NPCC audit found the ISO compliant with all 41 applicable reliability standards and 375 requirements and subrequirements over a two-year period, from June 2007 to April 2009. During this review, we were one of the first organizations in the U.S. to be audited for compliance with Critical Infrastructure Protection standards that safeguard certain energy infrastructure information. In analyzing our culture, NPCC stated that compliance is an "integral component of ISO New England operation." The ISO dedicates full-time resources to ensuring the company meets existing standards and follows the development of new standards.

and national requirements for keeping the lights on. These procedures work well—the New England grid has not experienced a widespread system outage in over 40 years.

MARKETS: New England's markets are guided by clear rules approved or mandated by FERC, resulting in a marketplace that has yielded numerous reliability and economic benefits.

SYSTEM PLANNING: We have been able to form a successful transmission planning process because national, mandatory reliability standards provide clear goals and because industry roles and authority for planning the grid to meet these standards are well defined.

Policy Incentives Transform It

New Englanders have come to expect that the lights will stay on. Now, society is looking for something more from the grid—to take it beyond a system based on traditional infrastructure to one that is smarter and greener. Reflecting these desires, government policies are expanding their focus beyond reliability and wholesale competition.

Over the past several years, state environmental policy initiatives have been geared toward stimulating industry and investor interest in developing renewable energy in New England. Ten Northeast and Mid-Atlantic states have joined the Regional Greenhouse Gas Initiative, or RGGI, the first market-based effort in the U.S. to reduce carbon dioxide emissions from power plants. RGGI auctions emission allowances for the states, which use most of the proceeds to promote energy efficiency, renewable energy, and other clean-energy technologies.

Five of the six New England states also have enacted individual Renewable Portfolio Standards (RPSs) that mandate the amount of electricity that must come from renewable sources. Vermont has established goals, similar to an RPS, for renewable energy growth. Combined, the states' RPSs and related targets call for 30% of New England's projected total electric energy demand in 2020 to be met by renewable energy resources and energy efficiency.

This potent combination of state initiatives has resulted in significant investment in renewable energy. For example, New England has seen the amount of electricity produced by wind increase from 20 MW at the beginning of 2008 to more than 300 MW by the end of 2010. Nearly 3,000 MW more have been proposed for development.

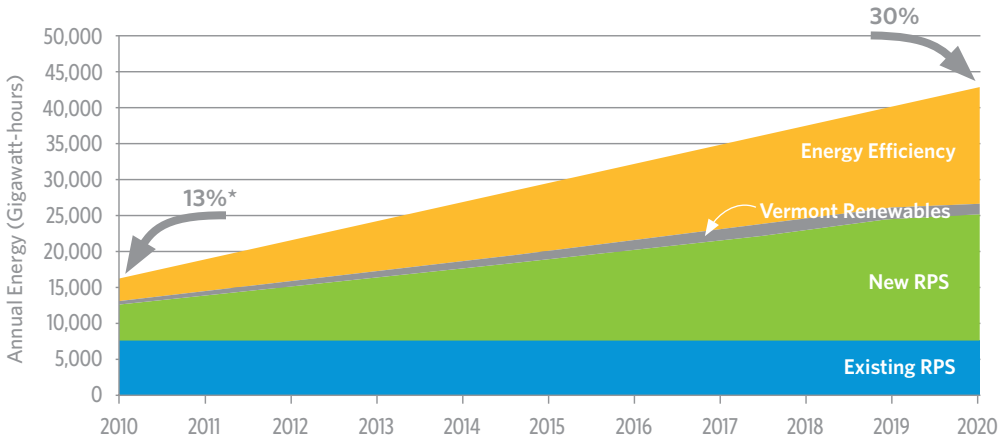
In Washington, the Administration and Congress are considering federal energy policies that encourage clean energy investment. Policymakers are also focused on modernizing the nation's transmission system to foster

the development of renewable energy, pave the way for advances in alternative energy and other technologies, and achieve national energy security. Through the *American Recovery and Reinvestment Act of 2009*, more than $80 billion has been dedicated to grants, tax incentives, and loan guarantees to ramp up the development and deployment of energy-efficiency programs, renewable power, and smart grid technology.

In addition, FERC is considering policies that support investments in the smart grid, including increasing the number of transmission projects that incorporate advanced technologies. Congress has directed FERC to adopt standards and protocols to govern the implementation of smart grid technologies to ensure that systems and components from many different manufacturers will work together.

The extent of investment in power system infrastructure that will be needed to meet emerging federal energy requirements—and how these requirements correspond to state requirements—are not yet known. Once these federal policies and standards are established, investors will be able to consider the economics of renewable resource and technology investments. Together, the policy incentives, market signals, and information from the planning process will enable investors to develop competitive, cost-effective resources that meet governmental goals and shape our energy landscape.

Projection of Renewable-Resource and Energy-Efficiency Targets in New England to 2020



*For comparison, renewable resources provided approximately 13% of New England's electric energy in 2009.

Holistic Approach to Challenges

Although large, centrally located power plants will remain at the core of New England's power system for the foreseeable future, the grid eventually will incorporate more wind farms, biomass plants, small hydroelectric units, photovoltaics, and other renewable sources to produce electricity; energy efficiency and demand-side resources to reduce electricity use; devices such as flywheels and batteries to store energy; and plug-in electric vehicles (PEVs) that charge up on lower-cost, off-peak electricity. >>>

These resources have the ability to improve system efficiency, allow consumers to manage their electricity use and costs, and reduce harmful emissions. However, adding these numerous, diverse resources and technologies will create engineering and economic challenges as the power system becomes much more complex.

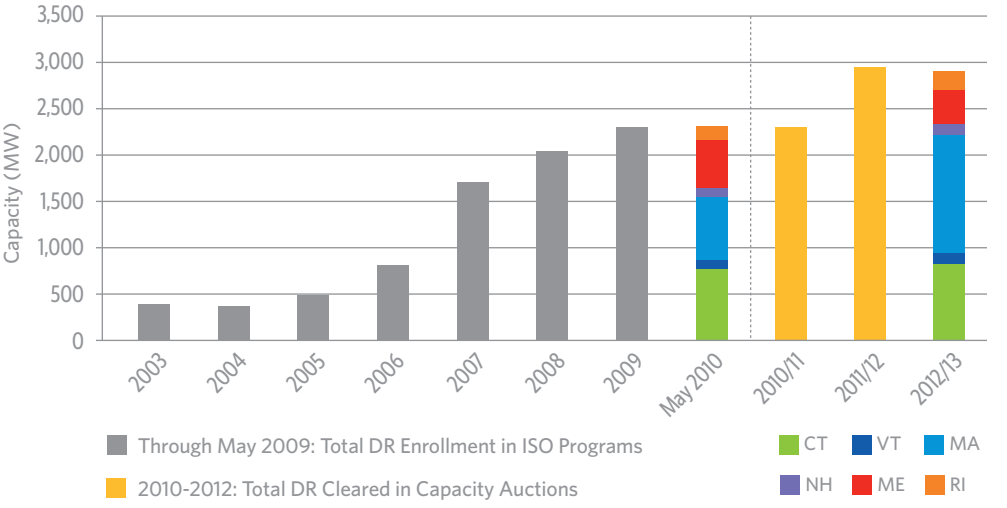
For example, system operators will need new technologies and procedures to manage thousands of distributed resources and process an exponential increase in the volume of data. The energy, capacity, and ancillary services markets will have to be reviewed to ensure continued system reliability and market efficiency. System planning analyses will become increasingly intricate to keep pace with evolving power system infrastructure.

To realize their many potential benefits, these resources must be integrated into grid operations, market design, and power system planning in a way that is cost-effective and maintains reliability. Therefore, policymakers, industry participants, and the ISO must address and resolve challenges through a systematic and coordinated approach. Working with stakeholders, we are moving forward on many initiatives to prepare for, plan for, and begin the integration of new resources and technologies.

Integrating Demand

A major challenge for New England is that the region must have the infrastructure available to meet summer demand, which has peaked at more than 28,000 MW, even though average electricity use the rest of the year is about 18,000 MW. Despite the current economic slowdown, peak demand is projected to grow. Resources such as energy efficiency, load management, and distributed generation that reduce

Demand Resources Growing in New England



electricity use during these high-demand periods help preserve reliable operations and keep wholesale prices in check.

Demand resources are projected to account for nearly 10% of capacity in 2011. That's the highest percentage of any region in the nation.

In New England, demand resources are a well-established tool used to manage the power system. Through markets and ISO-run programs, the amount of demand resources in the region has grown over tenfold since 2003. Most recently, ISO New England launched a new market, the Forward Capacity Market, to procure the resources necessary to ensure a reliable supply of electricity. We worked with our stakeholders to introduce a major innovation: allowing demand resources to compete with traditional generation resources to provide capacity services. Because of this market—which is the first of its kind in the country—demand resources are projected to account for nearly 10% of capacity in 2011. That's the highest percentage of any region in the nation.

The ability for system operators to call on such a large amount of demand reduction can accomplish several objectives. It can defer the need to build expensive power system infrastructure that might otherwise be needed to meet the peak. It can reduce the region's reliance on imported fuel supplies for certain power plants that run only during peak times. And it can reduce emissions by not using certain plants during peak demand days. In addition, demand resources may facilitate the integration of wind resources with their ability to quickly reduce demand when the wind stops blowing.

To achieve these benefits, we have been working on numerous initiatives that will ensure the efficient, coordinated integration of this large amount of demand resources into system operations, market operations, and system planning. For example, in June 2010, we launched improvements to the software and communications infrastructure used between demand resources and the ISO during real-time system operations. We also have revised market rules and operating procedures to more effectively employ demand resources as reserves during shortage events and emergencies. New dispatch rules are planned for June 2011 that divide the region into 19 dispatch zones so operators can call on demand resources precisely where, when, and in the amount they are needed.

The final step in fully integrating demand into our wholesale markets will be taken once we have received direction from

the FERC on the appropriate pricing methodology for demand that responds to real-time energy prices.

Applying Technology

The ISO is working on several projects to enhance and integrate new power system, communication, and information technology infrastructure that will improve grid efficiency and enable the addition of alternative resources.

In early 2010, we replaced the software and hardware used to communicate with generators and demand resources with more widely available, industry-standard equipment. In addition, a pilot project is underway to evaluate the capability of alternative resources (such as flywheels and batteries) to help keep power system frequency regulated and participate in the ancillary services markets. We are also assessing an online decision-support tool to assist operators in restoring the power grid after a blackout, and we are actively participating in smart grid research, education, and standards development.

DEPARTMENT OF ENERGY SMART GRID GRANT: Over the past few years, the ISO has installed five phasor measurement units (PMUs) as part of the U.S. Department of Energy's Eastern Interconnection Phasor Project, a national effort to create synchronized data-measurement infrastructure across the North American interconnected electric power system.

In 2009, as part of the *American Recovery and Reinvestment Act*, DOE awarded funding to the ISO and transmission owners in New England to expand our phasor measurement infrastructure even further. The project will add at least 30 PMUs throughout the region and deploy an enhanced software and hardware system for collecting and analyzing data.

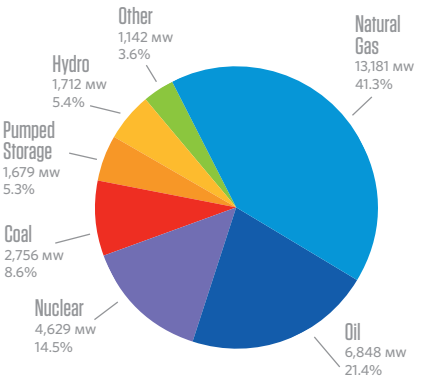
PMUs enhance system operators' ability to monitor and measure performance of the grid, broadening their ability to detect and promptly address problems. With these tools, information on the system's status will increase from once every four seconds to 30 times per second. The technology will improve reliability and enable operators to reduce congestion and create other efficiencies that have the potential to lower wholesale electricity costs. The technology will also help accommodate the variable nature of wind resources.

The $8 million in funding will enable these "backbone" smart grid efforts to be completed at a lower cost and allow the

Installed Generation Capacity in New England by Primary Fuel Type

(Summer 2010)

Total = 31,950 MW



region to realize the benefits of smart grid technology much sooner.

Incorporating Wind

In responding to state incentives to promote renewable energy development, investors in New England are predominantly choosing to build wind generation. Emerging energy policy on the federal level also will drive the rate of wind development in our region.

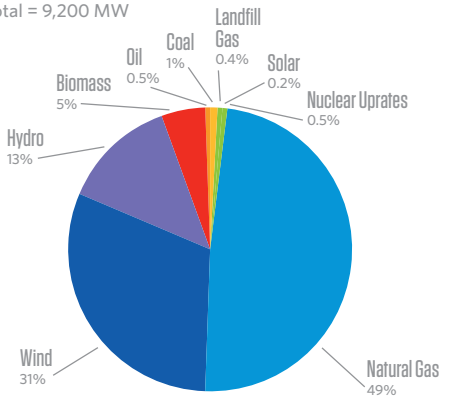
With zero emissions and no fuel costs, the addition of significant amounts of wind energy will help achieve environmental goals, help lessen the region's reliance on fossil fuels to produce electricity, and help mitigate fuel-related wholesale price volatility. However, this is likely to come at a price, since wind resources are usually in remote locations and integrating these resources will require a significant expansion of the power grid. This includes investment to build the wind farms, investment to expand the transmission system that will deliver energy from remote resources to consumers, and investment in new smart grid technologies so that system operators can integrate renewable energy reliably.

Engineering challenges exist when trying to integrate a large amount of wind power, primarily because it is difficult to forecast when and how hard the wind will blow at the precise location of a wind farm. Because system operators need to fully understand where power will be flowing on the system at any point in time, the ISO has embarked on a series of wind-integration activities to help address these challenges.

Proposed Generation in New England by Primary Fuel Type

(Summer 2010)

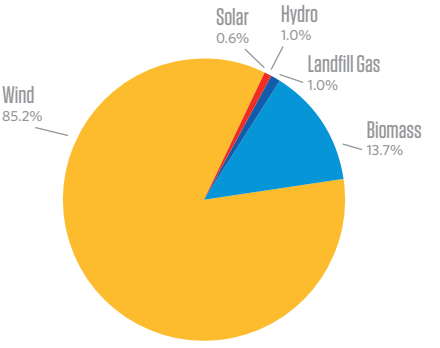
Total = 9,200 MW



Proposed Renewable Energy Projects in New England by Type

(Summer 2010)

Total = Approx. 3,400 MW



Synergy Among Diverse Resources

A synergy exists between wind, demand resources, and electricity storage capability. Demand resources can help compensate for the drop in power when the wind stops blowing or when wind turbines cut out during high wind events. In addition, wind blows longer and faster at night, but peak demand occurs during the day. Additional electricity storage capability could help save this nighttime electricity production for later use.

The ISO's wind-integration activities have three areas of focus: participating in NERC's Integrating Variable Generation Task Force, facilitating the interconnection process for new wind generators, and conducting the large-scale New England Wind Integration Study.

To be published in 2010, the comprehensive, 18-month integration study will create a detailed on- and offshore wind model for the region, determine technical requirements, assess the impact of different wind development scenarios on system operations, and identify best practices for wind forecasting. The results will be used to assess whether modifications are needed in operating procedures and market rules to reliably integrate new wind generation.

Examining Transmission

New England has made great strides in building transmission to meet reliability needs. The region is now tackling the issue of how to develop and pay for transmission that is designed to meet environmental goals. We have begun working with stakeholders to assess the potential economic and environmental benefits of various transmission-investment scenarios.

In 2009, the governors of the six states asked us to perform a technical and high-level economic analysis of what would be needed to integrate renewable and low-carbon-emitting resources into the region's energy mix. The study concluded that New England has significant on- and offshore wind-resource potential and the opportunity to import clean energy from hydro, wind, and even potential nuclear sources in Canada.

> The addition of significant amounts of wind energy will help achieve environmental goals, help lessen the region's reliance on fossil fuels to produce electricity, and help mitigate fuel-related wholesale price volatility, but will require significant investment.

However, the analysis found that the cost to build the transmission needed to deliver these resources to major demand centers would be significant. The cost estimates for developing various amounts of native wind power, from 2,000 MW to 12,000 MW, range from $1.6 billion to $25 billion. Access to a combination of in-region and nearby Canadian wind power would meet approximately 15% of the region's energy needs with clean resources and would require approximately $10 billion in new transmission investment.

The region is now tackling the issue of how to develop and pay for transmission that is designed to meet environmental goals.

The analysis also concluded that to integrate New England's wind resources or enable access to resources in Eastern Canada would be more cost-effective than building long transmission lines from large-scale wind farms in the Midwest.

The technical analysis produced valuable comparisons of the options available to meet the region's renewable resource goals. Moreover, the process demonstrated that close collaboration among the ISO and the states is necessary to achieve wind integration within the region.

The ISO will continue to fulfill study requests in 2010 to inform government officials as they establish policies that affect the future planning and development of the system. For example, one study will simulate the replacement of older coal- and oil-fired generating units with natural gas combined-cycle generators, wind resources within New England, and renewable imports from Canada.

On a national level, we currently are active in a number of forums and working groups on interconnection-wide planning to meet economic and environmental policy objectives. The ISO is working to ensure that broader planning initiatives take into account the status, needs, and future development of New England's system. A process that harmonizes regional plans with federal energy policy goals will best serve the interests of the states, regions, and the federal government.

Delivering Results

In a relatively short time, the combined functions of competitive electricity markets, a dynamic and transparent regional planning process, and centralized system operations have guided the development of a bulk power system that is more reliable, economical, and environmentally sound.

Supply

Approximately 10,800 MW of new, efficient, low-carbon-emitting supply have been added to the power system; another 3,500 MW are committed for 2010 to 2012. Since this investment is made by private firms and not public utilities, consumers are shielded from the investment risks they had been exposed to under the previous, regulated system. Moreover, under markets, power plants are paid only for performance and therefore operate more efficiently, contributing to system reliability and lower costs.

Demand Resources

Energy efficiency, load management, and distributed generation resources have

grown from 200 MW in 2003 to more than 2,000 MW in 2010. This translates into about 5,000 individual demand assets integrated into the power system. By 2011, demand resources are projected to account for nearly 10% of capacity.

Environment

The introduction of cleaner, more efficient power plants has decreased nitrogen oxide emissions by 45% and sulfur dioxide emissions by 50%. As of summer 2010, developers are proposing approximately 3,400 MW of renewable resources throughout New England, with wind accounting for roughly 85% of these proposals.

Technology

Markets are stimulating technological innovations that are modernizing the bulk power system. These smart grid projects will result in a more efficient, responsive, and reliable system that can incorporate greater amounts of demand resources and alternative energy resources.

Transmission

Since 2002, over 300 transmission upgrades totaling $4 billion have been put in service in all six New England states. Recent upgrades have yielded significant market cost savings, including reducing the cost to operate certain power plants to ensure reliability by almost 90% in 2009. Approximately $5 billion in transmission investment is planned over the next 10 years to meet reliability requirements, improve the economic performance of the system, and position the region to integrate renewable resources and alternative technologies.

Price

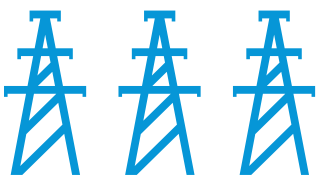
The markets consistently produce competitive prices that reflect suppliers' costs of production and system conditions. In 2009, average wholesale energy prices fell by 50% to $42/MWh. This primarily reflects the decline in the price of natural gas and lower demand as a result of the economic downturn combined with moderate weather. Wholesale prices have remained stable over the past decade, when adjusted for fuel impacts.

Learn more from the following reports available on ISO New England's website or by contacting info@iso-ne.com. The *2009 Regional System Plan* describes the status of the power system, regional challenges and opportunities, and initiatives underway to address the power grid's needs over the coming 10 years. The *2010 Wholesale Markets Project Plan* describes the nearly 20 market enhancement projects currently in development. The *2009 Annual Markets Report* analyzes the performance of the markets. The *2009 Financial Report* provides a complete analysis of ISO costs.

Key Facts

6.5 million
households and businesses; population 14 million

More than
30,000 MW
of generating capacity



More than
8,000 miles
of transmission lines

Approximately
350 generators

13 inter-connections
to power systems in New York & Canada

Approximately

2,000 MW

of demand resources

$ $ $

$5–11 billion

annual total energy market value

$4 billion

in transmission investment since 2002 (including six major 345 kV projects); another $5 billion planned

All-time peak demand of

28,130 MW

set on August 2, 2006

More than

400 buyers & sellers

in the markets

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*As of January 1, 2010

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