

Energy Teachers Community News

All the ideas we have the energy to print.

Newton, MA June 2005

A free service of EnergyTeachers.org Inc., the network for curriculum development in energy production and use.
Sponsored in part by the Massachusetts Technology Collaborative

Please use this newsletter and our web site as a guide to all our free services:

- *A library of reviewed books and curriculum*
- *News of events and professional development*
- *Hundreds of links with teachers' comments*
- *Total curriculum-planning: Library research, field trips, lab equipment, competitions, college and careers, campus activities, and current events*
- *Personal attention and support*

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PICNIC!

*email picnic@energyteachers.org
or check the web site to find out
about our plans to have a picnic
in several regions of Massachu-
setts this summer.*

Welcome!

If this is your first issue of our newsletter, we welcome you to our network of teachers interested in teaching about energy. In 2004, I started this free service with the intention of finding and comparing energy-curriculum for a wide variety of classroom styles. I wanted us to share our experiences about what works and what doesn't, what projects engage students and fill gaps left by textbooks and the standard curriculum.

Especially if this *isn't* your first issue, I'd like to explain some new activities and formats at EnergyTeachers.org (ETO):

Because of increasing opportunities for teachers in energy-education, we will print this newsletter more frequently. Our online newsletter publishes many timely updates, some of which are printed here on page 4.

This is the era of carefully reviewed, standards-correlated resources. We feature such reviews,

written/assembled by teams of educators, on page 3.

Thanks to teachers' comments, our web site is much more dynamic. It is now easy to search news, books, links, and (our cornerstone) **Teachers' Goals**—A guide to multifaceted curriculum design. It is also easier to submit news and other items. Check back for new features coming soon.

-Shawn Reeves, Director
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ETO FOCUS: RENEWABLE SYSTEMS EXPLORER

Analyzing the Performance and Environmental Parameters of RE Plants. By Shawn Reeves

The Massachusetts Technology Collaborative has introduced a new web resource for examining data gathered from renewable powerplants around the state. This *Systems Explorer* allows teachers and students to register, view, watch select systems, and create custom graphs of insolation (incident sunlight), wind speed, ambient (air) temperature, and power output; some sites measure only a subset of these data. Also shown on the details-page (not shown) are some contextual measurements of the electricity generated, such as how many thousands of hours of use of a light bulb has been generated and pollution offset by this generation in lieu of traditional generation of electricity.

Sharing

At right is the home page, showing a graph for North Quincy (MA) High School's power output from a roof-top PV system. The modules rated at a sum of 2.4 kW are just reaching a 2 kW peak in the middle of the third day. Going to the page for North Quincy's system, you can compare this graph with one for sunlight, wind, or temperature. You can also view a photo of the system, energy/pollution equivalents, and a map of the state showing the site.

The screenshot shows the homepage of the Renewable Energy Trust website. At the top, it says 'RENEWABLE ENERGY TRUST' and 'A PROGRAM OF THE MASSACHUSETTS TECHNOLOGY COLLABORATIVE'. There are navigation links for 'MTC Home', 'Renewable Energy Trust', 'Energy Information', 'Search', and 'Contact Us'. A main banner features a photo of solar panels being installed on a roof with the text 'Catch some RAYS...'. Below this is a line graph titled 'Energy Insight' showing 'Output (kW)' over time from 9/11 03:00 to 9/16 02:00. The graph shows several peaks, with the highest peak reaching approximately 2.0 kW. A 'What's New' section on the right lists '42 systems are currently being shared online' and '38 systems are being actively monitored'. It also mentions that converted sunlight into 80,403 kilowatt-hours (kWh) of energy and displaced approximately 111,960 pounds of carbon dioxide emissions. A 'Register Now!' button is also visible.

Note the two cloudy days on this sample graph at <http://soltrex.masstech.org>

Diverse systems

Currently 42 systems share data, 38 of those continuing to collect new data. There are sites producing twenty times as much energy as North Quincy's; sites that have been around since the 80's; and sites at businesses, industries, schools, homes, and a church.

Plan to include a visit

Some of these sites will be featured in the EnergyTeachers.org Field Trip Guide, to be printed in 2006. If you would like to consider a visit, or if you're a teacher with knowledge of one of these sites, please contact us, fieldtrip@energyteachers.org

For more on this resource: <http://soltrex.masstech.org>

What Is This 'MTC' I Keep Seeing?

The Structure of Massachusetts Technology Collaborative, from masstech.org

Massachusetts Technology Collaborative

The Massachusetts Technology Collaborative (MTC) is an independent economic development agency chartered by the Commonwealth to serve as a catalyst for growing the state's innovation economy. MTC brings together leaders from industry, academia, and government to advance technology-based solutions that lead to economic growth and a cleaner environment in Massachusetts. MTC energizes emerging markets in the high-tech sector by filling gaps in the marketplace, connecting key stake holders, conducting critical economic analysis, and providing access to intellectual and financial capital. For additional information about MTC and its programs and initiatives, please visit the web site at

www.masstech.org.

The Renewable Energy Trust

MTC administers the Commonwealth's Renewable Energy Trust Fund (the Trust, or RET) to help build a sustainable, competitive market for renewable energy in the Commonwealth. The Trust was created by the Electric Utility Restructuring Act of 1997. MTC's legislative mandate is to increase the supply of and demand for green power while expanding economic activity in the state's renewable energy industry.

RET's K-12 Initiative

The K-12 Education Initiative (the "Initiative") aims to ensure that renewable energy concepts are incorporated into the curricula of Massachusetts schools. The Trust has initiated programs to encourage and make it easier

for teachers to teach their students about renewable energy. This includes developing an easily-accessible shared body of knowledge on renewable energy education and building an ever-growing network of teachers teaching renewable energy. [EnergyTeachers.org is now helping build that network. -ed.] Activities supported by the Initiative include sponsoring Renewable Energy Summer Content Institutes through the Massachusetts Department of Education; developing and presenting short Teacher Workshops to improve renewable energy education in the classroom; developing a Guide to Teaching Renewable Energy and Global Warming (currently available on the MTC web site); and making certain materials available at no cost to Massachusetts educators. [like this newsletter. -ed.]

Curriculum Focus: Water Power

A look at resources described in reviews at MTC's Guide to Teaching Renewable Energy and Global Warming (see sidebar)

The Nature of Water Power, 2002
Topics: Hydropower, Hydrologic Cycle
Source: Foundation for Water and Energy Education
Web address:
<http://www.fwee.org/TG/nwaterpwr.html>
Grade Levels: 6-8
Learning Strategies: Inquiry, hands-on, group activities
Frameworks Connections:
Science & Technology/Engineering
*Earth and Space Science, Grades 9-10
3. Earth Processes and Cycles
*Physics, Grade 9 or 10
3. Heat and Heat Transfer
*Biology, Grades 9-10
6. Ecology
Cost: Free downloadable materials
Description: The Nature of Water Power investigates electricity gener-

ated by hydropower, and the links between the hydrologic cycle, rivers and electricity. Eighty percent of the Northwest United States uses hydropower. Students begin with a brainstorming activity to serve as an introduction to hydropower and then move on to understanding the physics behind hydropower and its importance to our everyday lives. Process skills are intertwined into the activities and include observation, creating and testing models, making inferences, and developing conclusions. It is suggested that the curriculum units be performed in succession; however, they can be used to engage students in related curriculum pieces. The allotment of time required is flexible to the teacher, as the need to change the focus can be different for each of the classes working on the project.

Ocean Energy
Topics: Petroleum, Natural Gas, Methane Hydrates, Solar Energy, Wind Energy, Wave Energy, Ocean Thermal Energy Conversion, and Tidal Energy.
Source: The Minerals Management Service of the U.S. Department of the Interior
Web Address:
<http://www.mms.gov/mmskids>
Note: By selecting the Resources and Documents menu item on the home page one can then select Educational Tools for K - 12 Students and teachers and information about Student vehicle competitions.
Grade Levels: Middle School
Learning Strategies: Students are divided into groups to develop short presentations of information relating to a source of energy from oceans. This is followed by selected hands-on activities.
Frameworks Connections: (Gr. 6 - 8)

Science & Technology/Engineering
*Earth and Space Science
Heat Transfer in Earth's System
*Physical Sciences
Forms of Energy
Heat Energy
*Technology/Engineering
2. Engineering Design
5. Construction Technologies
Description: This site provides a 22-page PDF file including a teacher's guide, correlation to National Science Standards, information relating to non-renewable and renewable sources of energy in the ocean, and seven student activities. The teacher's guide recommends dedicating three to ten class periods to this lesson, depending on the number of activities selected. Each activity is designed to create simple models of the technologies used to extract non-renewable energy resources from the ocean or to simulate convection currents, wave generation, or wind energy conversion.

About the Guide

Working for the Massachusetts Technology Collaborative (MTC), teams of MA educators have designed an on-line guide to make it easy for teachers to find useful materials, activities, and resources for teaching students about renewable energy and global warming. Materials were described, reviewed, and correlated to standards by the teams. Two items of their results are reproduced here.

The Guide helps us select materials in energy education that will fulfill our courses' goals within the context of the Massachusetts Curriculum Frameworks. Resources are organized into descriptive pages with the following information:

Format of the Reviews

- Author/source of the information
- Web address or postal address
- Grade level(s) of the intended audience
- Learning strategies involved in the lesson(s)
- Framework Learning Standards the resource meets
- Cost of the teaching materials (most are free)
- Brief description and assessment of the resource

Use it wisely

Reviews of materials can be real timesavers; approach them with goals in mind, put at least a little trust in the reviewers, and you will not be led astray. The two reviews here and dozens more can be read at

[www.masstech.org/
cleanenergy/
curriculum/
about.htm](http://www.masstech.org/cleanenergy/curriculum/about.htm)

Taken a good hike lately?

We're compiling information for a document outlining field trips to sites that either produce power or use it in interesting ways. If you know any local power plants, industries, or buildings that might be interesting to visit, send a note to fieldtrip@energyteachers.org or use the comment form at <http://EnergyTeachers.org>



Opportunities for Professional Development

Highlights from the Calendar and News Pages at EnergyTeachers.org

Workshops

Climate Change Workshop for MA teachers with PDPs, Stipend Submitted by Bob Dickerman

Exploring the Greenhouse Effect, Global Warming and Climate Change

24 PDPs

A six-day workshop for high-school teachers on techniques and skills that will lead to a greater understanding of the Greenhouse Effect, Global Warming and Climate Change. As a hotly debated yet poorly understood contemporary issue, global warming offers an excellent means of capturing student interest in the key concepts of the life sciences/ecology strand of the MA Curriculum Frameworks.

The purpose of this workshop is to give you the tools needed to teach ecology from the perspective of global warming. The centerpiece of the course will be a series of innovative labs that can be used to teach ecology and global warming to high-school students. We will study the causes and effects of global warming, and we will then work through a series of labs that can be used to teach it.

The workshop will run from July 11-15, 2005 with a four-hour follow-up session in the Fall. Each participant completing the course will receive a \$500 stipend and 24 PDPs.

Provided by the Division of Mathematics, Science and Engineering Transfer at Springfield Technical Community College. To register, please call the STCC Center for Business and Technology at (413) 755-4502 or 755-4225.

For further information, contact: Bob Dickerman
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Springfield Technical Community College
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dickerman@stcc.edu

...Workshops...

MA Teachers Wind Workshops (See Kidwind.org for workshops in other states.)

These are FREE workshops for science teachers and outreach personnel who want to learn more about wind energy and how to execute wind energy activities in the classroom/field that support science & technology standards.

There are 30 spots for each event so please sign up!

July 5-6

MATCH School - Boston, MA

October 7-8

Center for Ecological Technology - Pittsfield, MA

Tired of two week long professional development workshops? Pack in tons of wind information and lessons in two days!

Attendees will be introduced to wind energy and wind technology. Your time at the workshop will be split between hands on lessons related to wind energy and wind technology and tours of local wind turbines and wind farms.

16 PDPs

Over 80% of teachers who attend these workshops try the materials with their classes—And our lessons work!

Teachers will leave the workshop with \$200 worth materials to replicate the lessons back in their classroom. Teachers will also receive 16 hours of PDPs.

No prior knowledge of wind energy is required to attend. For more information and to register head to

<http://www.kidwind.org/workshop/MAmtcworkshops.html>

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And More Workshops!

PowerUp! Summer Workshops for HS and Community College Educators

Submitted by Christine Shaw

The PowerUP! project, with the Museum of Science and Massachusetts Tech Prep network, is pleased to offer three regional seminars this summer for Power and Energy applications. These seminar series are three days with a fourth in the fall. They are highly interactive and hands on with at least two labs a day and an opportunity to share and discuss applications for science and engineering in the classroom.

There is a stipend for participants and all materials are included.

June 27, 28, and 29th

Worcester PowerUP!

July 11, 12, and 13th

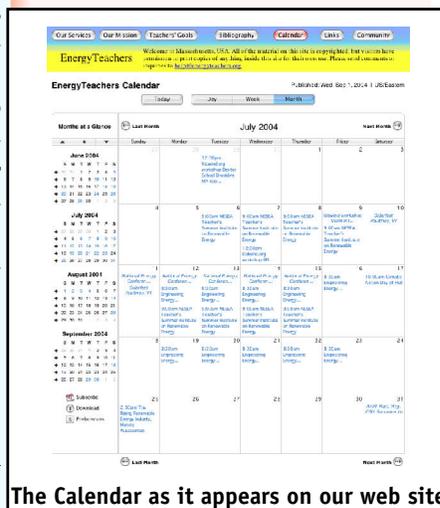
Northern Essex PowerUP! (Filling up fast!)

July 12, 13, and 14th

Boston PowerUP!

For more information please contact:

Melissa Higgins,
mhiggins@mos.org
or Christine Shaw,
cshaw@mos.org



The Calendar as it appears on our web site

Tell them
EnergyTeachers.org
sent you