

Utility Grid-Direct Photovoltaic System: Exelon-Conergy Renewable Energy Center

- *A Compelling Case for Reliable, Fiscally-Sound Clean Energy Power Plants*



The 3 MW **Exelon-Conergy Solar Energy Center** is a stimulating case study of how innovative partnerships can bring large-scale solar photovoltaic projects to utilities and energy providers across the United States to:

- 1) Optimize baseload and peak energy output,
- 2) Provide fast, affordable project scalability,
- 4) Help ensure rapid permitting and implementation,
- 5) Eliminate fuel costs; Slash operating costs,
- 6) Utilize beneficial tax incentives,
- 7) Meet Renewable Portfolio Standards (RPS) and
- 8) Earn goodwill with their communities, regulators and investors.

How can a project with so many variables achieve such success? Global strength, local expertise and experienced intellectual assets are key. Couple that with the collaborative approach among Exelon's Power Team, Conergy, the Pennsylvania Department of Environmental Protection (PADEP) -- and Waste Management, Inc.'s willingness to creatively transform landfill buffer into a productive clean energy utility plant site -- and success was inevitable.

UNPRECEDENTED BENEFITS FOR UTILITIES

Numerous agencies across the U.S. are inquiring about the Exelon-Conergy Solar Energy Center (EC-SEC) and how it can be used as a model in their respective jurisdictions.

Before we dive into the project details and benefits, let's look at the larger landscape of renewable energy – the RPS **challenges** and economic **opportunities** it offers today's utilities and large-scale energy providers.

Renewable Portfolio Standards (RPS) require electric utilities to produce a certain percentage of their power plant capacity or generation from renewable sources by a given date. Currently, 28 states have RPS, 5 states have renewable energy goals and more have RPS mandates under consideration.

The concept of a National Portfolio Standard is gaining momentum in the U.S. Congress. If this happens, there will be a national market for solar-generated energy with standards that will likely constitute around a 15% RPS by 2025, although in this economic climate, many considerations may change that. President Obama has gone on record as favoring a 25% RPS in that same time-frame.

With RPS in more than half of all American states and the prospect of a national RPS looming on the horizon, utilities actively engaged in renewable energy production will enjoy a competitive advantage in not only diversifying their portfolios and establishing a financially rewarding approach to energy independence, but in positioning themselves as caring contributors to cleaner, more vital neighborhoods for the communities they serve.

What's the up side? It's the *bottom line*.

THE THREE E'S IN FERTILE ECONOMIC GROUND

The electric business is large and complex, with over 3,000 electricity providers serving consumers across the nation. Government mandates can bring fear and frustration to the companies being regulated. In today's perfect storm, the economic **opportunity** of this regulatory activity – particularly in today's competitive landscape – brings fiduciary and operational benefits to the balance sheet that in the past would not have been considered. And these economic opportunities -- market stimulants, subsidies, tax incentives -- offer

utilities the opportunity to create a sustained profitability that can benefit them for decades.

The economic **opportunity** uniquely captured by utility scale solar energy is manifested in the three 'Es': Energy, the Environment and Economics.

ENERGY

Historically, utilities in industrial economies generate well over 90% of all electricity. Today, more and more businesses and consumers are embracing the aforementioned tax credits, state rebates and consumer mindset that on-site generation can give ratepayers a hedge against rising energy costs by purchasing and deploying on-site solar systems to generate electricity.

An appetite for distributed generation is taking a bite out of traditional, peak-hour revenue opportunities. To maintain market share, utilities can offer consumers who are considering purchasing their own systems – property owners, businesses and public agencies – a clean energy option. Solar can happen fast.

One of solar's great attractions for utilities is that consumer electricity demand and the power that utilities must provide throughout a typical day neatly track the daily and seasonal energy of the sun. Solar energy technology is uniquely positioned to be developed for distributed generation in highly-congested areas and load pockets, allowing energy to be produced where demand exists.

One in ten of the world's solar photovoltaic solutions are designed, engineered and/or installed by Conergy experts. What gives utilities the confidence to entrust Conergy with large-scale, turn-key solutions is Conergy's global financial strength, its longevity in the photovoltaic space and its unmatched expertise in successfully installing or engineering projects with collective generational capacities of over **1 Gigawatt**.

More than 400 Megawatts of Conergy's 1 Gigawatt of portfolio strength are manifested in the company's 10-year track record with market-leading utility-scale projects. Conergy's world-class engineering teams have broad and deep experience in designing and building modular photovoltaic solutions with the latest thin-film and crystalline technologies. The innovative configurations Conergy engineers have designed to optimize output while minimizing footprint – together with the low-maintenance nature of solar PV (few moving parts) translates into high reliability/low maintenance solutions for Conergy customers.

Projects involving other forms of renewable energy (like wind and hydro-electric power) are often site- specific and far from their consuming/target markets. Additionally, the variable generating capacity of wind makes it unsuitable for meeting peak demand requirements.

Today's solar energy is a mature, reliable, field-tested technology that has reached a level of technical sophistication and affordability significant enough to warrant serious utility industry consideration, particularly during peak demand. Simply said, solar photovoltaics is a proven, easily-deployed technology that provides a fuel source that

is at its strongest when utilities need it most. It is a versatile energy portfolio variable that can also serve as an effective complement to portfolios where wind and hydro already exist.

ENVIRONMENT

Not long ago, environmental programs were seen as adverse to good bottom-line strategies. Regulatory agencies were seen as obstacles to business development. Not anymore. The deployment of clean, renewable energy enables utilities to cost-effectively offer low-carbon energy while reducing the greenhouse gas emissions (GHGs) associated with energy production. Utility-scale solar energy addresses climate change issues, creates cleaner air for our citizens and earns utilities valuable credits toward portfolio standards. The deployment of solar energy by utilities sends a good neighbor message of corporate responsibility to rate-payers, shareholders and regulatory agencies.

As evidenced in the action of the U.S. Congress and the Obama Administration, advanced energy portfolio standards and the jobs they create, the clean, plentiful energy they provide, and positive contributions they make to addressing the consequences of global climate change can be key drivers for project regulators and stakeholders.

Embracing the philosophy that environmental challenges can become economic opportunities, the Commonwealth of Pennsylvania – an undisputed leader in the last century's Industrial Revolution – is now leading the way in the Renewable Revolution. The first oil well ever built was in the Keystone State, and one result of the state's Twentieth Century boom-time successes with coal and steel production is that it now produces 1% of the world's carbon.

Pennsylvania Governor Edward G. Rendell and the Pennsylvania Department of Environmental Protection are actively bringing incentives to the table that augment federal perks to make environmental stewardship integral to sound fiscal policy.

The Exelon-Conergy Solar Energy Center is a good example of how (through progressive political will, creative partnerships and innovative technology), Pennsylvania has created an economically viable approach to addressing today's economic and environmental issues that is far ahead of most of the nation.

ECONOMICS

2009 is rife with economic opportunity for utilities. First there's the unprecedented Congressional action allowing utilities to claim a Solar investment Tax Credit for up to 30% of renewable energy system costs. This same subsidy will be offered to businesses and home owners. Billions of economic stimulus plan dollars are being allocated for investment in renewable technologies and their deployment. Upcoming legislative activity looks to invest even more public dollars in renewable energy and energy efficiency.

Versatile financing options are also improving the economics of going solar. In light of current capital market challenges -- and the ushering in of a new administration that has clearly articulated that bold, clean

energy policies are the cornerstone of its economic policy -- solar energy is being perceived now more than ever as a safe and sought-after investment. Still, finding solid financing opportunities for projects of this scope and scale can be challenging. Project funding for projects like the Exelon-Conergy Solar Energy Center (below) can be secured by Conergy Finance, (formerly Epuron), a wholly-owned subsidiary of Conergy AG that develops, funds and operates large-scale renewable energy systems.

Conergy presents clients with an array of innovative financing options to get renewable energy systems up and running and earning clients capital.

Providing additional economic credibility to the business case for solar photovoltaics is a litany of specific Return On Solar Investment (ROSI) benefits, some quantifiable, some more easily measured in terms of social and political capital and improved customer satisfaction scores they elicit.

REALIZING RETURN ON SOLAR INVESTMENT (ROSI)

At CONERGY we believe that the return on solar investment (ROSI) is more than just the favorable life cycle cost of energy. ROSI delivers:

- | Renewable Portfolio Standard (RPS) energy credits;
- | Federal tax credits and accelerated depreciation of assets;
- | On-site energy production that tracks peak energy demand;
- | A clean, emissions-free fuel source without environmental hazards;
- | No fuel costs, transportation costs, emissions or waste;
- | Flexible siting options without costly zoning or permitting.
- | Intermediate load production that can offset the cost of upgrading transmission lines and equipment;
- | Targeted production locations;
- | Easing of grid stress on taxed transmission and distribution lines;
- | Reduced risk of peak-time brownouts;
- | A simple energy solution with low training costs for utility staff;
- | Low system maintenance costs;
- | Modular installations that can be precisely modified to reflect market forces;
- | A 25-year estimated system lifespan;
- | Unswitched capacity for utilities operating in states using or considering time of use rates (TOU);
- | A remarkable degree of positive publicity, social acknowledgement and customer good will for improving the quality of life for citizens served.

LOCAL EXPERTISE POWERED BY GLOBAL STRENGTH

1 in 10 of World's Solar PV Systems Are Built, Engineered or Installed by Conergy

The market potential of solar photovoltaic solutions for utility-scale power plants has attracted many new players, who, in their zeal to win business, may underbid projects or go after projects where they need subcontractors to perform critical project components.

While local expertise is essential to capably clearing so many of the hurdles of projects of this scope and scale, utilities traditionally seek peer corporate players to ensure their high-profiled projects are successful. Savvy players with market longevity who can sustain partnerships for the 20 to 25-year life of a project bring invaluable confidence to these publicly-scrutinized deals. In this economy and in the burgeoning photovoltaic space, Conergy's global experience brings strength and security to the table.

The more than 10-year track record of Conergy's globally-renowned engineering teams is legion, and is an important gauge of the accuracy with which Conergy-produced utility-scale power plant projects deliver on predicted output.

EXELON'S PLACE IN THE SUN

Closer to home – in the Commonwealth of Pennsylvania – Exelon emerged as an early leader in portfolio diversification. Today, Exelon boasts a diverse energy portfolio that includes wind, hydro-electric power, gas, nuclear energy and now, solar photovoltaics. As one of the largest power companies in the US, Exelon and the Exelon Power Team are leading the way to U.S. energy security and diversity, while enjoying a sound Return on Solar Investment.

Solar as an energy solution is simple and straightforward. Solar energy projects, particularly in this economy, are complex and can involve multiple customers and contracts. So how did Exelon get this project off the ground?

It was Exelon's success in pioneering other renewable that led to its interest in solar possibilities. One of the first steps in making the Exelon-Conergy Solar Energy Center (E-C SEC) a reality was consultation and planning between local Exelon and Conergy professionals. Understanding the immense opportunity to make a difference in the Pennsylvania marketplace, developers at Conergy were already formulating the case for utility-scale solar in the context of the Pennsylvania market. The initial series of meetings between the two led to an evaluation of credentials -- and an understanding that Conergy's engineering team had the engineering savvy, track record, local work experience, and the financial wherewithal to provide a menu of solutions to creatively and cost-effectively meet the goals and objectives of the project and ensure it came to fruition.

Public-private partnerships like that of the Exelon-Conergy Solar Energy Center allow agencies to initiate large-scale projects that can have meaningful impacts on meeting Renewable Portfolio Standards (RPS). Conergy is available to assist regulated and unregulated entities in all 28 of the U.S. states who currently have RPS to evaluate their options and provide unbiased counsel on the best energy systems to meet their needs – and then to assist them in maneuvering among the myriad power generation groups, public utility commissions and environmental and regulatory bodies to ensure their large-scale projects are developed within budget and on time.

Commensurate with that is working with municipalities, counties and state agencies to educate them about renewable energy and the beneficial impacts of solar photovoltaic plants -- and to discuss the passive environmental impacts of utility-scale solar projects.

Conergy teams stayed on top of key project considerations involving multiple customers and contracts for the host site, energy off-taker, financing entity and Solar Renewable Energy Certificate (SREC) off-taker.

They also negotiated the finance lease contract components and myriad SPV (Solar Photovoltaic) contract components, which included three contracts, a site lease and the energy off-taker arrangement. Specifics are available by contacting the Conergy professionals listed at the end of this case study.

PAY DIRT: Breaking New (Siting) Ground

Another ground-breaking component to this project was its location. The Exelon-Conergy Solar Energy Center was designed to serve the power needs of businesses, public agencies and home owners in the greater Philadelphia area. Philadelphia is the nation’s sixth- largest city and, as with any major metropolis, it has real estate constraints. With support from the Pennsylvania Department of Conservation, in rolled landfill management company Waste Management, Inc. (WMI), who – along with the Exelon Power Team -- saw the value of the buffer land around its G.R.O.W.S. landfill project as an ideal way to generate power in proximity to the greater Philadelphia region.

Leasing this remnant land (in the case of the E-C SEC, a 16.5-acre parcel) for the siting of clean, renewable energy projects was a terrific way to afford this land-constrained metropolitan area a low-cost venue for clean, power generation without the need for costly transmission lines. The project leaves much promise for the development of similar sites across the state. Pennsylvania has a higher concentration of landfills than many U.S. states.

PENNSYLVANIA: A Bellwether for State Renewable Energy Standards

The 3 MW Exelon-Conergy Solar Energy Center is also a keystone project of Pennsylvania’s Advanced Energy Portfolio Standard. The Standard mandates that Pennsylvania utilities obtain 18% of their energy from renewable and advanced sources by 2020. And it mandates a carve-out for solar photovoltaics.

In support, Exelon Corporation established a corporate goal to reduce, offset or displace more than 15 million metric tons of greenhouse gas emissions (GHG) by 2020. They are doing this by: 1) Reducing or off-setting Exelon’s carbon footprint by greening their operation; 2) Helping their customers reduce GHG emissions, and; 3) Offering more low carbon electricity in the marketplace.

The carbon emission reduction this project is realizing was an important consideration in earning the support of key administrators within the Commonwealth of Pennsylvania’s Department of Environmental Protection, who played a pivotal role in helping Conergy garner or reinforce the support of a spectrum of state and local regulators.

The environmental benefits of the Exelon-Conergy Solar Energy Center will be as effective as eliminating the pollutants that come from driving more than 100 million miles on Pennsylvania’s roads.

The project manifests a meaningful way for Pennsylvania to jump-start activities to meet its renewable portfolio goals while creating the ancillary benefit of green collar jobs in the nation’s new clean energy economy. And, given the new economic stimulus plan, there just might be some added incentives for those interested in reaping similar benefits.

WHERE WE ARE, THERE’S ENERGY

The business of renewable energy is rife with energy – and steeped with promise. Clean energy projects and economic development are no longer diametrically opposed philosophies. They are hand-in-glove. And unlike the historic nature of utility-scale energy projects, communities are now welcoming clean energy solutions like the Exelon-Conergy Solar Energy Center and finding ways to incorporate them into their community.

Conergy’s Project Development Team have earned a place as trusted advisors to help utilities navigate the challenges they face with RPS mandates, regulatory compliance, customer goodwill and the need to forge a balanced portfolio of energy options. Their expertise ensures optimal financial and energy performance for the entire life of the system.

To learn how Conergy’s turn-key, customized solar solutions can benefit your utility, business or public agency, phone Sarah Hetznecker or Gary Sheehan at the Conergy Projects Team, **1.888.396.6611**.

*With special thanks for the insights of Travis Bradford, author of **SOLAR REVOLUTION: The Economic Transformation of the Global Energy Industry.***

Exelon-Conergy Renewable Energy Center Project Snapshot	
Financing	Conergy-managed PPA ¹
Power Output	3,000 kWp
Solar Electricity Generated	3,7000,000 kWh Annually
Service Area	Clean Electricity to @500 Homes Annually
Location	WMI G.R.O.W.S. Landfill, just outside of Philadelphia, Pennsylvania
Project Site	16.5 acres
Modules	16,500 Conergy S 175MU
Project Timeline	8 months (completed on time)
Comminssioning	October 2008
Project Life Expectancy	20 to 25 years
Environmental Benefits	
Annual CO2 emissions reduced by four million pounds, Annual NOx emissions reduced by over 9,000 pounds, and Annual SOx emissions by reduced by 28,000 pounds.	
<small>¹ Generation, LLC is purchasing the power and renewable energy credits of the EC-REC through a long-term Power Purchase Agreement (PPA).</small>	