

Affordable Energy News

The publication of the Massachusetts Affordable Reliable Electricity Alliance

FALL 2008

FERC Commissioner Featured at Mass AREA and NEEA Clean Energy Forum

On October 2, 2008 more than 70 business executives, regulators and policy makers attended an energy forum co-sponsored by the Massachusetts Affordable Reliable Electricity Alliance (Mass AREA), and the New England Energy Alliance (NEEA) titled, "Putting Clean Energy to Work For Massachusetts: Real solutions that reduce global warming and our dependence on foreign fuel."



Federal Energy Regulatory Commission member Suedeem G. Kelly

The event, moderated by Peter Howe, Business Reporter at New England Cable News, began with presentations by Mass AREA members and offshore wind project developers, Cape Wind and the Blue H

Group. Dr. Andrew Kadak of the Massachusetts Institute of Technology (MIT) then gave a presentation on the future of nuclear energy and its importance to the nation's energy supply. The last speaker in the first half of the program, Bill Brier, vice president, policy and public affairs, Edison Electric Institute spoke about the benefits and importance of energy efficiency.

The second half of the program featured Federal Energy Regulatory Commission member Suedeem G. Kelly, who shared her insights on the future of generation resources, transmission and energy policy.

Commissioner Kelly then participated in an executive roundtable during which participants engaged in a spirited conversation about the development of the renewable energy sector in Massachusetts with a particular focus on transmission needs. The roundtable participants included: Janet Besser, VP Regulatory Affairs, National Grid

Joe Dalton, Director Government and Regulatory Affairs, Suez Energy North America

Jack Alexander, Manager Government Relations, Entergy

Helen Howes, Vice President, Environment, Health and Safety, Exelon
Peter Kelly-Detwiler, Senior Vice President of Energy Technology Services, Constellation

Dan Weekley, Director, Northeast, Government and Regulatory Affairs, Dominion Resources

Edward Krapels, Chairman, New England Independent Transmission Co.

Mike Hachey, Director, Northeast Region, TransCanada Power Marketing, Ltd.

Dr. Andrew Kadak, MIT

The two and a half hour energy forum was held at the offices of Brown Rudnick in Boston, MA. Copies of the speakers' presentations are available on the Mass AREA Web site at www.maarea.us. *

Inside this issue

- ISO-New England Conference3
- Green Line's Approach to Massachusetts' Energy Future 4
- MIT Makes Solar Energy Breakthrough5



Dr. Andrew Kadak of MIT giving his presentation on the future of nuclear technology.

New England Energy Alliance Survey Finds Public Misconceptions about Electricity Generation

A recent survey on energy issues conducted for the New England Energy Alliance found that New Englanders have significant misconceptions about the technologies, fuels and costs of electricity generation. Three misconceptions in particular, if unaddressed, could incorrectly skew public policy and influence private investment decisions involving electricity supply infrastructure and programs to minimize energy demand.

Misconception #1: Oil is the predominant fuel used to generate electricity.

A significant majority of New Englanders believe that oil-fired generating facilities produce the largest percentage of electricity in the region. Imported oil, however, generates just 4 percent of the region's electricity — a significant reduction from the early 1970s when it was used to

produce 70 percent of New England's electricity.

Reality: Natural gas is currently the predominant electricity-generating fuel.

Almost all of the generating plants built in New England over the past decade have been natural gas-fired due to their low capital costs, fuel supply availability, high efficiency and low-carbon emitting operations. According to ISO New England, about 40 percent of the region's electricity is produced by natural gas.

The region's increasing dependency on natural gas should be a growing concern because a diversified fuel mix provides the greatest hedge against supply interruptions.

Interestingly, the majority of oil used for

electricity generation is needed to back-up natural gas-fired generating plants during times when natural gas demand exceeds pipeline capacity and/or supply availability.

Misconception #2: Wind generating facilities produce the cheapest electricity.

The majority of New Englanders believe that wind generating facilities produce the cheapest electricity. A much needed and desired energy source, wind generation currently comprises less than 1 percent of the region's electricity supply.

According to the American Wind Energy Association, the cost of electricity from wind energy varies widely depending upon the wind speed at a given project site. Importantly, however, advanced technologies are now enabling wind

Continued on page 7 >

New Patrick Administration Computer Power Policy to Save Millions of KWs and Dollars

State government is expected to save more than \$2 million annually while using 12 million fewer kilowatts of electricity under a new computer power management standard that requires that Executive Branch agency computers be shut down or switched to energy-saving "sleep mode" when not in active use.

Part of Governor Deval Patrick's Leading by Example Program to reduce energy use and costs, the Enterprise Desktop Power Management Standards announced in September are among the most far-reaching computer power standards in the country. The policy is estimated to cut state agencies' carbon emissions by about 5,051 tons per year — roughly equal to the volume of CO₂ emitted from driving 925 cars or providing electricity to 669 homes for one year.

"Nationally, office equipment accounts for up to 10 percent of total annual electricity consumption in commercial buildings — and that's without considering the additional energy needed for office cooling due to waste heat emitted from computers and monitors," said Ian Bowles, Energy

and Environmental Affairs (EEA) Secretary whose office includes the Leading by Example Program. "Making sure we power down computers and workstations during periods of inactivity can potentially reduce the energy they use by 95 percent."

Bowles pointed out that state savings from the new policy could increase significantly if it is adopted by the 29 state colleges and universities, and dozens of non-executive branch agencies and authorities.

"We're excited to release workstation energy standards that will help agencies achieve immediate efficiencies and save money," added Anne Margulies, Chief Information Officer at the Division of Information Technology (ITD), which developed the standards in collaboration with an inter-agency team. "Although the energy saved for each PC seems like a small step, they add up to big savings for the Commonwealth — \$2 million per year."

About 80 percent of the Executive Branch's approximately 40,000 computers are expected to be covered by the new power management standard. The remaining

systems comprise those exempt from part or all of the standard because they are used for public safety, traffic monitoring, or other critical purposes where the standard would not be appropriate. The standard was developed over six months by ITD and an inter-agency team that included EEA and its Departments of Energy Resources and Environmental Protection, the Executive Office of Health and Human Services, the Operational Services Division and the Department of Revenue.

The new policy mandates that most computer monitors be placed in sleep mode after ten minutes of inactivity and be shut off whenever the workstation is shut down or in standby mode. It requires that screen saver options not be enabled, since they may increase a system's energy use. Most computers must be set to sleep after 30 minutes of inactivity and turned off during non-business hours unless administrative duties must be performed. Each agency is responsible for developing its own compliance strategies, ranging

Continued on page 7 >

Fitchburg Manufacturer to go "Off Grid" with Proposed Biomass Plant



Fitchburg, MA manufacturer Simonds International, has proposed plans to build a biomass gasification plant that would produce and supply power to its manufacturing facility. The biomass plant will use woodchips as its fuel source and be built on Simonds' existing property.

Said James P. Sweeney, president of CCI Energy of Plymouth, "This is one of the basics we can do, along with solar and wind power."

CCI Energy is set to build and operate the biomass plant for Simonds.

If everything goes as planned, the 176 year old cutting tool manufacturer expects to have the plant, already touted as the largest in the state if built, up and running by December of 2009. Costs for construction are estimated at \$46 million, with the plant producing upwards of 15 megawatts of power.

The biomass plant will work by burning the woodchips and using steam to produce all of the electricity needed at Simonds, essentially taking the manufacturer "off the grid."

"The proposed biomass project will eliminate the use of coal and fossil fuels to generate our electricity and significantly reduce Simonds' cost of electricity, which is over \$2 million a year," said Kenneth R. Myer, vice president of procurement at Simonds.

According to Mr. Myer, Simonds will use only 5 to 10 percent of the electricity produced, and sell the rest to the local grid.

"The balance of excess power will be sent out...to the lines for anyone else that needs power," Mr. Myer said. He also added that the biomass plant will be

reduced to a 10 MW facility if the local grid is unable to accept the excess power produced.

In addition to the \$2 million in savings already estimated, Simonds will be able to save another \$125,000 by using the steam from the biomass plant to heat its building and other area companies.

"This is the most exciting project I have worked on in 36 years here," Mr. Myer said. "It is a win, win, win, win situation." Taking these new savings into consideration, Simonds International will be able to continue to operate in Fitchburg. The company currently employs 150 people full time, continuing to add to the local tax base.

As of press time, it was not known if financing was approved for the biomass plant. *

Energy Issues Get Full Airing at ISO New England Conference

Independent System Operator New England (ISO-NE) sponsored a conference and vendor showcase on September 18 and 19 titled, "Lights Power Action." The event was held at the Renaissance Boston Waterfront Hotel and over 450 people attended.

Attendees and speakers at the two-day conference learned about and discussed the strategies that must be pursued to assure New England's electric energy future.

The conference featured keynote speeches by Federal Energy Regulatory Commission Chairman Joseph T. Kelliher and Chairman, President and Chief Executive Officer, of Northeast Utilities System, Charles W. Shivery.

Panel discussions with key policymakers, senior executives, and energy experts focused on:

- Balancing economic, environmental, and energy considerations through policy and technology

- Realizing the full potential of renewable resources to improve electricity reliability, efficiency, and fuel diversity
- Incorporating demand resources into both day-to-day market operations and long-term system planning

Mass AREA advisor Dr. Patrick Moore a world-renowned ecologist, environmentalist, co-founder and former leader of Greenpeace also addressed the conference and spoke about the importance of developing alternative energy sources while preserving the environment, meeting growing demand for power, and overcoming local opposition to the siting of new plants.

During his speech Dr. Moore placed a particular emphasis on nuclear power and the need for the continued operation and relicensing of the Pilgrim Nuclear Power Plant in Plymouth and other nuclear facilities in the region in order to help meet Regional Greenhouse Gas Initiative carbon emissions reduction targets.

Following Dr. Moore's speech, there was a luncheon held with several Mass AREA members.

In addition to the keynotes and panels, there was a vendor showcase displaying innovative industry products and services from the energy world. *



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Green Line - An Innovative Approach to Massachusetts's Environmental and Energy Future



Massachusetts is emerging as a national leader in the area of green power and environmental sustainability with the passage of five new energy and environmental initiatives in the last legislative session. Consequently, aggressive goals for energy efficiency, the creation of green jobs, and increased use of renewable energy resources have become the cornerstone of Governor Patrick's administration. Meanwhile, thanks to Mayor Menino's leadership, Boston is ranked as the 8th most sustainable city in the United States and sits on the EPA's top ten list of green power purchasers.

To stay at the forefront of addressing complex energy and environmental issues, Boston and the Commonwealth will need innovative projects that support the development of green power resources in an economic and environmentally sustainable way. Green Line is such a project – a 140-mile sub-sea transmission line that will deliver of 660 megawatts (MWs) of power from northern Maine directly to downtown Boston. Expansion of the line to 1,200 MW would allow power to be delivered into southeastern Massachusetts.

Green Line is being developed by New England Independent Transmission Company, LLC, and includes many of the same principals who developed the Neptune Project (see www.NeptuneRTS.com). One of the most successful transmission projects completed in the last decade, Neptune is a subsea 65-mile high voltage direct current (HVDC) 660 MW project that links New Jersey and Long Island, New York. Completed on time and on budget in July 2008, Neptune has saved Long Island consumers hundreds of millions of dollars since it began operation.

HVDC technology applied to underwater projects is not new. Submarine HVDC cables have been operating since the 1950s. Today there are more than 20 projects operating around the world. They have been installed at lengths of up to 360 miles and in water depths up to 3,330 feet. Neptune was the first subsea installation in the United States. A second is being installed that will provide power to San Francisco. And a third is under development in New York City.

Submarine cable installation has many advantages over traditional overhead lines, especially when used to service congested urban areas where new overhead lines are unacceptable. DC cables laid along the ocean bottom take a fraction of the right-of-way width of AC lines that carry the same amount of power. No right-of-way management is needed and there are no unsightly overhead lines to interrupt people's view. HVDC systems are also extremely reliable.



Green Line will use HVDC technology and submarine cabling to get power to the highly congested area of downtown Boston. Just as NSTAR's underground 345 kV AC project eliminated Boston's reliance on the aging New Boston station in South Boston, Green Line will forestall the need to build new power plants in the city. Green Line's HVDC converter station will act as a 660 MW generator in Boston, but without air or water pollution problems.

Green Line also addresses a fundamental problem within the New England electric grid – how to move more power north to south. If Massachusetts wants to get 25 percent of its energy from renewable resources by 2030 and reduce greenhouse gas emissions by 80 percent by 2050, large quantities of green generation are needed. And Massachusetts is not alone. Maine, New Hampshire, Connecticut, Rhode Island, and Vermont all want to use more renewable energy. The non-profit public policy group Environment Northeast has reported that 8,000 MWs of new wind generating capacity will be needed if New England is to meet its legislative goals for using renewable power.

Large-scale offshore wind projects can increase wind production in Massachusetts, however, even with these projects, much more will be needed. Northern New England and Canada stand ready to fill the gap. Last April, Maine Governor Baldacci signed a law to facilitate the development of 3,000 MW of new wind projects. But building new wind projects is not enough. As energy reporter Matthew Wald wrote recently in the New York Times, "The dirty secret of clean energy is that while generating it is getting easier, moving it to market is

not." Wald reports that the 90 MW Maple Ridge Wind farm near Lowville, N.Y., a project qualified to sell renewable energy credits to the Massachusetts market, "has been shut down even with a brisk wind blowing," because "the regional electric lines have been so congested." (*Matthew Wald, "Wind Energy Bumps Into Power Grid's Limits," New York Times, August 26, 2008.*) North-south transmission congestion has been a problem in New England. As more renewable energy projects get built in Maine, the grid will become more congested, and like in New York, projects that get built may not be able to operate when the wind blows.

Investment in transmission infrastructure is pivotal if the full potential of the renewable resources to the north are to be realized. Texas, California, and Colorado have already taken steps to develop

transmission lines that support wind development, while New England is just getting started. ISO-NE is now undertaking studies that look at the economic benefit of installing projects like Green Line that will facilitate the development of new green power resources.

Green Line is an innovative, environmentally benign transmission project that will keep Massachusetts and Boston at forefront of solving complex energy and environmental issues. More about the project can be found at its web site at www.greenlineproject.com or by contacting Stephen Conant at New England Independent Transmission Company at 781-246-9851.

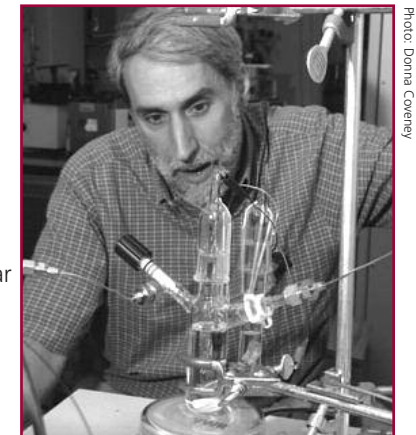
*Text courtesy of Green Line. **

MIT Researchers Make a Breakthrough with Solar Energy

Researchers at the Massachusetts Institute of Technology (MIT) have developed a major breakthrough by harvesting energy from the sun on a large scale and storing excess energy for future use.

Up to now, solar energy could only be used during daylight hours because of the costs associated with it, as well as the inefficient storage methods available. Daniel Nocera, MIT's Henry Dreyfus Professor of Energy and the senior author of the research paper, said in a statement, "Solar power has always been a limited, far-off solution. Now we can seriously think about solar power as unlimited and soon."

The research advancement uses photosynthesis as a model: Nocera, along with post doctorate fellow Matthew Kanan, use the solar power to break water down into oxygen and hydrogen gases during the day. According to the researchers, "Later, the oxygen and hydrogen may be recombined inside a fuel cell, creating carbon-free electricity to power your house or your electric car, day or night."

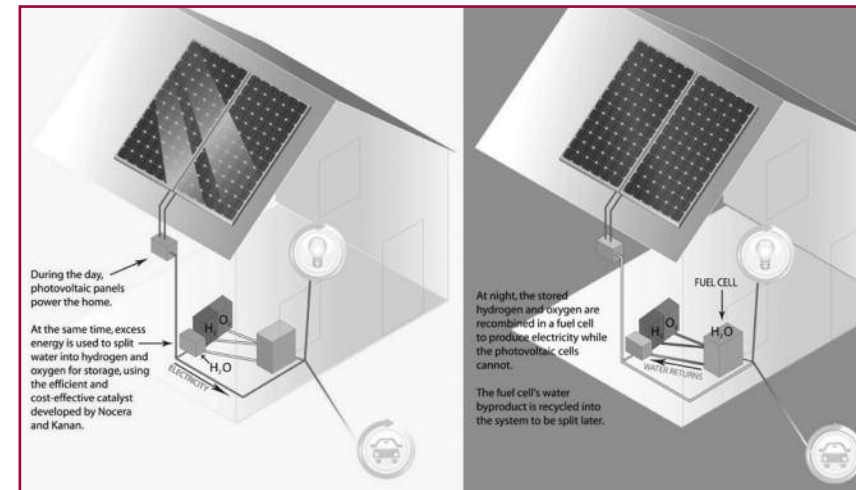


Daniel G. Nocera, the Henry Dreyfus Professor of Energy at MIT, has developed a simple method to split water molecules and produce oxygen gas, a discovery that paves the way for large-scale use of solar power.

The process, which can work with any renewable energy source, is aided by catalysts comprised of cobalt metal, phosphate and an electrode, which is then combined with another catalyst made of platinum, thereby duplicating photosynthesis. Nocera and Kanan report that the catalyst works in neutral water at room temperature and is relatively easy to set up in residential homes and larger buildings alike.

"This is a major discovery with enormous implications for the future prosperity of humankind," said James Barber, the Ernst Chain Professor of Biochemistry

Continued on page 8 >



New England Energy Alliance Survey Continued from page 2 >

generating facilities to produce electricity that is cost competitive with other fuels. Wind facilities have no fuel costs, but they do have maintenance and substantial capital development costs that must be recovered over periods of significant intermittent operation (the vagaries of Mother Nature).

Reality: Nuclear generating facilities produce low cost electricity

The Nuclear Energy Institute reports that on a per kilowatt-hour basis, existing nuclear energy facilities generate the cheapest electricity at about 1.76 cents per kWh, followed by coal at 2.47 cents per kWh. Electricity generated from natural gas and oil is more expensive at 6.78 and 10.26 cents per kWh respectively. Based on studies by the American Wind Energy Association, state-of-the-art wind plants in high-wind states can generate electricity at about 5 cents per kWh (although this is not always the case).

Generic calculations show that even with the high capital costs of new nuclear facilities, they can produce electricity at a cost as low as the most cost efficient wind generating facility. The very high operating availability of nuclear energy plants (operating continuously "round-the-clock") contributes to their low electricity production costs.

Most consumers are also apparently unaware that the price of renewable electricity generation (which includes wind) in New England is made more affordable by state taxpayer assistance including: 1) subsidies from consumer-funded renewable programs

legislatively mandated by Massachusetts, Connecticut and Rhode Island, collected through a surcharge on electricity bills; and 2) costs associated with state renewable portfolio standards that require the region's electric utilities to purchase a specified percentage of electricity supply from qualified renewable generation sources — or make an alternative payment collected from ratepayers that is applied towards renewable resource development.

Misconception #3: Wind generating facilities can be relied upon for 24/7 operations

Most New Englanders also incorrectly believe wind generating facilities can be relied upon for 24/7 operations. A wind plant is "fueled" by the wind which blows steadily at times and not at all at other times, often running at less than full capacity.

A generating facility's "capacity factor" is one way of measuring its productivity. It compares the plant's actual production over a given period of time with the amount of electricity the plant would have generated had it run at full capacity. Nuclear power plants — and other large base load power plants — have the highest capacity factors because they run continuously unless idled for maintenance. The American Wind Energy Association references capacity factors of 25 to 40 percent for wind energy facilities -- although off-shore facilities (like the proposed Cape Wind Project) may achieve higher capacity factors.

Reality: Wind is not suitable as a base load source of electricity, but is essential to meet carbon emission reduction targets

The need for base load capacity — power plants that operate continuously — have been steadily increasing as the economy and consumer lifestyles require around-the-clock electricity. According to ISO New England, demand for electricity is growing by just under one percent each year. As demand continues to grow, increasing base load generation will be critical.

A major effort to construct more wind generating facilities is essential if the region is to meet its carbon emission reduction target agreed to under the Regional Greenhouse Gas Initiative. In the absence of additional technological breakthroughs, however, wind facilities will be limited to about 30 percent or less of the region's generating capacity because of intermittent operational constraints that require back-up supplies and other measures to limit potential impacts on the stability of the electrical grid.

The annual telephone survey was conducted by Opinion Dynamics for the New England Energy Alliance in April 2008 and included 600 registered voters (consumers) proportionately distributed throughout New England. The margin of error is +/- 4 percent.

The New England Energy Alliance is a coalition of energy providers, business and trade organizations concerned about future energy supplies. *

energy use in state agencies while benefiting the environment at the same time. Computer power management is a great low-cost way not only for states, but for any organization to reduce energy expenditures and at the same time reduce their carbon footprint."

Massachusetts state government contributes more than one million tons of greenhouse gases to the atmosphere annually — the equivalent of emissions generated by over 200,000 cars driven for one year. Acknowledging this impact and its environmental consequences, Governor

Patrick issued an Executive Order in April of 2007 requiring state agencies to cut greenhouse gas emissions by reducing energy consumption in state facilities, expand use and purchase of renewable energy, adhere to green building standards and reduce water use.

In concert with contracts used to acquire computers and workstations and provide for their recycling and disposal, the Administration's new Enterprise Desktop Power Management Standards address the lifecycle environmental impacts of state-owned computer equipment. *

Computer Power Policy Continued from page 2 >

from employee education and monitoring programs to use of central software to make agency-wide computer setting changes.

"Massachusetts is the first state that we know of that is taking steps to fully implement power management across all of its agencies and computer networks and, not surprisingly, is the first state to join the EPA ENERGY STAR Low Carbon IT program," said Steve Ryan, Program Manager of the ENERGY STAR Low Carbon IT Program. "By taking this action, Massachusetts can significantly reduce the

UMass Creates Nuclear Science Task Force

On July 12, 2008, the University Of Massachusetts (UMass) Board Of Trustees voted unanimously to approve the creation of a task force to research nuclear science and technology in Massachusetts.

The vote requested that the University of Massachusetts Lowell, led by Chancellor Martin Meehan, Provost Ahmed Abdelai and supporting faculty and staff, conduct analyses of the nuclear educational and research enterprise and recommend how to maximize the University core capabilities to best fit the needs of nuclear technology, education and research now and into the future.

The focus of the committee will be critical analysis of nuclear energy in Massachusetts and a review of the state's energy challenges, as well as the economic benefits of a nuclear initiative in the Commonwealth of Massachusetts.

The task force is chaired by UMass Board of Trustees member Richard Lawton, who recently interviewed with Executive Director of Mass AREA Lauren Mauriello about the project.

Lauren Mauriello (LM) - *What do you think the most important steps are that can be taken so Massachusetts has clean and affordable electricity?*

Richard Lawton (RL) - *We have to take a look at all of our energy sources and we need to find alternative fuel sources that are clean and efficient, and I think that nuclear is something that can lead the way in that regard.*

LM - *Tell me a little more about the task force.*

RL - *The UMass system is a great asset to the Commonwealth. The University is always exploring new ways to approach things like economic growth and housing issues and has wanted to take a look into the energy crisis. Back in July the University took a unanimous vote to form a nuclear task force.*

It's a two faceted task force. One side is to look into how the University can expand upon their nuclear Program in Lowell to meet the needs of the growing energy field.

The second is to take a look at how the energy needs we are faced with could be helped with nuclear. We need to take a look at what other states are doing in regards to nuclear. Nuclear not only creates low cost clean energy, but also has a strong economic impact with tax revenues and jobs. We are going to take a look, policy-wise, on how we can use nuclear to drive up our economy here in the Commonwealth.

LM - *Why do you think nuclear power is such a tough sell?*

RL - *In Massachusetts and beyond we need to be educated on nuclear power and its benefits. Nationally the support for nuclear is growing every day. Since oil prices and electricity costs are so high, I think that Massachusetts as a whole is going to take a more realistic approach to nuclear and what it can bring to our energy mix. It's the cleanest, most affordable and safest power source out there.*

LM - *What do you think the greatest benefit to nuclear power is?*

RL - *Nuclear is clean, that is the bottom line. It doesn't release any harmful substances into the environment. France has over 50 reactors and it's the size of Texas. France also has the cleanest air in the world.*



Richard Lawton, University of Massachusetts Board of Trustees member and chairman of the UMass Nuclear Task Force.

LM - *What would you like to see happen on a state level to increase nuclear power in Massachusetts?*

RL - *At the end of the day we don't know where this task force is going to go, but the University is taking a comprehensive and analytical approach to nuclear. The state has looked into wind and solar, however if there is no wind and no sun where will our energy come from. It's all about education and I think with time Massachusetts will fully embrace nuclear energy. **

MASS AREA AFFORDABLE RELIABLE ELECTRICITY ALLIANCE **Yes! I want to join the Massachusetts Affordable Reliable Electricity Alliance.**

I support your efforts to educate communities regarding the necessity for safe, reliable energy and advocacy to ensure that Massachusetts has an ample and reliable electricity supply and economic prosperity for years to come.* Enclosed is my tax-deductible contribution of:

Associate Member: \$50 Other \$ _____

Business/Labor Member: Contribution Amount: \$ _____

Check Enclosed

Mail to: 10 Milk Street, Suite 411, Boston, MA 02108-4600

Signature: _____

Name: _____

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* Conditions of membership apply. For more details send inquiries to info@maarea.us. MASS AREA is a 501(c)(6) IRS Tax-Exempt Organization that advocates for reliable, affordable, and clean energy solutions, as well as conservation measures, for all of Massachusetts.

Mass AREA Advises Consumers to Take Action to Reduce Winter Heating Costs

Heating costs will likely be more this winter than last. In order to lessen that blow, the best way to save is to be more energy efficient. What follows are some measures – from simple and less expensive to more time consuming and difficult (e.g. you might need to hire a contractor) – to help you save money this coming winter season and beyond.

Low-cost Easy Ways to Save

- Turn down the temperature of your water heater to the warm setting (120°F).
- Clean or replace furnace and heat-pump filters regularly
- Install low-flow shower heads and faucet aerators
- Change the five most-used lights in your home to compact fluorescent lamps and you'll save more than \$60 every year in energy costs
- Unplug that second, old refrigerator! Today's models use at least 40 percent less energy than even the conventional models sold in 2001.
- Lower your thermostat – for every degree you shave about 2 percent off your heating bill.
- Weather strip doors and windows – properly air sealing cracks and openings in your home can significantly reduce heating and cooling costs, improve building durability, and create a healthier indoor environment
- Use Power Strips – plug your electronics into power strips – especially televisions and computers. When you're done using them, turn the power strip off to prevent the stand-by mode that draws unnecessary electricity
- Keep fireplace dampers closed whenever your fireplace is not in use and install glass doors for even more savings
- Use the air dry setting on your dishwasher
- Keep shades and curtains open during the day on the south side of your home to allow solar heating. Close them at night to retain heat

Moderate Effort

- Install a programmable thermostat which can save you about \$100 per year.
- When it's time to replace an old appliance, make sure to purchase one that has earned the ENERGY STAR® label. Any extra upfront cost will be recouped with years of savings
- Insulate hot water pipes and ducts wherever they run through unheated areas
- Make sure your water heater has an insulating blanket
- Seal up the largest air leaks in your house. The worst culprits are utility cut-throughs for pipes and vents/fans, gaps around chimneys, recessed lights in insulated ceilings, electric outlets, and unfinished spaces behind cupboards and closets. Reducing air leaks could cut 10 percent from an average household's monthly energy bill.
- Regularly service your heating system
- Add insulation to attic floor and basement ceiling

More Effort/Perhaps Hire a Contractor

- Install new energy efficient windows and entry doors
- If your walls aren't insulated have an insulation contractor blow cellulose into the walls.
- Plant evergreens on the north and west side of your home to deflect wind in winter

Remember – any and all energy efficiency measures taken can reap benefits and savings for years to come! ✨

MIT Researchers *Continued from page 5 >*

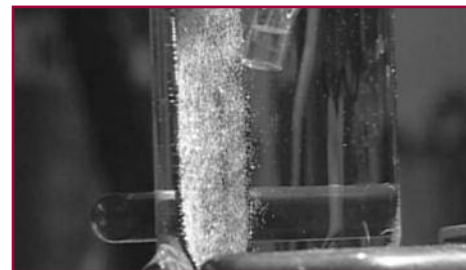
at Imperial College London. "The importance of their discovery cannot be overstated since it opens up the door for developing new technologies for energy production thus reducing our dependence for fossil fuels and addressing the global climate change problem."

Although more work needs to be done to incorporate Nocera and Kanan's work into current photovoltaic systems, the researchers are confident that it's only a matter of time.

"This is just the beginning," said Nocera. "The scientific community is really going to run with this." Nocera is anticipating

that in 10 years, homeowners will be able to power their homes through their own fuel cells, making electricity received by wire from utilities a thing of the past.

"This discovery in the Nocera lab demonstrates that moving up the transformation of our energy supply system to one based on renewables will depend heavily on frontier basic science," said Energy Initiative Director Ernest Moniz. This solar power project is part of the MIT Energy Initiative and the school's Solar Revolution, both which promote the research aimed at helping to meet future global energy needs. ✨



MIT researchers have developed a new catalyst, consisting of cobalt metal, phosphate and an electrode. When the catalyst is placed in water and electricity runs through the electrode, oxygen gas is produced. When another catalyst is used to produce hydrogen gas, the oxygen and hydrogen can be combined inside a fuel cell, creating carbon-free electricity to power a house or an electric car, day or night.

Photo: Tom White, MIT