Viridity Energy and the Southeastern Pennsylvania Transportation Authority (SEPTA) Awarded $900,000 from the State of Pennsylvania for Innovative Project to Recycle Energy Produced by Electric Public Transit

Pennsylvania Energy Development Authority (PEDA) grant will fund Viridity Energy’s innovative energy storage project to help SEPTA achieve economic value and environmental benefits through deployment of smart grid solutions

September 1, 2010

PHILADELPHIA--(BUSINESS WIRE)--Viridity Energy, a Philadelphia-area smart grid company, today announced that it had received a $900,000 grant for its innovative pilot project with the Southeastern Pennsylvania Transportation Authority (SEPTA), the nation’s sixth largest public transit organization. As part of the project, Viridity Energy will deploy its software optimization system to allow SEPTA to recycle the energy created from the regenerative braking ability of trains and trolleys at a high-use propulsion substation in Philadelphia, which will in turn improve power quality, produce energy savings and generate revenues. The State of Pennsylvania awarded the Viridity Energy “SEPTA Recycled Energy and Optimization Project” funding through the 2010 Pennsylvania Energy Development Authority (PEDA) grant program.

The project will pair the latest 21st century technologies and energy optimization practices with one of the country’s oldest transportation systems, dating back to the deployment of electric trolleys in 1892. Mass transit systems across the country are striving to maintain high quality service while facing growing fiscal challenges which are further compounded by rising energy costs. The pilot represents a large and untapped potential for transit systems to help meet these challenges and at the same time improve grid reliability in highly populated urban neighborhoods.

The project calls for Viridity Energy and SEPTA to install a large-scale battery to capture the energy from regenerative braking of trains along a portion of the Market-Frankford Line, the highest ridership line in SEPTA’s system. The Viridity Energy-SEPTA project will result in numerous economic, operational and environmental benefits including, but not limited to, the following:

- **Delivers Energy Savings** – SEPTA will capture and productively use electric power that would be otherwise wasted while reducing its electricity consumption.
- **Realizes Economic Value** – In addition to using less electricity and reducing operating costs, the project will generate significant revenues through participation in PJM’s wholesale power markets.
- **Increases Operational Efficiency** – SEPTA will increase operation and maintenance efficiencies through improved power quality and system management.
- **Achieves Sustainability and Carbon Footprint Goals** – By reducing its use of electricity generated on the grid, the project will help SEPTA decrease its carbon emissions by 1,258 tons per year.
- **Enhances Grid Reliability** – The stored energy will help balance electric generation and electric load on the PJM interconnection system while assisting PECO Energy Company in preserving the reliability of its electric distribution system.

“We are delighted to receive this grant from PEDA and are looking forward to working with SEPTA to deploy the latest energy optimization techniques with the goal of improving their operational efficiency, reducing their carbon footprint and lowering their costs,” said Audrey Zibelman, President and CEO of Viridity Energy. “This project is a perfect example of how smart grid innovations and advances in technology can effectively be paired with revenue opportunities from competitive energy markets to yield substantial economic, operational and environmental benefits to all the parties involved.”

As part of the pilot project, SEPTA expects to generate approximately $500,000 in economic value for the agency. A successful pilot could lead to potential deployment at all 38 SEPTA substations. It is estimated that this expansion could translate into significant savings from SEPTA’s current electricity spend.

“We are pleased to partner with Viridity Energy on this project under the PEDA grant program,” stated Joseph M. Casey, General Manager, Southeastern Pennsylvania Transportation Authority (SEPTA). “Upon implementation, the storage system will serve as a foundation for measurable gains in both energy efficiency and voltage stability in this critical corridor, providing a replicable and scalable model for broader system-wide implementation. By moving towards energy storage, SEPTA will be assuming a leadership role among transit agencies.”
“SEPTA’s partnership with Viridity Energy supports Philadelphia’s burgeoning market position as a cutting-edge center for smart grid technologies,” said Rina Cutler, Deputy Mayor for Transportation and Utilities. “This kind of energy saving technology and improvement to transit service reliability advances the Mayor’s Greenworks Philadelphia agenda.”

About Viridity Energy

Viridity Energy is making the next generation of the smart grid a reality by providing large energy consumers with powerful tools to increase energy efficiency and decrease energy costs. The company’s unique and flexible VPower™ platform enables customers to dynamically shift and balance energy load, integrate advanced energy technologies and convert existing energy investments into lucrative new revenue streams. Viridity Energy helps organizations achieve sustainability goals and contribute to the greater good by stabilizing energy price fluctuations. Headquartered in Conshohocken, Pennsylvania, Viridity Energy was founded in 2008 by former executives of PJM Interconnection. For more information visit www.viridityenergy.com

SEPTA pilot program to capture, reuse subway energy
By Andrew Maykuth, Inquirer Staff Writer
September 2, 2010

The Market-Frankford Line is going hybrid.

SEPTA announced a pilot project Wednesday that would capture electricity generated by braking subway trains, much like a hybrid automobile produces power when it slows down.

The electricity will be stored in a large, railside battery array and reused when the train accelerates. The system is expected to reduce electrical power purchases 10 percent to 20 percent at each location of the batteries, said Andrew Gillespie, SEPTA’s chief engineering officer for power.

But the system is designed to do more than capture power from the subway’s dynamic braking system, said Audrey Zibelman, the chief executive officer of Viridity Energy Inc., the Conshohocken smart-grid innovator that devised the project for SEPTA.

The power-storage system is potentially so large - each battery array would store one megawatt of power - that SEPTA could further reduce its electric bill by buying cheap power at night to use or resell during expensive peak hours.

And SEPTA also could collect fees from the regional grid operator, PJM Interconnection L.L.C., by providing power on short notice - one or two seconds - to stabilize regional power flows on the grid.

Zibelman said the transit agency could realize energy savings "substantially higher" than the 20 percent target Viridity typically sets for a project. SEPTA currently spends about $20 million a year to buy electricity from Peco Energy Co. to power its trains, subways, and electrified trolley and bus fleet.

The pilot project, involving a single battery array at a SEPTA electric substation in Kensington, would cost about $1.5 million.

The Pennsylvania Energy Development Authority is underwriting the project with a $900,000 grant. Viridity will underwrite the remaining capital cost, Zibelman said.

If the project proves economic - Viridity estimates one battery array will generate $500,000 a year in value - SEPTA envisions installing the technology at all 33 electric substations that serve its subway and trolley lines.

The system will take advantage of regenerative-braking capacity already installed in the Market-Frankford Line and SEPTA’s electrified buses and trolleys.

When applied, the brakes now convert the train’s kinetic energy into electricity, which is transmitted into the third-rail system for use by other trains.

But when there are no other trains nearby to consume the electricity, the power is lost. Excess electricity from the brakes is converted into heat that is dissipated from vents in the carriage rooftops.
About half the power produced by the regenerative brakes is now lost, Gillespie said.

SEPTA says the batteries, in addition to capturing the regenerated power that is now lost, will help increase the system's electrical efficiency and stabilize the voltage - it operates on 600-volt direct-current power.

Zibelman envisions other transit agencies' adopting Viridity's technology.

"This is an opportunity," she said, "for us to develop a market."

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**Governor Rendell Announces 40 Innovative Energy Projects to Create 1,400 Jobs; Calls for Higher Solar Standards to Spur Additional Job Growth**

**Governor’s Press Office, News for Immediate Release**

**September 1, 2010**

Harrisburg - Governor Edward G. Rendell today announced $20.5 million in state and federal investments that will create 1,400 jobs in the rapidly expanding clean energy industry.

The funding will benefit 40 diverse energy projects that will generate or save the equivalent of more than 10 billion kilowatt hours of electricity over their lifetimes. That's enough energy to power 1 million average homes in Pennsylvania for one year-and reduce carbon emissions by nearly 9 million tons, which is the equivalent of removing 1.5 million passenger cars from the roads for one year.

"A few years ago, projects like these existed only in theory. Today, they are a reality," said Governor Rendell. "They benefit Pennsylvania's consumers by generating and saving electricity, driving down utility rates, making additional projects more affordable and feasible, while stimulating the economy by creating manufacturing and employment opportunities, attracting private investments and making our environment cleaner."

The Governor noted that the state investment provided through the Pennsylvania Energy Development Authority, or PEDA, will also leverage more than $211 million in private funds, generating a 10-to-1 return on investment. Since 2005, PEDA has invested more than $99 million in 201 projects which have generated more than $883 million in matching funds.

He also stressed the need to increase Pennsylvania's clean energy portfolio standards, saying higher standards will translate into even more jobs and economic development for the state-just as the first Alternative Energy Portfolio Standards law did.

"The solar industry has grown at a rapid pace despite the uncertain economy," said Governor Rendell. "Investors and developers have proven anxious and eager to invest in clean solar energy projects. Venture capitalists alone poured $1.4 billion into the industry last year. Pennsylvania could attract a larger share of that action if we just increased the solar share of our portfolio standards law."

When it was enacted in 2004, Pennsylvania's Alternative Energy Portfolio Standards act was one of the nation's most ambitious laws, but has since been surpassed by other states.

The current law's solar share requirement requires that one-half-of-one percent of the electricity Pennsylvanians purchase in 2021 come from solar power. However, Delaware has a 3.5 percent requirement by 2025; Maryland will require that 2 percent of their electricity comes from solar by 2022; New Jersey will require 4 percent solar generation by 2021; and Illinois-the seventh-largest coal producer in the nation-has set a 1.5 percent goal for 2025.

"Pennsylvania is on pace to become one of the top five states this year for the amount of installed solar generation capacity we have, but that's because of the standards we enacted six years ago," said the Governor, adding that less than two years ago, Pennsylvania's installed solar capacity was minimal. "Today, we have more than 39 megawatts of capacity installed, or enough to power 5,900 homes and that number increases daily.

"Unless we move now to increase our solar share-even to a modest 1.5 percent target-the types of projects we're announcing today won't even consider Pennsylvania. They'll look elsewhere and take their jobs with them. And the 600 solar businesses now operating in Pennsylvania may move to another state where the sun shines brighter. Not acting on this issue now will only hurt our economy in the long-run."
The projects announced by the Governor were funded through three sources. Twenty-four projects were funded with $13 million from Growing Greener II, eight projects were funded with $5 million in federal stimulus funds through the American Recovery and Reinvestment Act, and eight projects in the Pittsburgh region were funded with $2.5 million through Duquesne Light Co. settlement funds.

For more information, visit www.depweb.state.pa.us, keyword: PEDA, or call the Department of Environmental Protection's Office of Energy and Technology Deployment at 717-783-8411.

For more information on how the American Recovery and Reinvestment Act is working in Pennsylvania, visit www.recovery.pa.gov.

Media contacts:
John Repetz, DEP; 717-787-1323
Michael Smith, Governor's Office; 717-783-1116

Editor's Note: Following is a list, by county, of the 40 alternative and renewable energy projects approved by the Pennsylvania Energy Development Authority. (kWh=kilowatt hours, MW=megawatts).

24 Projects funded by Growing Greener II:

**Blair**
Roaring Springs Blank Book Co. -- $450,000 to turn wood- and paper-based waste into cleaner burning fuel cubes that can be used in place of coal. The project is the first of its kind in Central Pennsylvania.
Lifetime kWh Saved/Generated: 676,261,332

Solar Development Group LLC -- $737,139 for a 1.5 MW photovoltaic system.
Lifetime kWh Saved/Generated: 70,555,983

**Bradford**
KGRA Energy Corp. -- $750,000 to construct a heat-recovery-to-power project at a gas gathering station which will convert waste heat from eight Caterpillar reciprocating engines to clean, renewable electricity.
Lifetime kWh Saved/Generated: 254,861,250

**Bucks**
Pennsbury School District -- $188,000 to install a solar roof, improve energy efficiency and enhance indoor air quality at the historic Makefield Elementary School.
Lifetime kWh Saved/Generated: 42,735,821

UGI Development Co. -- $900,000 to install a 2 MW solar facility at an existing manufacturing plant which will offset a portion of the plant’s power requirements.
Lifetime kWh Saved/Generated: 59,925,000

**Butler**
Pennsylvania American Water -- $180,000 for the installation of a 30 kW micro-hydro turbine to recover energy from the raw water pipeline of the Oneida Valley Water Treatment Plant.
Lifetime kWh Saved/Generated: 7,530,000

**Chester**
MainLine Solar LLC -- $450,000 for a flat roof-mounted 900 kW solar electric farm on the A. Duie Pyle Parkesburg facility. The energy produced will supply 100 percent of the electricity needs for this distribution center.
Lifetime kWh Saved/Generated: 25,000,000

Phoenixville Area School District -- $554,500 to implement a comprehensive energy program at three school buildings. The work includes installation of 400 kW photovoltaic electric generation; energy efficient retrofits of lighting, heating, cooling, pumping and ventilation systems.
Lifetime kWh Saved/Generated: 49,389,969

Clarion
Solar Strategies Development Corp. -- $730,000 to produce NetZero Energy Modular Homes in a re-equipped modular manufacturing facility.
Lifetime kWh Saved/Generated: N/A

Clearfield
Curwensville Area School District -- $574,772 for a closed-loop geothermal heat pump system that will reduce energy costs and substantially reduce the amount of air quality emissions which is currently produced from burning coal.
Lifetime kWh Saved/Generated: 140,674,080

Dauphin
Hamilton Health Center Inc. -- $242,672 for construction of a geothermal well field required for installation of a closed-loop geothermal system at the center’s new facility located in an adaptively reused 68,000-square-foot warehouse on a Brownfield Action Team site.
Lifetime kWh Saved/Generated: 12,105,345

Delaware
Haverford Township -- $300,000 to install a geothermal system in its new 35,000-square-foot Community Recreation Environmental Center located at the former Haverford State Hospital site.
Lifetime kWh Saved/Generated: 55,170,616

Lancaster Community Energy Inc. -- $1,000,000 to construct a 15 MW, $65 million solar photovoltaic project which will be the largest solar electric generating facility in the eastern part of the United States.
Lifetime kWh Saved/Generated: 530,000,000

Kline's Services -- $250,000 to install a methane digester and a generator to produce electricity. The methane digester will take waste from Kline's operation and turn it into a methane rich biogas.
Lifetime kWh Saved/Generated: 120,000,000

Quantas Technologies Inc. -- $900,000 for the development of the next generation of Insulating Glass System (IGS) product. The company currently markets an IGS to the low-income weatherization segment. This development will broaden the product line, allowing greater penetration of this energy saving technology in the region.
Lifetime kWh Saved/Generated: N/A

Mifflin Renewable Energy Partners Inc. -- $850,000 to install a minimum of 1.8 MW of net-metered photovoltaic solar modules on 12.5 acres of land adjacent to, and part of the Greater Lewistown Corporate Center.
Lifetime kWh Saved/Generated: 55,118,657

Montgomery American Refining and Biochemical Inc. -- $315,000 to equip and expand its existing thick film manufacturing facility and dedicate it to the production of improved metallization pastes that are used in the manufacture of high-efficiency silicon solar cells.
Lifetime kWh Saved/Generated: N/A

Northampton Metro-Tek Electrical Services -- $831,250 for a 2.2 MW ground mounted solar system for Moore Township Elementary and Lehigh Township Elementary schools.
Lifetime kWh Saved/Generated: 61,188,000

Ultra Poly Corp. -- $750,000 to convert 20 tons per day of non-source separated waste plastic into 3,000 gallons per day of liquid fuel meeting the American Standard Test Method standard for low sulfur fuel.
Lifetime kWh Saved/Generated: 1,302,313,747

Philadelphia Arthur Ashe Youth Tennis and Education Center -- $393,400 for the installation of a 330 kW solar energy generator on the south facing roofs of the center, and an energy efficient lighting system for the tennis building.
Lifetime kWh Saved/Generated: 11,357,536

Philadelphia City Treasurer Department of Recreation -- $412,482 to replace lighting and upgrade controls at six recreation sites, and install a 14.5 kW photovoltaic system at one site.
Lifetime kWh Saved/Generated: 26,962,200

Viridity Energy Inc. -- $900,000 for installation of an innovative energy storage system to maximize the recapture of existing regenerative braking capacity from trains along a portion of the Market-Frankford Line, the highest ridership line in SEPTA's system.
Lifetime kWh Saved/Generated: NA

Venango UPMC Health System -- $124,170 for a closed-loop geothermal system which uses an industrial-sized chiller to manage the cooling and air replacement requirements of a hospital. The system will also eliminate chemical cooling tower treatments and reduce demands placed upon the municipal water and sewage infrastructure.
Lifetime kWh Saved/Generated: 12,800,000

Washington CONSOL Energy Inc. -- $529,157 for a micro turbine generator to capture and use a waste stream from a coal bed methane processing plant to produce electricity.
Lifetime kWh Saved/Generated: 141,841,498

8 Projects funded by the federal American Recovery and Reinvestment Act:

Allegheny Pittsburgh Allegheny County Thermal Ltd. -- $1 million to update infrastructures on an existing steam generation and distribution system located in downtown Pittsburgh.
Lifetime kWh Saved/Generated: 322,581,058

Bucks Albright College -- $8,466,000 for the installation of a 1 MW combustion turbine which will include a waste heat recovery boiler. The system will allow for the on-site production of power combined with the recovery of waste heat for use on site as well.
Lifetime kWh Saved/Generated: 120,431,408

Clarion Piney Creek L.P. -- $429,599 to supplement a portion of its waste coal fuel with biomass fuel. Sources of biomass could potentially include a range of materials including forest harvesting residues; sawmill residues and municipal biomass wastes.
Lifetime kWh Saved/Generated: 690,302,950
Dauphin
ArcelorMittal USA Inc. -- $800,000 to purchase and install an energy-efficient, low-emission, recast furnace at its Steelton facility. The proposed project will implement the most advanced technology to recycle and recover energy, increasing energy efficiency and reducing CO2 emissions.
Lifetime kWh Saved/Generated: 5,319,238,650

Erie
General Electric Compacting through GE Transportation Division -- $500,000 to provide a portion of the costs for a higher capacity crane at the Erie-area facility to allow test and development of wind turbine drive trains from 2.0 to 3.6 MW in order to meet the market need for larger drive trains.
Lifetime kWh Saved/Generated: N/A

Lehigh
Kraft Foods Inc. -- $577,500 to purchase and install a filtration system compressor and pipeline to deliver 105 Mmcf (million cubic feet) per year of biomethane - which is currently flared off at a wastewater treatment plant -- to fuel a boiler at Kraft.
Lifetime kWh Saved/Generated: 615,449,100

Philadelphia
The Fox Chase Cancer Center -- $250,000 to replace all existing windows with new thermally improved aluminum frames with low E, high-shading coefficient insulated glazing assembly. An operating energy cost savings of at least 40 percent can be achieved.
Lifetime kWh Saved/Generated: 31,080,383

Sullivan
Sullivan County School District -- $630,000 to install a biomass energy system which will replace 85 percent of the heating oil used with 775 tons of sustainable, harvested local biomass, which will reduce energy costs at the high school and elementary school.
Lifetime kWh Saved/Generated: 47,697,305

8 Projects funded by the Duquesne Light Settlement:

Allegheny
Burns & Scalo Roofing Company Inc. -- $498,357 to redevelop the flat roof of an existing office/warehouse building, utilizing three different solar energy technologies totaling 105 kW. A green roof under and around a section of the solar installation will allow for the study of increased solar efficiency from ambient air temperature reduction around solar arrays.
Lifetime kWh Saved/Generated: 13,240,479

City of Pittsburgh -- $816,105 for the first phase of an energy efficient streetlight conversion that will replace 40,000 high pressure sodium lights with more efficient light-emitting diodes (LED). Phase I will replace the lights in 30 business districts throughout the city.
Lifetime kWh Saved/Generated: 49,546,065

Converteam Inc. -- $250,000 to transfer the company’s existing state-of-the-art ProSolar inverter technology developed by its German affiliate to its manufacturing facility in Pittsburgh. The goal of this project is to develop and manufacture the next generation of higher power and higher efficiency solar inverter systems for utility-scale photovoltaic installations in the U.S.
Lifetime kWh Saved/Generated: N/A

PPG Industries Inc. -- $35,784 to complete an energy efficient lighting upgrade at the company’s Glass Business and Discovery Center. The work will include installation of nearly 3,500 energy efficient lighting products.
Lifetime kWh Saved/Generated: 16,419,288

School District of Pittsburgh -- $71,000 for a solar thermal initiative, following a successful LED lighting initiative started in 2009. Solar thermal systems, each including roof-solar collection systems, will be installed at three properties. Each is expected to offset energy costs associated with heating domestic hot water and provide a practical teaching tool.
Lifetime kWh Saved/Generated: 13,162,725

Soldiers & Sailors Memorial Hall and Museum Trust Inc. -- $84,000 to update and enhance electrical operations to reduce annual costs. The project will involve new lighting systems, HVAC upgrades and variable speed drives.
Lifetime kWh Saved/Generated: 13,162,725

United States Green Energy Corp. -- $750,000 for an automated continuous flow high speed solar siding/shingle lamination machine at a restored roundhouse located on a former steel mill site in McKeesport.
Lifetime kWh Saved/Generated: N/A

Wilkinsburg Borough -- $141,750 for energy efficiency improvements to the municipal building. The roof has been replaced, boiler system replaced and 66 new energy efficient windows installed. Fifty-five remaining original construction windows will be replaced.
Lifetime kWh Saved/Generated: 1,256,569
Philly subway to capture energy from braking trains
CNET, By Martin LaMonica
September 1, 2010

Here's an unusual way to upgrade a subway system: add a giant battery.

Viridity Energy said on Monday it has been awarded a $900,000 grant by the Pennsylvania Energy Development Authority to build a system which will capture the energy from Philadelphia subway cars as they brake to enter a station.

The regenerative braking system will collect energy in a large battery installed along the busy Market-Frankford Line. The stored energy will be used to power trains when they leave the station and to earn money selling energy back to the grid.

"Essentially we're creating a microgrid that is integrated with the transmission grid and operated so that its optimized for efficiency and economics," said Audrey Zibelman, President and CEO of Viridity Energy.

The project, which Viridity hopes to be operating by next spring, will have a battery between one and one and a half megawatts of capacity which will replace the current system which cannot capture all the energy from incoming trains.

With the battery in place, it can power trains when they leave, cutting down on the operating costs of Southeastern Pennsylvania Transportation Authority (SEPTA).

The battery will be able to make money, too, by providing services to the grid. Using its stored energy, it can make money from grid operator PJM by supplying quick bursts of energy to maintain a steady frequency. SEPTA can also draw energy from the grid at off-peak times and supply it at peak times when the utility is looking to lower usage because energy prices are high.

Viridity Energy's hosted software is like a "network operating service" that optimizes how the energy is pulled into and dispatched from the battery, said Zibelman. The company, which makes money by getting a percentage of customers' revenue, is now evaluating what types of batteries it will use, she added.

"Electric vehicles are on everyone's mind right now as where we need to go, but we have an electric vehicle system already sitting here. Let's use those first," Zibelman said. "It's something could be done in almost any transit system.

SEPTA estimates it can save $500,000 a year on its electricity spending. If the project is successful, SEPTA hopes to replicate the model system-wide, Joseph Casey, SEPTA general manager said in a statement.

Martin LaMonica is a senior writer for CNET's Green Tech blog. He started at CNET News in 2002, covering IT and Web development. Before that, he was executive editor at IT publication InfoWorld. E-mail Martin.

Read more: http://news.cnet.com/8301-11128_3-20015306-54.html#ixzz0ylQohEkl4

SEPTA to capture braking system energy for electricity
Philadelphia Business Journal - by Peter Key, Staff Writer
September 1, 2010

Viridity Energy Inc. said Wednesday that it and SEPTA have received a $900,000 grant from the state of Pennsylvania to fund a project to capture electricity produced by the braking systems of the trains on SEPTA's Market-Frankford Line.

Viridity, which develops smart-grid software, and SEPTA will install a battery in a substation to store electricity produced by the trains on a portion of the line. The stored electricity will be fed back into the line's electrical system, allowing SEPTA to reduce the amount of electricity it has to buy.
SEPTA and Conshohocken, Pa.-based Viridity said that if the project is successful, SEPTA could deploy batteries at all 38 of its substations and use them and Viridity’s software to reduce its power bill significantly.

Viridity Energy and SEPTA Awarded $900,000 from State for Innovative Project

*Mass Transit Magazine*

*September 1st, 2010*

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Last week, Viridity Energy announced it received a $900,000 Pennsylvania grant for an energy pilot project with the Southeastern Pennsylvania Transportation Authority (SEPTA). The state awarded funding through the 2010 Pennsylvania Energy Development Authority grant program.

As part of the project, Viridity Energy will deploy its software optimization system, which would enable SEPTA to recycle energy created from regenerative braking of trains and trolleys at a propulsion substation in Philadelphia. The project calls for Viridity Energy and SEPTA to install a large-scale battery to capture the braking energy along a portion of the Market-Frankford Line.

The project will help SEPTA cut energy costs, increase operational efficiency and decrease carbon emissions, Viridity Energy officials said in a prepared statement. SEPTA expects the pilot to generate savings of about $500,000. If the pilot project is successful, the agency might deploy the software system at all of its 38 substations.

“By moving towards energy storage, SEPTA will be assuming a leadership role among transit agencies,” said SEPTA General Manager Joseph Casey.

Philadelphia subway returns power to grid

By Jason Kambitsis, Wired – Autopia blog

Regenerative braking is common on hybrids like the Toyota Prius and EVs like the Nissan Leaf, and it long has been a source of energy for lights and other functions on trains. Now it’s being used in southeastern Pennsylvania to generate electricity for the grid.

A huge battery will capture kinetic energy generated when trains apply the brakes while entering one of the busiest subway stations in Philadelphia. That energy will be used by the Southeastern Pennsylvania Transportation Authority or sold to the local utility. The transportation authority and smart-grid company Viridity Energy have received a $900,000 grant from the Pennsylvania Energy Development Authority for $1.5 million the pilot program.

The system will be installed along a stretch of the Market-Frankford line, which has the highest ridership in the system. It will generate 1.5 megawatts of energy that can be used by accelerating trains, stored for future use or returned to the grid. The transit authority will be able to sell the power on the wholesale energy market, or simply use it to improve its own voltage on the system. The transit agency also could purchase electricity at night when rates are low and store it in the batteries for use during the day.

Philadelphia subways use regenerative braking to some degree now; kinetic energy is converted to electricity that is returned to the system through the third rail. But the system still loses at least half the energy as heat.

Joseph M. Casey, general manager of the transportation authority, says the system will provide measurable gains in energy efficiency and voltage stability in a critical mass transit corridor. Audrey Zibelman, president and CEO of Viridity Energy, says the goal is to improve the transit agency’s operational efficiency, reduce its carbon output and cut its costs.

The system is expected to come online next spring, and it could save the transit agency $500,000 in energy costs. The transit agency typically spends $20 million on electricity annually to power its trains, buses and trolleys, according to the Philadelphia Inquirer. If it were used at each of the 33 electrical substations serving the railway system, officials say, the agency could cut its energy consumption 40 percent.
PHILADELPHIA -- Sparks fly and steel beams shake as electrified trains stop and go at Huntingdon Station on Market-Frankford, the city's busiest subway line.

The Southeastern Pennsylvania Transportation Authority's (SEPTA) nearby Letterly substation is able to capture about half of braking trains' kinetic energy to power outbound ones. The timing has to be just right, such as when a train is approaching the powder-blue, elevated platform from the other direction.

If only we could catch and release it all, at will, engineers have mused often. They are about to get their wish.

The Philadelphia-area startup Viridity Energy Inc. will use a $900,000 state grant to augment SEPTA's regenerative braking system with a device capable of storing up to 1.5 megawatts. Engineers are mulling everything from lithium-ion batteries to flywheels -- discs that maintain kinetic energy by spinning -- to store electricity in the bowels of the more than 80-year-old Letterly substation.

SEPTA will propel the Huntingdon Station's outbound trains with the power as well as sell it to PJM Interconnection LLC, the regional grid operator. Viridity will use its smart-grid software to show when the price is just right, such as on hot summer afternoons when Philadelphians crank up their window air conditioners and box fans.

"Clearly, SEPTA has a lot of electricity it's not leveraging," said Laurie Actman, Viridity's director of business development and government relations. "The battery will take the uncertainty away and enable [SEPTA] to reuse all of the power."

When approaching trains hit the brakes today, SEPTA converts the kinetic energy into electricity and sends it to a third rail at the Huntingdon station. If there are no nearby trains in need of propulsion, the energy is dissipated as heat through the rooftops of train carriages.

The pilot project, which will include a three-month demonstration in early 2012, will cost about $1.5 million. Viridity hopes to demonstrate that SEPTA could recoup the capital investment within three years through energy savings, Actman estimated.

SEPTA, the nation's fifth-largest transit agency by ridership, spends about $20 million annually to buy electricity from Peco Energy Co. to power a fleet that includes 38 electrified buses and a sprawling network of subway trains and trolleys.

The Letterly pilot project will reduce energy consumption by about 15 percent, which translates to about $500,000 annually, estimated Erik Johanson, a SEPTA strategy and sustainability planner. The project will also further the agency's bid to slash its greenhouse gas emissions 5 percent annually, he said.

"Any way we can reduce our electricity consumption and prepare for a carbon-priced world is clearly in our best interest," Johanson added.

'Increasingly valuable proposition'

Viridity has yet to prove the Letterly pilot project's wherewithal, but SEPTA officials are already mulling whether to install energy-storage devices in most of the agency's 34 active DC-current substations.

Building a new substation, not including land, would cost SEPTA between $5 million and $9 million, agency officials estimate. The cost of installing an energy-storage device in an existing substation would cost in the range of $1 million to $1.5 million.

"If we did this systemwide, we could save about $2 million a year on energy," Johanson estimated. "This [technology] is going to be an increasingly valuable proposition for us."

The prospect of cutting power bills and greenhouse gas emissions has spurred several other electrified transit operators to test energy-storage devices.

TriMet, the public transit operator for the Portland, Ore., metropolitan area, tested a Siemens-built unit of supercapacitors in 2004. The wayside unit was able to temporarily store energy captured from trains braking at a station on its MAX light-rail line.
The pilot project’s basic technology “worked just fine,” but the concept of a fixed energy-storage device was not ideal for a slower-moving line where trains pass by every 10-15 minutes, said Thomas Heilig, the agency’s director of systems engineering.

“We came to the conclusion that it would be better for us to put units on the [train] cars than on the wayside,” Heilig explained.

TriMet is seeking a $10 million grant from the Department of Transportation to install energy-storage units atop 20 of its train cars.

“This is a technology that could really save us some money,” Heilig added.

SEPTA hopes a giant battery will capture energy now lost
Philadelphia Business Journal - by Athena D. Merritt Staff Writer
September 17, 2010

Every time a subway train brakes on SEPTA’s Market-Frankford Line electricity is generated. By next summer, a large-scale battery could be in place to capture and recycle that energy under a pilot project Viridity Energy Inc. started this week.

The energy conserving move on the transportation authority’s highest ridership line is just one of several actions that SEPTA is planning or has made as part of a broader environmental sustainability strategy. All stand to benefit the transit agency when state-imposed energy rate caps on Peco Energy Co. expire Dec. 31.

SEPTA spends an estimated $20 million annually to power its subway, trolley and regional rail lines. The Market-Frankford Line project will turn what was once an expense on the books into revenue by enabling SEPTA to capture energy that can be used later or sold back to the power grid, Viridity Energy President and CEO Audrey Zibelman said.

If the installation of the truck-size, one megawatt battery proves successful, others are already lined up and waiting.

“Several [transit] agencies have reached out to us as a matter of interest,” Zibelman said of the project, which if successful could lead to deployment at all 38 SEPTA substations. “We are in ongoing conversations with transit agencies in New York and Amtrak.”

SEPTA has applied for a $2.7 million federal grant to install wayside storage super-capacitors at the Allison and Pine substations, which feed the Southwest Philadelphia trolley and Broad Street subway, respectively. With Mondre Energy Inc.’s guidance, SEPTA also struck an agreement last month to begin procuring about 40 megawatts of electric to power subway, trolley and railroad lines from Exelon and Sempra Energy. The contracts, which begin Jan. 1, are expected to save more than $8 million through the end of 2012.

“Basically they were able to give us a better rate than Peco,” SEPTA spokesman Andrew Busch said.

SEPTA and MEI are also shopping for deals for electricity for offices, maintenance yards and other facilities, Busch said. Toward the end of the year SEPTA will put out requests for proposals for a project to install solar panels on roofs, SEPTA Director of Strategic Planning Byron Comati said. Like Viridity’s project, the solar panels would give SEPTA another source from which energy can be drawn and sold back to the grid, Comati said.

“We have so much interest from the private sector on solar panels and their installation, which is very viable because we have so much square footage on our roofs,” Comati said of SEPTA’s maintenance shops for bus and rail.

A significant effort is also under way by SEPTA to convert to more energy-efficient lighting systems and boilers wherever possible. Last month, SEPTA received energy star certification for its headquarters at 1234 Market St., Comati said.

“When you have a large footprint in the region as SEPTA does, the opportunities for being very sustainability conscious are there,” Comati said.
SEPTA subways go hybrid with lossless battery storage system
By John Steele
September 21, 2010

Philadelphians know SEPTA's Market-Frankford El as the Blue Line. But a new pilot program, which stores leftover power from the subway's regenerative braking system in a massive battery, would make the Blue Line a little greener, and provide SEPTA some much-needed capital.

Earlier this month, SEPTA and Conshohocken smart-grid firm Viridity Energy announced receipt of $900,000 from the Pennsylvania Energy Development Authority to install a massive storage battery—about the size of a cement truck—at SEPTA's Kensington electrical substation. The current regenerative braking system transmits electricity, collected as trains enter stations, to other electric vehicles. But if no other vehicles are in range, the electricity is lost. The battery, capable of storing up to a megawatt of electricity, would siphon energy to be resold to the power grid. Viridity estimates that this one battery will generate $500,000 a year in clean, green profit. SEPTA has already applied for new funding to install these battery systems at all 33 substations across their service area.

"With this technology, SEPTA can be very strategic with their power; when they are using it, when they are storing it and when they are selling it back into the grid," says Viridity Director of Business Development Laurie Actman. "At peak periods, the grid is willing to pay premium prices for sources of reliable load."

Since 2008, SEPTA has struggled to execute capital improvements to its transit infrastructure. Most recently, a proposed switch to SmartCards has drawn scrutiny from city media and transit bloggers. When Governor Ed Rendell made a play to turn state thoroughfare I-80 into a federal toll road, he promised a chunk of the resulting revenue to SEPTA. Since Rendell's proposal was defeated, SEPTA has been looking for other ways to fund improvements, from fare hikes to advertising on the sides of trains. The battery system technology could be the answer they have been looking for that will finally bring the Philadelphia subway into the 21st century.

"As we all know, SEPTA has always had a constrained budget and not enough money to invest in its infrastructure," says Actman. "For so long, SEPTA's infrastructure, that was built nearly a century ago, has been a liability. We are turning that into an opportunity."

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