Innovative Procurement Models for Renewable Electricity

U.S. EPA’s Green Power Partnership

Tuesday, March 31, 2015
Smart & Sustainable Campus Conference
Baltimore, Maryland
Speakers & Agenda

Speakers

- Anthony Amato, ERG – Contractor to U.S. EPA’s Green Power Partnership
- Richard Walsh, Manager, Technical Energy Sales, WGL Energy
- Meghan Chapple, Director of Sustainability, The George Washington University
- Chris O’Brien, Director of Higher Education Programs, Altenex (Formerly with American University)

Agenda

- Basics of Green Power
  - Power Purchase Agreements
  - Status within Higher Education
- Procurement options for colleges and universities
- Case Study: Capital Partners Solar Project
What is Green Power?

- Subset of renewable energy - representative of resources and technologies that offer the highest environmental benefit.

- **Electricity** generated from natural resources that replenish themselves over short periods of time, including the sun, wind, moving water, organic plant and waste material (biomass), and the Earth’s heat (geothermal).

- Must be from “new” facilities placed into service within last 15 years.

- Must be from the “voluntary” market.
Renewable Energy Certificates (RECs) – Making Green Power Possible

- A REC is the legal instrument that conveys to its owner the right to claim the associated environmental attributes of a generating resource
  - In essence RECs represent the “renewable-ness” of the power
- A REC is created for every Megawatt-hour of renewable electricity generated and delivered to the utility grid
- A REC includes the following information:
  - Type of renewable resource
  - Location of renewable resource
  - Date stamp or vintage of generation
  - Emissions profile of the generating resource
  - Unique identification number
- Electricity use from a renewable resource in the absence of owning the associated RECs is considered null or generic power and has the same environment profile as the residual grid electricity mix – RECs make it renewable!
Green Power – Procurement Options

1. **Renewable Energy Certificates (RECs)**
   - The environmental “attributes” of electricity generated from renewable resources (1 REC = 1 MWh)
   - Attributes are based on the generation technology type and age, geographic location, and time of generation
   - Does not include the underlying electrons – “unbundled”

2. **Utility Supplied Green Power Products**
   - Green power offered by utility suppliers that is generated from renewable sources
   - “Bundled” product that includes both the RECs and underlying electrons

3. **On-site Generation**
   - Install a renewable system on-site (e.g. solar panels, wind turbine)
   - Produces both electricity and RECs from the on-site source
   - Self-financed installation or third-party financed

4. **Power Purchase Agreement (PPA) for Renewables**
   - Usually a long-term contract to procure RECs and underlying electrons from a specific project, can be signed pre- or post-project development
Emergence of New Green Power Solutions

- Utility Green Power Programs (1997)
- Unbundled RECs (2002)
- Utility-scale Offsite PPAs (2010)
- Community Choice Aggregation (2013)
- Community Solar Gardens (2014)
- What’s Next? Virtual PPAs?
GPP Summary Statistics 2014: Annual Green Power Use by Product Type

Higher Education Product Breakdown

- REC: 55%
- Pricing: 10%
- Marketing: 11%
- On-site: 3%
- Off-site PPA: 15%
Utility-Scale PPAs – Ideal Off-taker Characteristics

- Large electricity user with dense load center (college campus or tech data center)
- Financial stability/credit-worthiness
- Focus on longer timeframes
- Open to thinking outside of the box
- Looking to reduce carbon footprint

**Benefits**
- Potential cost savings
- Long-term predictable pricing
- Tangible, clear association with specific renewable energy facility
- Naming rights/branding opportunities with renewable energy facility
- Potential reduction in carbon footprint (with REC ownership)

**Challenges**
- Not legal in certain states
- Change in risk profile
- Investment grade credit required
- Longer timeframe procurement process
- Complexity / Outside of core competencies
- Performance risk
Power Purchase Agreements

Corporate Purchaser’s Cost of Electricity After Entering into a Wind PPA

Source: OwnEnergy
PPA Price Trends for Solar and Wind

Source: DOE 2014

Unsubsidized Levelized Cost of Energy Comparison

Note: Size of “bubble” is proportional to project nameplate capacity.

Source: Lazard 2014
Value Proposition of Renewables for a College Campus

- Meet environmental objectives
  - Sustainability goals
  - GHG reduction targets
  - American College & University Presidents Climate Commitment

- Manage risk
  - Reduce exposure to fossil-fuel price volatility
  - Deploys quickly & scales up easily

- Drive economic development
  - Higher ed commitments are financeable
  - Domestic energy supply
  - New U.S. jobs

- Enhance school brand
  - Prospective students
  - Host communities
  - Peer institutions

- Attract & retain students
  - Sustainability and green power is a hot topic on campus

- Incorporate green power into research initiatives & curricula
Current Status: Green Power in Higher Education

EPA’s Green Power Partnership

- 134 College and University Partners
  - 86 REC contracts
  - 49 Utility Market contacts
  - 92 onsite systems
  - 12 off-site PPAs

- Green power use totaling nearly 2.6 billion kWh
  - Equates to ~5% of voluntary green power market
  - Equivalent to the electricity use of 250,000 average American homes for one year

American College & University Presidents’ Climate Commitment

- 695 Signatories committed to becoming climate neutral
  - Purchased electricity currently constitutes ~40% of their GHG emissions

- 244 Schools committed to Tangible Action #5
  - Within one year of signing commitment, begin purchasing or producing at least 15% of institution's electricity consumption from renewable sources
Green Power Partnership Overview

● **Summary**
  - The U.S. EPA’s Green Power Partnership is a free, voluntary program that encourages organizations to use green power as a way to reduce the environmental impacts associated with conventional electricity use.

● **Objectives**
  - Reduce U.S. greenhouse gas emissions
  - Expand the voluntary green power market
  - Standardize green power procurement as part of best practice environmental management
  - Provide recognition platform for organizations using green power in the hope that others follow their lead

● **Current Status**
  - 1,300 Partners using 28 billion kWh of green power annually, equivalent to the annual carbon dioxide emissions from electricity use of more than three million average American homes.
Partnership Requirements

- EPA supports Partners’ procurement of green power by offering advice, technical support, tools and resources, and recognition.
- Partners agree to procure green power and provide an annual update.
- In return, EPA commits to:
  - Provide public recognition
  - Provide procurement and communications assistance, as requested
  - Provide a brief description of the Partner’s green power use on EPA’s website

<table>
<thead>
<tr>
<th>If your annual electricity use is:</th>
<th>Partnership Benchmark</th>
<th>Leadership Benchmark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Over 100,000,000 kWh</td>
<td>3% of your use</td>
<td>30% of your use</td>
</tr>
<tr>
<td>10,000,001-100,000,000 kWh</td>
<td>5% of your use</td>
<td>50% of your use</td>
</tr>
<tr>
<td>1,000,001-10,000,000 kWh</td>
<td>10% of your use</td>
<td>100% of your use</td>
</tr>
<tr>
<td>Under 1,000,000 kWh</td>
<td>20% of your use</td>
<td>N/A</td>
</tr>
</tbody>
</table>
Program Resources for Procuring Green Power

The Partnership Offers:
- Green Power Locator Tool
- Green Power Equivalency Calculator
- Guide to Purchasing Green Power
- Resource Library featuring example contracts and solicitations
- Webinars showcasing best practices
- Issue whitepapers

COMING SOON!
EPA’s Green Power Partnership: Helping You Leverage Your Green Power Use

- **Credible Benchmarks & GHG Quantification**
  - Metrics for “How much green power is enough?”
  - Definition of eligible renewables & products
  - GHG reduction guidance and calculations

- **Planning & Implementation Resources**
  - Green power locator
  - Purchasing strategy guidance
  - Marketing and communications support

- **Recognition**
  - Top Partner Lists
  - Use of the Partner mark
  - Green Power Leadership Awards
  - Promotional opportunities

- **Best Practices & Innovation**
  - Collaborative solar procurement
  - New contract mechanisms
Want to Know More?

- **Basic Information**
  - An overview of Green Power Partnership is available on EPA’s Web site [www.epa.gov/greenpower](http://www.epa.gov/greenpower).
  - To see EPA’s Top 30 College and University Partners, please visit: [www.epa.gov/greenpower/partners/top30ed.htm](http://www.epa.gov/greenpower/partners/top30ed.htm).
  - To see EPA’s College & University Green Power Challenge, please visit: [www.epa.gov/greenpower/partners/hi_ed_challenge.htm](http://www.epa.gov/greenpower/partners/hi_ed_challenge.htm).

- **More Questions?**
  - Anthony Amato, ERG (contractor), 781-674-7225, [anthony.amato@erg.com](mailto:anthony.amato@erg.com)
INNOVATIVE RENEWABLE ENERGY PROCUREMENT IN HIGHER-ED

SMART AND SUSTAINABLE CAMPUSES 2015
Agenda:

WGL Overview

Options for Higher-Ed:

- Green Products
- On-site Generation
- Off-site Generation
WGL is a diversified energy business that provides natural gas, electricity, green power, carbon reduction and energy services.

Our calling as a company is to make energy surprisingly easy—for our employees, for our community and for all our customers.
One company. One team.
WGL ENERGY IS . . .

RELIABLE & EXPERIENCED
We are one of the largest and longest-serving green energy suppliers in the Mid-Atlantic. And a deregulated subsidiary of WGL Holdings, Inc., which has been in business for over 170 years. (NYSE: WGL)

DIVERSIFIED
We offer a competitive electricity and natural gas supply, plus a robust portfolio of green product solutions including:

- Distributed Generation
- Fuel Cells
- Wind Power
- Carbon Offsets
- Solar Power
- Combined Heat & Power

AN HONORED GREEN POWER LEADER
In 2011 and 2014, WGL Energy was named the Green Power Supplier of the Year by the DOE and EPA. WGL Energy was the recipient of the 2013 DC Mayor’s Sustainability Award.

WGLEnergy.com
GREEN PRODUCT SOLUTIONS

- Retail Natural Gas
- Wind Power-sourced electricity
- Carbon Offsets
- Onsite and Offsite Solar
- Wind Power RECs
- Carbon Offsets matched to Natural Gas usage

WGL Energy is a leader in efficient and environmentally-friendly energy technology solutions that provide electricity, natural gas, renewable energy and green products to public and private sector customers across the United States.
<table>
<thead>
<tr>
<th>American University, Washington, DC</th>
<th>University of Maryland</th>
<th>The Catholic University of America</th>
</tr>
</thead>
<tbody>
<tr>
<td>Houghton College</td>
<td>Western University of Health Sciences</td>
<td>Skidmore College</td>
</tr>
<tr>
<td></td>
<td>The discipline of learning. The art of caring.</td>
<td></td>
</tr>
<tr>
<td>Hobbart College</td>
<td>Nova Northern Virginia Community College</td>
<td>Goucher College</td>
</tr>
</tbody>
</table>

Confidential and Proprietary
PV Installations by Client Type

- Utility: 45
- Municipality: 21
- Educational: 17
- Commercial: 14
- Not For Profit: 5

Confidential and Proprietary
Agenda:

WGL Overview

Options for Higher-Ed:

• Green Products
• On-site Generation
• Off-site Generation
Benefits: flexibility, geographic preference, inexpensive, easy streamlined process, marketing value, meet sustainability goals, stakeholder engagement

Disadvantages: Intangible product, no economic value

Examples: Over 1,300 companies in the EPA Green Power Partnership including dozens of colleges and universities.
# Green Products

<table>
<thead>
<tr>
<th>Annual Green Power Usage (kWh)</th>
<th>GP% of Total Electricity Use*</th>
<th>Green Power Resources</th>
<th>Providers (listed in descending order by kWh supplied to Partner)</th>
<th>Athletic Conference</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. University of Pennsylvania</strong></td>
<td>200,183,000</td>
<td>51% Wind</td>
<td>Renewable Choice Energy*, Community Energy*</td>
<td>Ivy League</td>
</tr>
<tr>
<td><strong>2. Georgetown University</strong></td>
<td>132,370,500</td>
<td>130% Various</td>
<td>Hess Energy Marketing*</td>
<td>Big East</td>
</tr>
<tr>
<td><strong>3. University of Oklahoma</strong></td>
<td>134,888,600</td>
<td>76% Wind</td>
<td>Oklahoma Gas &amp; Electric</td>
<td>Big 12</td>
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<tr>
<td><strong>4. The Ohio State University</strong></td>
<td>133,631,369</td>
<td>23% Wind</td>
<td>Blue Creek Wind Farm LLC</td>
<td>Big 10</td>
</tr>
<tr>
<td><strong>6. Oklahoma State University</strong></td>
<td>100,360,039</td>
<td>71% Wind</td>
<td>Oklahoma Gas &amp; Electric</td>
<td>Big 12</td>
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<tr>
<td><strong>7. Northwestern University</strong></td>
<td>96,720,800</td>
<td>38% Solar, Wind</td>
<td>3Degrees*, On-site Generation</td>
<td>Big 10</td>
</tr>
<tr>
<td><strong>8. Drexel University</strong></td>
<td>96,718,000</td>
<td>100% Solar, Wind</td>
<td>Community Energy*</td>
<td>Colonial Athletic Association</td>
</tr>
<tr>
<td><strong>9. University of Utah</strong></td>
<td>85,926,100</td>
<td>28% Solar, Wind</td>
<td>3Degrees*, Rocky Mountain Power*, On-site Generation</td>
<td>Pac-12</td>
</tr>
<tr>
<td><strong>10. University of Tennessee, Knoxville</strong></td>
<td>80,020,000</td>
<td>32% Biogas, Small-hydro, Solar, Wind</td>
<td>Tennessee Valley Authority*, On-site Generation</td>
<td>Southeastern Conference (SEC)</td>
</tr>
</tbody>
</table>

* GP% refers to the percentage of green power in the total electricity use.
Agenda:

WGL Overview

Options for Higher-Ed:

- Green Products
- On-site Generation
- Off-site Generation
ON-SITE GENERATION

**Benefits:** save money from day 1, meet sustainability goals, long-term price hedge, protection against volatile energy prices, no upfront capital

**Disadvantages:** Site and infrastructure requirements

**Examples:** Dozens of higher-ed institutions have instituted solar. WGL Clients include the University of Maryland, Catholic University, Skidmore College, American University and others.
University of Maryland

630 kW with over 2,600 panels

20 year PPA with annual escalator

Output: 792,000 kWh/yr

CO2 offsets: ~550 MT per year

Part of robust sustainability program at the University of Maryland
Agenda:

WGL Overview

Options for Higher-Ed:

• Green Products
• On-site Generation
• Off-site Generation
Power from a new, off-site solar development

Backed and managed by a fiscally solid, and seasoned energy partner

No upfront capital costs or onsite hosting required

A TURNKEY SOLUTION FOR SOLAR ENERGY

FLEXIBLE SOLAR

POWER SOLUTION

WGL Energy
A WGL Energy
INVEST in a new offsite solar PV development, a clean and reliable source of energy.

POWER your business with solar output for 20 years.

BENEFIT from 20-year price protection with a low, fixed rate.

GAIN RECOGNITION as a long-term, committed supporter of renewable energy.

Confidential and Proprietary
20-year Solar Electricity Supply Agreement (SESA)

WGL Energy can provide the balance of your load, and will match the market rate.

You’ll power your business with 100% of the output from the new solar development.

Flexible supply options for remaining 17 years

WGL ENERGY:
- Manages all development complexities
- Operates and maintains the system
**ECONOMIC BENEFITS**

**MITIGATED RISK**
There are no requirements involving infrastructure, sunlight exposure, building ownership or capital expenditure.

**PRICE PROTECTION**
20-year fixed rate for your solar power providing maximum protection from volatile energy markets.

**FLEXIBILITY**
You will have the ability to source the balance of your load at market rates in the same manner you currently buy power.

**Why WGL Energy?**
Our interest is in owning and operating long-term generation assets, versus short-term investments.

**SEAMLESS MANAGEMENT**
Our in-house experts manage all complex design processes, swiftly close on projects, manage assets, schedule the power and allow the customer to focus on its core business.
This project will contribute to sustainability and carbon reduction goals. Your use of clean, solar power will have the environmental benefit equivalent to taking over 4,000 cars off the road per MW installed.
Off-site solar is one of the more innovative developments in the energy industry. This commitment will surely draw significant attention from the press and the community.

Students, faculty, staff, and alumni are able to visit the site and WGL will organize a ribbon-cutting event.
SAMPLE PROJECT

<table>
<thead>
<tr>
<th>Facility address:</th>
<th>Glen Arm, Maryland</th>
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</thead>
<tbody>
<tr>
<td>System type:</td>
<td>Ground mounted PV</td>
</tr>
<tr>
<td>Size:</td>
<td>1000 kW AC / 1233 kW DC</td>
</tr>
<tr>
<td>Number of Panels:</td>
<td>4,180</td>
</tr>
<tr>
<td>Utility:</td>
<td>Baltimore Gas &amp; Electric</td>
</tr>
<tr>
<td>Planned Solar Generation</td>
<td>1689 MWh/year</td>
</tr>
</tbody>
</table>

**Design Notes:**
- 15kV electrical interconnection
- Centralized inverter design
- Turnkey management of multiple levels of contractors
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Manager, Technical Energy Sales
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