



Energy Report

Newsletter for the Central Pennsylvania Chapter of The Association of Energy Engineers

Volume II, Issue V

April 2009

APRIL 2009 MEETING NOTICE

AEE Central PA Chapter April 30, 2009 Meeting Announcement



We're on the Web!
www.aee-centralpa.org

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Meeting Topic:	Energy from Bio-mass and GLRA Landfill Gas Facility Tour
Speaker:	Richard Madeira Vice President, Enginuity Energy, LLC Larry Taylor Greater Lebanon Refuse Authority
Location:	Greater Lebanon Refuse Authority 1610 Russell Road Lebanon, PA 17046
Date:	Thursday, April 30, 2009
Schedule:	11:45 am – Registration / Lunch 12:15 pm – Biomass Presentation 1:00 pm – GLRA Presentation 1:30 pm – Tour of Landfill and Facilities
Registration:	To register, contact Ed Berger (610) - 374-6144 x257 or eberger@rpaengr.com Registration is \$25 for AEE members or \$30 for non-members Registration includes a catered lunch

About the Speaker

Richard Madeira
Vice President
Enginuity Energy LLC

Mr. Madeira is the Vice President of Enginuity Energy LLC a company that was “designed for the environment”. The turnkey solutions developed and implemented, by Enginuity Energy; promote energy conservation, use alternative energy sources for the creation of “green” steam or power, and include sustainable building designs for both the renovation and new construction of commercial buildings. Under his direction, Enginuity Energy LLC is introducing new bio-mass gasification technology to the Mid-Atlantic region. This new multi-fuel source technology is ideal for States such as Pennsylvania which are steeped in agriculture.

Mr. Madeira has extensive experience developing and managing the deployment of energy conservation projects within the PJM territory. Prior to becoming Vice President of Enginuity Energy, Mr. Madeira spent eleven years with a global leader in the energy services industry where he held various positions including business development and marketing. He resides in Central Pennsylvania and serves on several boards including the Central Pennsylvania Chapter of the Association of Energy Engineers.

Board of Directors

If you are interested in serving on the Board of Directors or participating in Chapter events, please contact one of the Directors listed below.

President:	Edward Berger, CEM RPA Associates Inc. president@aee-centralpa.org	Kevin Close Ames True Temper
Vice President:	David Eberly, PE, CEM, CSDP Armstrong World Industries, Inc. vp@aee-centralpa.org	Mark Kauffman, CEM, CEP UGI Energy Services, Inc.
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Website/ Newsletter:	Thompson McConnell, CAP, CEM, CSDP, CDSM Powerhouse Operations Inc. webmaster@aee-centralpa.org	Jeff Marks Reliant Energy
		Travis Peck RPA Associates Inc.
		Diane Shellenhamer Schaedler Yesco Distribution, Inc.

About Landfill Gas

A significant by-product of waste decomposition is landfill gas, which is similar to natural gas. This gas is comprised primarily of methane, carbon dioxide and balance gases. The primary component of landfill gas, methane, is odorless and highly flammable and requires special management practices by landfills. The "balance gases" are neither flammable nor odorless, and require similar management practices to control the smell.

The Greater Lebanon Refuse Authority, in cooperation with PPL Energy Services, currently has a collection program that burns landfill gas to produce electricity. What was originally a landfill hazard and a smelly problem is now a benefit to our integrated solid waste management system.

PPL Energy Services, a methane recovery facility located on GLRA's property, has been in operation since 2007. The facility generates an average of 3,200 kilowatts of electricity per hour by. This is enough to supply approximately 3,000 homes with electricity each day. PPL Energy Services vacuums the gas out of the Greater Lebanon Refuse Authority's landfills, burns the gas in an internal combustion engine to produce electricity, and sells the electricity to Met-Ed utilities. In return for the use of the gas by PPL Energy Services, the GLRA receives a royalty payment from the sale of the landfill gas. The vacuum the landfill gas-to-energy plant uses to collect the gas eliminates the problem of dangerous methane gas escaping from the landfill and at the same time it recycles a by-product of the landfill into an extremely valuable resource.

Methane is a by-product of the decomposition of garbage. It is odorless, colorless, potentially deadly and also explosive! In a new landfill, emitted gases contain 40-50% carbon dioxide, 40-50% chloride & hydrogen sulfide, and only 10% is methane. After 5 years, these percentages reverse.

The landfill gas is actively collected by placing a vacuum on the landfill. Gas wells are drilled into the wastes and collection pipes are assembled into a network. A blower, located at the generation facility, uses the vacuum side of the system to pull gas into the pipe system, and the discharge side of the system to push the gas into the generation plant, similar to the two sides of a household vacuum cleaner; one side sucking up, one side blowing out. The methane gas pulled into this network then enters a central pipe known as a "trunk line". The temperature of the gas is between 70 and 80 degrees when collected and as a result it picks up water as it travels through the trash and enters the collection network. This "wet" gas is swirled around in a scrubber tank where moisture is removed. Then the gas travels to two filter tanks which remove dirt and other particles. Finally, the gas is forced into two 2,200 horsepower Caterpillar engines and create electricity.

Each engine has two carburetors which control the amount of gas entering into the engines. Each engine and generator has separate controls. The engine supplies the power and when the engine is in synch with the generator, it produces electricity. The generator has an arm that goes around a magnetic field, creating friction and producing electricity.

As a secondary means of landfill gas management, the Greater Lebanon Refuse Authority has recently added a flaring unit to its landfill gas management program. In the event that PPL Energy Services is unable to operate its facility to produce electricity, the gas will be directed from the network of gas collection pipes to an "Enclosed Flare". The "Enclosed Flare" is so named because its burners are located at the base of a 40 foot high stack. The flare uses the flammable portion of landfill gas, methane, to destroy the balance gases that are the cause of landfill odors, controlling both the explosive issues and the odor issues with one operation. To accomplish this correctly the system is designed to burn at approximately 1,600 degrees Fahrenheit. To keep the unit operating correctly the temperature, landfill gas flow rate, and air flow to the burners are closely monitored. In the event that something goes wrong, the unit will automatically shut down and call GLRA Staff.

About the Greater Lebanon Refuse Authority Tour

GLRA and PPL have partnered to develop a *Renewable Energy Education Facility* consisting of an educational building, a 1000 watt wind turbine, a 1000 watt solar array, and a 3200 kilowatt landfill gas-to-energy project at GLRA's facility on Russell Road in North Annville Township. PPL has installed and operates a wind turbine, a solar array and two *Caterpillar* powered generators fueled by GLRA's landfill gas. Landfill gas is a renewable resource that currently produces enough electricity to power 2,500 homes in Lebanon County. Most importantly, GLRA and PPL have partnered to provide Lebanon County's local schools, universities and the local community a working, educational forum for students from preschool to adult, teachers, professors, educators, engineers, scientists, environmentalists and future leaders of Pennsylvania to learn about the benefits of producing domestic, green and renewable power from landfill gas, wind and sun.

GLRA and PPL have constructed the *Renewable Energy Education Facility* which provides a side by side educational experience of how wind, solar and landfill gas can be combined in a mutually beneficial way. GLRA constructed the new building with a 480 square foot educational room and extended its existing landfill gas collection system to direct the captured methane gas and distribute it to PPL's *Caterpillar* engines. The *Renewable Energy Education Facility* has large viewing windows enabling visitors to see the working engines and various controls used in converting the GLRA's landfill gas into electricity. This project has been specifically designed for tours and community involvement to make it educational in every aspect.

With one specific goal in mind, the *Renewable Energy Education Facility* promotes the education of renewable energy as sustainable energy sources and technologies. By providing an educational setting with actual functioning sources of renewable energy to students, teachers, scientists, engineers, and the local community we are fulfilling our primary goal of promoting sustainable energy sources and fostering environmental education and stewardship. GLRA encourages our collective responsibility as environmental stewards through the promotion of environmental education.

Mark Your Calendar—May Meeting Preview

Join us for our May 8th meeting on ACT 129 & the PJM Demand Response. The meeting will be held at from 8:30 to 11:00 a.m. at Schaedler-Yesco, 3982 Paxton Street, Harrisburg, PA 17111.

Passed in 2008, ACT 129 amends several sections of the Public Utility Code. The PUC will be phasing in ACT 129 with the first phase including energy efficiency and conservation programs. Subsequent phases will address EDC and default service, provider responsibilities, conservation service providers, smart meter technology, time-of-use rates, real-time pricing plans, default service procurement, market misconduct, alternative energy sources, and cost recovery.

Plan to join us. Additional information will be provided in our next newsletter and on our website at www.aee-centralpa.org.

PPL Renewable Energy | Greater Lebanon Refuse Authority

PPL Renewable Energy designed, constructed, owns and operates a 3.2-megawatt methane-to-electricity plant at the Greater Lebanon Refuse Authority (GLRA) Landfill in Lebanon County, Pennsylvania. PPL realized this project by entering into a partnership with GLRA, which provides the gas and land for the project.

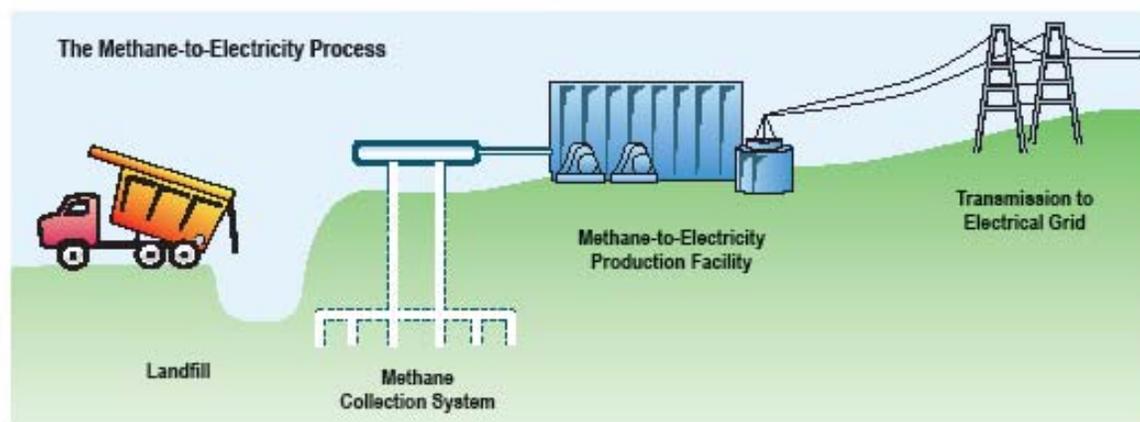
PPL uses methane gas that is collected every day to fuel its two Caterpillar engine generators. The engines produce enough electricity to power 2,500 homes in Lebanon County, which is equivalent to 5 percent of Lebanon's 50,000 homes.

With the installation of this system, the GLRA Landfill is able to reduce greenhouse gas emissions and provide benefits to the environment by reducing methane emissions by 6,375 tons each year and carbon dioxide emissions by 19,500 tons each year. It is also equivalent to removing 27,000 cars from the road, planting 38,000 acres of forest or offsetting electricity used by 251,000 light bulbs.

In addition, the facility includes an innovative educational facility to raise awareness about the benefits of renewable energy. The project received a "Community Partner of the Year Award" from the U.S. Environmental Protection Agency.



Location:	Lebanon, Pa.
Operational:	September 2007
Equipment:	Two Caterpillar 3520 (1.6 MW) engines
Capacity:	3.2 MW
Input:	Landfill methane gas
Output:	Around the clock, base load is sold to PJM



PPL Renewable Energy
 Two North Ninth Street
 Allentown, PA 18101-1179
 Tel. 610-774-6866
www.pplrenewableenergy.com



Directions to Greater Lebanon Refuse Authority

From Harrisburg and Points Southwest:

Take 322/422 East to Hershey. Follow 422 East to the village of Annville.

Turn North on PA 934 at the light in Annville.

On 934: Cross Railroad Bridge (tracks are below) at Lebanon Valley College.

Pass under decorative pedestrian bridge at Lebanon Valley College. PA 934 bears right then left.

See concrete wall on left. Pass Thompson Avenue on right.

Crest hill. Observe road intersection at bottom of hill about $\frac{3}{4}$ mile north on the East Side. This is Hill

Church Road Turn East on Hill Church Road

Stay to the right at the "Y" immediately after the turn from 938. (Left turn is Ono Road – O-no, don't take that one.)

Travel about three miles on Hill Church Road:

Pass Thompson Avenue Intersection (Cross Road) (1 mile.)

Pass Weber Avenue intersection from the Right (2 miles.) SLOW DOWN at brown/yellow barn on left.

Turn North (Left) on Russell Road. (See flat hedges where the other guy didn't slow down.) Stay Left at "Y". Pass

Long Lane Intersection

SLOW Down at house on left due to sharp turns ahead. Pass through "S" turn.

Office is just ahead at row of pine trees. Pass Emma Road intersecting from the East.

Turn Right (East) into parking lot at row of pine trees.

The red brick ranch house building is our Administrative Office. Continue $\frac{1}{2}$ mile to Maintenance, Engineering and

Operations Building on Right.

Enter through open gate.

From Allentown and Points North and East using I 81, I 78, PA Route 22:

Exit to PA Route 72 (South):

From PA 72 South, turn west onto Heilmandale Road (See Blue Attraction Sign for GLRA)

Follow Heilmandale Road west about 1 mile to a 90 degree turn to the north. SLOW DOWN

Turn left, west, onto Russell Road.

Follow Russell Road to a second 90 degree turn, this one to the South. (SLOW DOWN)

Pass Police Pistol Range on your right side. (If you didn't slow down, back up onto road.)

Continue past Maintenance, Engineering, and Operations Building and Pre-treatment Plant to top of ridge.

Office is a small red brick ranch type building on the left side marked with US and PA Flags and a sign.

From the East and Southeast using PA Turnpike, PA Route 322 or Pa Route 422 :

Use PA Route 72 North (Turnpike Exit 267):

Follow PA 72 North, through the City of Lebanon. See Heisey's Diner on Right Side.

From PA 72 North, turn west (left) onto Heilmandale Road (See Blue Attraction Sign for GLRA)

Follow Heilmandale Road west about 1 mile to a 90 degree turn to the north. SLOW DOWN

Turn left, west, onto Russell Road.

Follow Russell Road to a second 90 degree turn, this one to the South. (SLOW DOWN)

Pass Police Pistol Range on your right side. (If you didn't slow down, back up onto road.)

Continue past Maintenance, Engineering, and Operations Building and Pre-treatment Plant to top of ridge.

Office is a small red brick ranch type building on the left side marked with US and PA Flags and a sign.

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We're on the Web!
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Chapter Schedule of Events (2008-2009)



September 2008	Harrisburg, PA	Golf Outing
November 14, 2008	Harrisburg, PA	Energy Star Program
December 2008	Harrisburg, PA	Holiday Party
January 14, 2009	Harrisburg, PA	Joint Meeting between ASHRAE & AEE
March 25, 2009	Armstrong Lancaster, PA	Data Center Energy Management Energy Star Web Conference
April 30, 2009	Lebanon Landfill	Lebanon Landfill
May 8, 2009	Schaedler-Yesco Harrisburg, PA	Act 129--PA Energy Association PJM Demand Response
June 17, 2009	TBA	Solar Strategies Energy Star Web Conference
July 15, 2009	TBA	Engaging Sites with Performance Data Energy Star Web Conference
August 19, 2009	Schaedler-Yesco Harrisburg, PA	Lighting Technologies and Strategies

