SOLAR MASTER PLAN

Washington & Lee University

December 2015

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This report is intended to be a planning tool for this particular institution of higher education and its partners. The format of this report was developed and approved with the input and approval of the colleges and universities that are participating in the CICV Solar Market Pathways Collaboration. Sections I through III were provided by Optony Inc., and the information contained in Section III is a summary of what can be found in the college or university’s Solar Feasibility Assessment Report. Appalachian School of Law professor Mark Belleville and some of his students at ASL provided the legal and policy summaries and analyses in Section IV. The school to which this report pertains will provide content for Sections VI and VII. As a planning tool, this report may be modified and augmented from time to time as solar plans and activities progress. The information presented is current as of December 2015. As additions or edits are made, the college should note the date thereof.

About the Council of Independent Colleges in Virginia

The Council of Independent Colleges in Virginia (CICV) was founded in 1971 and currently operates as Virginia Private Colleges, a nonprofit, 501(c)(6) organization representing 28 accredited nonprofit independent colleges and universities in Virginia. We work collaboratively in the areas of public policy, cost containment and professional development as well as providing support to our member institutions and their students in the following areas: government relations, collaboration, research, and public relations.

For more information, visit cicv.org
About Optony Inc.

Optony Inc. is a global research and consulting services firm focused on enabling government and commercial organizations to bridge the gap between clean energy goals and real-world results. Optony’s core services offer a systematic approach to planning, implementing, and managing commercial and utility-grade renewable power systems, while simultaneously navigating the dramatic and rapid changes in the solar industry; from emerging technologies and system designs to government incentives and private/public financing options. Leveraging our independence, domain expertise and unique market position, our clients are empowered to make informed decisions that reduce risk, optimize operations, and deliver the greatest long-term return on their solar investments. Based in Silicon Valley, Optony has offices in Santa Clara, Washington DC, Denver, Chicago, and Beijing.

For more information, visit optonyusa.com
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I. Introduction

Solar Market Pathways Project

U.S. Department of Energy grant number DE-EE0006904 is a Solar Market Pathways collaboration with the Council of Independent Colleges in Virginia (“CICV”). The CICV Solar Market Pathways Collaboration (“SMP-ICV”) program is intended to create a statewide network of private colleges to plan deployment of solar PV on their campuses. The final goal is to create a revolving joint procurement model to be implemented over the course of five years. The project team will engage a broad group of stakeholders, develop and deploy institutional expertise, and work with local governments and electric utilities to lay the groundwork for deploying solar PV installations on the campuses of participating colleges.

College Background

Washington and Lee University was founded in 1749 in Lexington, located in the Great Valley of Virginia between the Blue Ridge and Allegheny Mountains. It is named for two men who played pivotal roles in the school’s history: George Washington, whose generous endowment if $20,000 in 1796 helped the fledgling school, then known as Liberty Hall Academy, survive; and Robert E. Lee, who provided innovative educational leadership during his transformational tenure as president of Washington College from 1865 to 1870. The University’s motto, Non Incautus Futuri, “not unmindful of the future,” underlies W&L’s commitment to providing a liberal arts education that is vital and relevant to the 21st century. By combining the benefits of a liberal arts foundation with emerging technologies and interdisciplinary perspectives, W&L students head into life after college equipped with the habits of mind, strength of character and essential knowledge needed to pursue lives of consequence.

Sustainability Spotlight

The University Sustainability Committee will advise the president on sustainability efforts. The committee will report to the President and periodically to the President’s Council. The committee will: create a strategic plan to guide the University in achieving the goals of the Talloires Declaration and President’s Climate Commitment; annually, identify and recommend to the President key programs and priorities for the year; in conjunction with the Environmental Management Coordinator, assure the submission of necessary reports to the governing bodies of these initiatives; serve as a clearing house for campus sustainability efforts through the provision of support for curricular and co-curricular efforts, including prioritizing needs and funding for programs that support the goals of the strategic plan; ensure that campus sustainability efforts are appropriately publicized; coordinate campus efforts with the efforts of municipal organizations and the surrounding community; and provide the President with an annual report that outlines the work of the committee and progress toward meeting the goals of the Talloires Declaration and President’s Climate Commitment.
Solar 101

How Solar Works
We can change sunlight directly to electricity using solar cells. Every day, light hits your roof’s solar panels with photons (particles of sunlight). The solar panel converts those photons into electrons of direct current ("DC") electricity. The electrons flow out of the solar panel and into an inverter and other electrical safety devices. The inverter converts that "DC" power (commonly used in batteries) into alternating current or "AC" power. AC power is the kind of electricity that your television, computer, and toasters use when plugged into the wall outlet.

A net energy meter keeps track of all the power your solar system produces. Any solar energy that you do not use simultaneous with production will go back into the electrical grid through the meter. At night or on cloudy days, when your system is not producing more than your building needs, you will consume electricity from the grid as normal. Your utility will bill you for the "net" consumption for any given billing period and provide you with a dollar credit for any excess during a given period. You can carry your bill credit forward for up to a year.

Figure 1: Solar PV Net Metering Diagram

Source: Florida Power and Light Company

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1 The information in this section was taken directly from the Go Solar Californial Campaign website, which is a joint effort of the California Energy Commission and the California Public Utilities Commission. Full program information is available here: http://www.gosolarcalifornia.ca.gov/solar_basics/how.php.
Solar Cells
Solar cells are small, square-shaped panel semiconductors made from silicon and other conductive materials, manufactured in thin film layers. When sunlight strikes a solar cell, chemical reactions release electrons, generating electric current. Solar cells are also called photovoltaic cells or "PV cells" and can be found on many small appliances such as calculators.

Solar Photovoltaic (PV) System Components
A PV system’s components include PV modules (groups of PV cells), which are commonly called PV panels; one or more batteries; a charge regulator or controller for a stand-alone system; an inverter to covert solar power from direct current (DC) to the alternating current (AC) of the utility grid-connected system; wiring; and mounting hardware or a framework. A PV module arranges individual PV cells, and the modules are grouped together in an array. Some of the arrays are set on special tracking devices to follow sunlight all day long and improve system efficiency.

PV System Installation, Maintenance, and Longevity
You could install a photovoltaic (PV) or solar electric system yourself. But to avoid complications or injury, you will probably want to hire a reputable professional contractor with experience installing solar systems. While they are sophisticated electric systems, PV systems have few moving parts, so they require little maintenance. The basic PV module (an interconnected, enclosed panel of PV cells) has no moving parts and can last more than 30 years while requiring little maintenance. The components are designed to meet strict dependability and durability standards to withstand the elements. The best way to ensure and extend the life and effectiveness of your PV system is by having it installed and maintained properly. Most PV system problems occur because of poor or sloppy system installation. Solar systems that receive rebates through California utilities are required to have a 10-year system warranty.

Figure 2: Solar installation types solicited in the CICV Solar PV RFP
II. **General Collaborative Solar Procurement**

**Overview**

Two key barriers to solar deployment are high costs (both capital and transactional) and a lack of understanding of solar technology, financing models, and value streams. Collaboration is an efficient and proven solution to address both issues through the aggregation of purchasing power and reduction of administrative time and cost. Site aggregation can result in an incremental 10 to 15 percent reduction of energy cost, compared to individual projects, and reduce transaction and administrative time by 75 percent for collaborative procurement participants. Furthermore, collective approaches to procuring solar energy can yield favorable contract terms with their associated reduced risks.

Through the U.S. Department of Energy’s Solar Market Pathways program, CICV embarked on a mission to create a statewide network of private colleges to plan for the deployment of solar PV on their campuses by leveraging a collaborative solar procurement model. The ultimate goal is to create a revolving bulk procurement model to be implemented over the course of five years. To achieve this goal, the project team will engage a broad group of stakeholders, including higher education institutions, electric utilities, industry organizations, and state-level government officials. Below is an overview of the CICV Solar Market Pathways project stakeholders.

**Table 1: CICV Collaborative Solar Market Pathways Stakeholders**

<table>
<thead>
<tr>
<th>Roles</th>
<th>Stakeholders</th>
<th>Responsibilities</th>
</tr>
</thead>
</table>
| LEAD ORGANIZATION          | Virginia Private Colleges | • Leadership  
• Participant recruitment  
• Project management  
• Communication |
| PARTICIPANTS                |              | • Commitment to collaborative procurement process  
• Provide site access  
• Provide electricity data  
• Contribute to vendor selection process  
• Lead contract negotiations  
• Student engagement  
• Curriculum integration  
• Support project communications |
| TECHNICAL ADVISOR          | Optony       | • Independent solar energy expertise  
• Strategy development  
• Feasibility assessments  
• RFP management |
| COMMUNICATION              |               | • Participate in Advisory Committee  
• Disseminate key project communications |
Approach and Timeline

In order to accomplish CICV’s project goal of collaboratively procuring and installing 30 megawatts of on-site solar power generation for 16 college campuses across Virginia by 2020, the project team will work together to establish and implement the collaborative solar procurement model outlined in this section. Participating colleges will leverage their group purchasing and negotiating power to reduce the cost of solar installations through at least three solar bulk purchases taking place between 2015 and 2020. This will involve the creation of RFP documents, vendor evaluation matrices, and integration of innovative financing models to avoid the upfront cost of solar power. The table below outlines the process for the first RFP of the grant period.

Figure 3: CICV Solar RFP Process and Timeline

<table>
<thead>
<tr>
<th>Strategy Dev. &amp; Participant Recruitment</th>
<th>Conduct In-Person Site Visits</th>
<th>Create RFP Materials</th>
<th>RFQ Responses Due</th>
<th>Solar Vendor(s) Awarded</th>
<th>Contract Negotiation</th>
<th>Project Commissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>DOE SMP Award &amp; Project Kick-Off</td>
<td>Establish Site Portfolio &amp; Pre-Screening</td>
<td>Feasibility Assessment Reports</td>
<td>RFP Issued</td>
<td>RFP Responses Due</td>
<td>College Decision Point</td>
<td>Project Construction Begins</td>
</tr>
<tr>
<td>1H 2015</td>
<td>2H 2015</td>
<td>1H 2016</td>
<td>2H 2016</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The figure below shows the geographic distribution of the colleges and universities participating in the CICV Solar Market Pathways project, including the RFP bundling strategy in yellow.

Figure 4: Geographic Distribution and Bundling Strategy
In order to ensure that solar developers can successfully install the high number of distributed projects within a reasonable timeframe, the sites have been grouped into bundles by geographic region and utility territory. Furthermore, effective bundling will both streamline the evaluation process and maximize interest from developers by building scale for distributed projects. Generally, the minimum size for a bundle of medium or large facilities is approximately 2-3 MW, and pricing should improve for bundles above that size. The criteria for grouping sites together can include: design characteristics, individual project size, number of sites, and financing method(s).

Table 2: Steps to a Successful Collaborative Solar Procurement

<table>
<thead>
<tr>
<th>Steps</th>
<th>Key Activities</th>
</tr>
</thead>
</table>
| 1     | • Identify appropriate organization to lead collaborative initiative.  
       | • Develop solar strategies that leverage limited resources to maximize environmental and economic impact.  
       | • Create plan(s) to address a broad range of stakeholder interests and goals.  
       | • Launch outreach and recruitment effort to invite candidate organizations to join collaborative solar procurement effort. |
| 2     | • Collect essential energy data and site information.  
       | • Establish portfolio of potential candidate sites for initial screening.  
       | • Conduct preliminary assessment of technical solar viability to eliminate poor sites from consideration.  
       | • Estimate potential scale and capacity of project. |
| 3     | • Conduct in-person site visit to document site characteristics and conditions, including roof, electrical, structural, geotechnical, and environmental.  
       | • Take shade readings for any potential shading obstructions.  
       | • Investment-grade analysis of solar opportunities across portfolio of viable sites.  
       | • Collect and document relevant data. |
| 4     | • Evaluate historical energy and demand usage, cross-referenced with utility tariffs to determine optimal solar system sizing and complementary technologies.  
       | • Identify long-term project structures and available financing models and/or programs, as well as any available incentives (e.g. grants, rebates, awards, etc.).  
       | • Pre-engineering solar PV system designs.  
       | • Recommended sites for project development that can maximize value. |
| 5     | • Gather requirements and develop a tailored RFP + Exhibits.  
       | • Manage the RFQ qualification process, if necessary.  
       | • Develop detailed evaluation criteria and scoring matrix.  
       | • Manage the RFP bid selection process. |
| 6     | • Evaluate vendor proposals on comparative basis.  
       | • Compare pricing and performance benchmarking to industry trends.  
       | • Negotiate the best possible deal and contract terms.  
       | • Finalize contracts and power purchase agreements. |
| 7     | • Communicate risks and opportunities to key stakeholders.  
       | • Review final engineering documents and system designs.  
       | • Oversee the solar project implementation to ensure compliance to specification during and after construction.  
       | • Develop site-specific maintenance schedule and provide training to staff.  
       | • Active system “tune-up” to confirm performance and monitoring process. |
Roles and Responsibilities

Four unique roles are required to execute a successful collaborative purchase. However, every initiative is different and some of the responsibilities recommended for each role below could be performed by another organization, while others are mutually exclusive. For example, the technical adviser should be independent of the participants and lead organization so that it can provide objective counsel about maximizing benefits to the overall initiative. Identifying a convener is especially important in the early stages of a project to assist with recruitment and coordination. Thus, even if the collaborative purchase is initiated by a participant or lead organization, this guide recommends that they also identify a convening organization with which to partner.

**Convener:** The convener should be a local organization with an interest in promoting renewable energy and/ or economic development, with no direct financial interest in the initiative. Its responsibilities include education and outreach, sharing technical resources with participants, scheduling and coordinating stakeholders, and establishing a steering committee. The organization chosen needs to be credible and well-respected, and could be either a local government or nonprofit entity.

It is important that the convener have a mission aligned with the goals of a collaborative solar purchase, and the time/resources to dedicate to its responsibilities throughout the duration of the effort. Good candidates can be sought in the following areas:

- Economic development and/or planning agencies and nongovernmental organizations;
- Environmental organizations with local presence and/or partners;
- Service organizations (e.g., AmeriCorps);
- Government agencies dealing with energy or the environment;
- Local chambers of commerce or industry associations;
- Academic or research institutions.

To raise the profile of the initiative in the region and tap resources from a larger support base, the convener should establish a steering committee. This local leadership team helps maintain the regional perspective and ties to additional participants and resources that will ensure success. Individuals who make up the leadership team can come from the potential participant pool, other regional organizations, or organizations that have prior experience with renewable energy procurement or regional collaboration.

**Lead Organization:** This organization is one of the purchasers, but also leads the procurement and negotiation process. The lead organization should have a strong commitment to purchasing solar energy and be driven to accomplish this mission with or without the collaborative group. The lead organization is willing to take the lead role because it understands the benefits of collaboration as having a positive impact on its own bottom line—including volume pricing, more favorable contract terms, project risk reduction, and faster deployment. The lead organization will issue the solicitation documents, access

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2 *The following information in this subsection was taken directly from a publication coauthored by Optony and the World Resources Institute entitled “Purchasing Power: Best Practices Guide to Collaborative Solar Procurement.” The full report is available here: [http://www.wri.org/publication/purchasing-power](http://www.wri.org/publication/purchasing-power).*
technical resources, engage with the convener, and act as the main point of contact between the other participants and the vendors. In most cases, the convener will need to identify the lead organization during its early recruitment efforts. In some circumstances, the Convener can play this role.

**Participants:** These are the members of the collaborative group with facilities and have an interest in purchasing solar power, but may or may not be committed to buying solar power at the outset. Due to time or resource constraints, participants might not be able to procure solar power on their own. As such, they are not candidates for lead organization, but their participation in the collaborative is crucial to achieving scale.

**Technical Adviser:** It is important to have an independent technical expert with resources and experience to support both the process and participants throughout the project. The function of this role depends somewhat on the complexity and number of sites, financing options, and aggregation strategy. The technical adviser advises the participants, incorporates solar vendor input into the bidding process and timeline, performs feasibility assessments, supports the procurement and evaluation processes, technically evaluates optimal groups of sites to bid out together, and provides expertise across the life cycle of solar purchasing to maximize PV deployment and the initiative’s impact. Therefore, the technical adviser must be independent of any purchasing party, potential bidders, or industry representatives.

The technical adviser should have as many of the following capabilities as possible:

1. In-depth experience with solar technologies and market drivers
2. A solar design and project management team
3. Strong expertise in solar optimization for technical and economic results
4. Successful solar technology procurement with financing, especially via public solicitation
5. Experience working within the participant pool (e.g., with the public or private sectors)
6. Prior experience with portfolio/group assessments and purchases.

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**PURCHASING POWER**

*Best Practices Guide to Collaborative Solar Procurement*

“This guide to collaborative solar purchasing represents a nationally significant approach to drive broad adoption of cost-effective renewable energy. [...] The authors, their respective organizations, and the groups participating in the examples featured here are developing and championing new ideas to reduce costs while accelerating green power deployment. Their leadership is critical and lessons learned from this valuable resource should be factored into all future regional solar initiatives.”

- Director, EPA Green Power Partnership

Free download: [www.wri.org/publication/purchasing-power](http://www.wri.org/publication/purchasing-power)
III. Campus Building Portfolio & Solar Feasibility Assessment

A preliminary feasibility assessment of candidate sites is a key step prior to issuing a request for proposals. This step eliminates sites that are not technically viable, which reduces time and cost for solar developers. Each participating college received a solar feasibility assessment report drafted by the technical advisor, which includes detailed site information, technical assessment, and financial analysis. A summary of the report contents is provided below, as well as a hyperlink to the actual report.

<table>
<thead>
<tr>
<th>Maximum</th>
<th>Recommended</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Size:</td>
<td>2,526 kW-DC</td>
</tr>
<tr>
<td>Expected Output:</td>
<td>3,189,155 kWh/year</td>
</tr>
<tr>
<td>Electricity Offset:</td>
<td>20%</td>
</tr>
<tr>
<td>Carbon Displacement:</td>
<td>2,146 tonnes CO₂/year</td>
</tr>
</tbody>
</table>

| System Size:           | 1,836 kW-DC          |
| Expected Output:       | 2,347,705 kWh/year   |
| Electricity Offset:    | 15%                  |
| Carbon Displacement:   | 1,565 tonnes CO₂/year|

- 2.5 MW at 10 sites
- 3,100+ MWh Generated Annually
- $195,000 Net Cost Over 25 Years
- $4.8M Economic Impact
- 23 Jobs Created
- 2,200 tonnes CO₂ Displaced Annually

Solar Feasibility Assessment Reports are Available at: commons.marymount.edu/cicvsola

*Power Plant Building, Main Meter
IV. RFP Process & Contracting

November 2015 RFP
Available at: commons.marymount.edu/cicvsola/

Council of Independent Colleges in Virginia

REQUEST FOR PROPOSALS
for
SOLAR PHOTOVOLTAIC PROJECTS

Complete information regarding this project, please visit CICV RFP website:
http://my.solarroadmap.com/ahj/smp-cv/view

Issued: November 16, 2015

CICV Contact Person:
Tyler Espinosa, CICV Solar Project Consultant: tyler.espinosa@evpnyusa.com
(All correspondence must include CC to Carol Wampler, CICV Project Manager at carol.cicv@gmail.com)

RFQ SURVEY RESPONSES DUE BY: December 2, 2015 at 5:00 pm EST
RFP RESPONSES DUE BY: January 22, 2016 at 5:00 pm EST

Contracting
(To be added 2016)
V. Codes, Regulations, and Processes

State-Level Policy

A detailed discussion of Virginia law and policy with respect to renewable energy is beyond the scope of this section. Rather, highlighted below are the most important state-wide policies for the Colleges considering solar installations.³

Broad Policy Objectives

The General Assembly has adopted a Virginia Energy Plan that has as one of its goals the encouragement of renewable energy development.⁴ However, the Virginia Energy Plan is merely guidance to state agencies when taking discretionary action on energy related matters.

Likewise, the Commonwealth has enacted a voluntary Renewable Portfolio Goal, which rewards utilities that obtain a portion of their electricity from renewable sources. This voluntary goal falls short of the mandatory renewable portfolio standards that have spurred renewable energy development in many states.

Net Metering

Retail customers in Virginia who generate renewable energy can take advantage of Virginia’s net metering law. Net metering requires your utility to monitor how much energy your solar power system produces and how much energy you actually consume, and make sure you get credit for the surplus.⁵ This offsets the electricity you consume, reducing your retail purchase of electricity from a utility.

Under Virginia’s net metering provisions, an Eligible Customer-Generator is one who “owns and operates, or contracts with other persons to own, operate, or both, an electrical generating facility.”⁶ Commercial systems up to 1,000 kW are eligible to offset the customer’s requirements for electricity.⁷

The availability of net-metering is limited to a maximum participation of one percent of the regulated utility’s “Virginia peak-load forecast for the previous year.”⁸ All surplus generation is applied as a credit to your next bill at the utility’s avoided cost (or other previously agreed upon) rate.⁹ All cumulative surplus built during each 12-month billing cycle may be carried over indefinitely, or you can choose to sell the electricity back to the utility at the end of the 12-month period. In order to sell the electricity to the utility you must negotiate a power purchase agreement prior to starting net metering.

³ For further information on Virginia State-Level Policy, see Chapman memo “Virginia Renewable Energy” and Belleville memo “APCo PPA Proposal.”
⁴ Title 67 of the Virginia Code.
⁵ Va. Code § 56-594 (B).
⁶ Id.
⁷ Id.
⁹ Id.
Standby Charge

An eligible customer-generator with a renewable energy facility that exceeds 10 kW pays the incumbent electricity provider a standby charge. The standby charge allows the regulated utility that provides the distribution service for electricity to recover a portion of the infrastructure costs associated with serving the customer’s remaining energy needs. The utility’s methodology for calculating the standby charge must be approved by the SCC.

Third-Party Ownership

Third-party power purchase agreements (PPAs) are used in many parts of the country as an important way to finance and support solar system installation. For purposes of distributed solar, PPAs allow property owners desiring to install solar to contract with a third party to own the panels and sell the generated electricity back to the host property owner. The contract by which the electricity is sold from the system owner to the host is the PPA.

PPAs allow the property owner to avoid the upfront capital costs of buying and installing the panels. They are uniquely beneficial to non-profit entities and others who do not pay federal income taxes, because they allow a for-profit entity to own the panels and take advantage of various federal tax incentives, thereby lowering the cost of the system and making the PPA transaction financially attractive. Finally, PPAs allow the customer to lock in rates for a portion of its electricity for a long period of time (typically 20 years).

Va. Code §56-577.A.5. allows retail customers to purchase electricity that is 100% generated from renewable sources by a licensed supplier so long as the incumbent utility does not have a tariff offering 100% renewable energy:

[I]ndividual retail customers of electric energy within the Commonwealth, regardless of customer class, shall be permitted:

a. To purchase electric energy provided 100 percent from renewable energy from any supplier of electric energy licensed to sell retail electric energy within the Commonwealth, other than any incumbent electric utility that is not the incumbent electric utility serving the exclusive service territory in which such a customer is located, if the incumbent electric utility serving the exclusive service territory does not offer an approved tariff for electric energy provided 100 percent from renewable energy.

An entity that offers 100% renewable energy and that does not already serve an exclusive service territory would apply with the SCC for what is called a competitive service license; that entity

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11 Id.
would then be “licensed to sell retail electric energy” in Virginia under the statute.\textsuperscript{12} Because incumbent utilities serving the Colleges do not have a tariff to offer 100% renewable energy, an SCC-licensed licensed entity should be able to sell renewable energy via a PPA.\textsuperscript{13}

The permissibility of PPAs in Virginia is not without controversy. APCo has taken the position that third-party PPAs are not permissible under current Virginia law, as they would violate the utility’s exclusive service territory. Dominion had previously taken a similar position, but third-party PPAs are currently allowed in Dominion’s territory under a statutorily-authorized pilot program. For more information on your utility’s policies, see below.

**Customer Self-Generation Agreements**

As a way to avoid utility company opposition to PPAs, a new tool known as a ‘customer self-generation agreement’ has been developed. These are basically service agreements, whereby a third party owns the panels but, instead of the host customer buying the generated electricity, the host pays a monthly service fee to the third party owner. These agreements are purportedly based on Va. Code §56-594, discussed above, which allows net metering participation not only by a customer who owns the generating facilities, but also a customer who “contracts with other persons to own [or] operate” the facilities.\textsuperscript{14} That definition has given rise to the customer self-generation or maintenance agreements which, the argument goes, prevents the utilities from claiming that the owner of the panels is improperly selling electricity in contravention of the utility’s exclusive service territory rights.

**Renewable Energy Credits**

The generation of solar energy also results in renewable energy credits (RECs). RECs are tradable, non-tangible energy commodities representing proof that 1 MWh of electricity was generated from a qualifying renewable source. Although the absence of a mandatory renewable portfolio standard has left Virginia without its own REC market, there are various markets in which they have value. Specifically, Pennsylvania utilities are able to meet their renewable portfolio standards by buying RECs from anywhere in the mid-Atlantic, including Virginia. Colleges that own their own solar system will also own the accompanying RECs. Under third-party PPAs, the owner of the solar system generally

\textsuperscript{12} The process for obtaining a competitive service license is largely mechanical, requiring a showing of things like financial and institutional stability. We have separate memos describing the process for applying for a competitive service license.

\textsuperscript{13} The SCC determined in a separate proceeding that the fact that a utility (like APCo) offers Renewable Energy Credits (RECs) does not mean that the utility offers 100% renewable energy.

\textsuperscript{14} “Eligible customer-generator” under Va. Code §56-594 means “a customer that owns and operates, or contracts with other persons to own, operate, or both, an electrical generating facility that (i) has a capacity of not more than 20 kilowatts for residential customers and 500 kilowatts for nonresidential customers unless a utility elects a higher capacity limit for such a facility; (ii) uses as its total source of fuel renewable energy, as defined in §56-576; (iii) is located on the customer’s premises and is connected to the customer’s wiring on the customer’s side of its interconnection with the distributor; (iv) is interconnected and operated in parallel with an electric company’s transmission and distribution facilities; and (v) is intended primarily to offset all or part of the customer’s own electricity requirements.”
also owns the RECs, but there is nothing in Virginia law preventing the parties from negotiating REC ownership.

**Other State-Wide Incentives and Financing Opportunities**

**VirginiaSAVES Green Community Program.** This program provides low cost financing to private commercial entities, non-profits, and local governments to fund a wide range of renewable energy projects in the State. The program is funded through Qualified Energy Conservation Bonds (QECB), whose use was authorized for by Governor McAuliffe through his executive order in 2014. The program is administered by CleanSource Capital, LLC under the guidance of Virginia Department of Mines, Minerals, and Energy (DMME). Interested applicants must submit a summary worksheet that describes the project, including measures being funded, vendors involved, and energy assessment. The program administrator will approve the application after ensuring that the proposed measures constitute “qualified conservation purposes” within the QECB regulation and meet other project guidelines.

**PACE Financing.** Property-Assessed Clean Energy (PACE) financing effectively allows property owners to borrow money to pay for energy improvements. The amount borrowed is typically repaid via a special assessment on the property over a period of years. Virginia has authorized certain local governments to establish a loan program to provide financing for clean energy improvements, including renewable energy production and distribution facilities, to property owners via local ordinance. Va. Code §15.2-958.3. Recent legislation has attempted to ease some of the lien priority problems PACE financing has encountered. S.B. 810 (2015). The Virginia Department of Mines, Minerals and Energy is directed to develop statewide financial underwriting guidelines for loans no later than December 1, 2015.

**Voluntary Solar Resource Development Fund.** Created in 2011, this fund is administered by the DMME. All utilities are required to provide a link on their web site to the DMME web site, where customers can make contributions to the fund. Utilities must also provide opportunities for customers to donate through their paper newsletters, emails or bills. The fund will be used to provide loans for residential, commercial, or nonprofit solar energy projects that are installed after July 1, 2012.

**Virginia Resources Authority Financing.** The VRA provides financial assistance to local governments in Virginia for a variety of projects, including renewable energy projects. Va. Code §62.1-197 et seq. VRA offers several financing options, including the Virginia Pooled Financing Program, Revolving Loan Funds, and Term Financing. Interested entities should use the contact form available on the VRA web site in order to discuss financing options with VRA staff.

**Virginia Small Business Financing Authority.** Beginning in 2014, the Authority is authorized to provide financing for wind and solar projects to small businesses and nonprofits. Va. Code §2.2-2279.

**Commercial Solar Property Tax Exemption.** Beginning January 1, 2015 all commercial solar facilities under 20 MW and certified with either a local building authority or the Department of Environmental Quality are exempt from state and local taxes. The law broadly defines eligible solar facilities as "any property, including real or personal property, equipment, facilities, or devices...designed and used primarily for the purpose of collecting, generating, transferring, or storing thermal or electric energy." The exemption however does not include the land on which the equipment or facility is located.
Local Property Tax Exemption Option. Recently enacted legislation provides an option for local governing bodies to impose a different property tax on renewable energy generating machinery and tools than other normal use machinery. The rate of property tax imposed must not exceed that is applicable to the general class of machinery and tools.

Local Building, Zoning and Permitting

W&L is located in the independent city of Lexington, which has adopted the Virginia Uniform Statewide Building Code (USBC) and has a City-wide Zoning Ordinance. Neither contains specific limitations relating to solar system installation.

Under the USBC, a permit is required when undertaking any construction, installation or alterations involving any structural component, electric wiring, mechanical systems, or any equipment regulated by the USBC. (USBC §108.1). No permit is required for construction work deemed by the building inspector to be minor and ordinary and which does not affect public health and safety. (USBC §108.2(13)).

Information relating to permits and building codes may be obtained through the City’s Building Permits & Inspections, 540-462-3704. The fee schedule can be accessed here: http://www.lexingtonva.gov/305/Filing-Fees.

Local Incentives

Lexington exempts solar energy equipment from local taxation. It is calculated by applying the local tax rate to the value of the solar equipment, and deducting that amount from any machinery and tools tax due. Lexington Code of Ordinances, §§366-47 through 366-54.

Interconnection rules and procedures

All electricity distributors in Virginia are obligated to connect any retail customer, including those using distributed generation, to those facilities that are used for the delivery of retail electric energy, subject to SCC rules and regulations and approved tariff provisions. Va. Code §56-578. Virginia has two interconnection standards: one for net-metered systems and one for systems that are not net-metered.

Net-Metered Systems

Customer-generators that net meter must comply with the interconnection rules within the regulations governing net metering, 20 VAC 5-315-40. Customer-generators with systems that meet the major national safety and equipment standards are not required to install any additional safety equipment.\(^\text{15}\)

\(^\text{15}\) However, a utility’s net metering tariff may require that customer-generators install a manual, external disconnect switch that complies with national safety requirements and is certified by a licensed electrician.
Customer-generators must notify the electric service provider prior to interconnecting; the minimum advance-notice requirement depends on system size. Customer-generators with systems greater than 25 kW in capacity must reimburse the utility for its cost to modify any facilities needed to accommodate the interconnection with respect to power quality, voltage regulation and transformer loading.\(^{16}\)

Customer-generators with interconnected systems that do not exceed 10 kW in rated capacity must have at least $100,000 in liability insurance. Customer-generators with systems greater than 10 kW must have at least $300,000 in coverage.

*Interconnection for Non-Net-Metered Systems*

SCC rules adopted in 2009 set out the interconnection procedures for systems smaller than 20 MW that are not net-metered. 20 VAC 5-314. These rules apply to all electric utilities -- investor-owned utilities, municipal utilities and electric cooperatives -- operating in Virginia. Prior to installation, the Interconnection Customer must insure compliance with all local, state and federal laws and regulations, including applicable permitting and easements.

The interconnection procedures set three tiers of review for interconnection requests. The three tiers are:

- **Level 1**: Small generating facilities no larger than 500 kW;
- **Level 2**: Certified facilities no larger than 2 MW that do not qualify for the Level 1 process;
- **Level 3**: Facilities no larger than 20 MW not qualifying for the Level 1 or Level 2 process.

Fees for interconnection requests increase with each Level. A Level 1 request must submit $100 fee; a Level 2 request must submit $500 fee; and a Level 3 requests must submit a deposit of $1000 or 50% of the estimated cost of the feasibility study (whichever is less).

The process for each level differs as well; in general Level 1 requests require an evaluation and no additional studies. Level 2 requests require an initial review and possibly a supplemental review and/or modifications to either the small generating facility or the utility facilities. Level 3 requests may include a scoping meeting (which may be waived), a feasibility study (which may be waived), system impact study, and facilities study. Level 2 and 3 both require a signed Small Generator Interconnection Agreement before the systems may begin operation. The forms for requests and agreements are standard SCC determined forms (https://www.scc.virginia.gov/pue/rules.aspx).

Interconnection requests that include multiple energy production devices located on one site with a single point of interconnection will be evaluated on the aggregate capacity of all systems. Interconnection request for systems wishing to increase capacity shall be evaluated on total new capacity.

Regardless of the size or tier in which the facility is evaluated, it is the utility's discretion whether or not an external disconnect switch is required.

Depending on the size of the small generator facility, insurance requirements differ. Facilities with rated capacity 10 kW or less must carry liability insurance of at least $100,000 per occurrence.

\(^{16}\) Customers may be required to pay up to $50 for an inverter inspection for inverter-based systems.
Facilities with rated capacity exceeding 10 kW but less than or equal to 500 kW must carry liability insurance with coverage of at least $300,000 for each occurrence. Facilities with rated capacity greater than 500 kW but less than or equal to 2 MW must carry liability insurance with coverage of at least $2 million per occurrence. Insurance coverage for facilities with rated capacity greater than 2 MW will be determined on a case-by-case basis, depending on the size of the installation and potential risk of system damage.

Utility Company Policies

**Pilot PPA Program.** Third-party ownership of solar systems is permitted in Dominion territory. While Dominion has historically fought to prevent PPAs in its territory, it acquiesced in 2013 legislation that directed the SCC to conduct a pilot program for third party PPAs, but solely in Dominion’s service territory. Virginia Act of Assembly (2013), Chapter 382. On November 14, 2013, the SCC established guidelines implementing that pilot program. Virginia ex rel. State Corp. Comm’n, Case No. PUE-2013-00045, Order Establishing Guidelines (Nov. 14, 2013).

This pilot program allows qualified customers in Dominion’s service territory to enter into a PPA with a third party renewable energy supplier. The project-size minimum is 50 kW, but this does not apply to tax-exempt entities such as the colleges; there is a 1 MW maximum project size. Under the pilot program, a person that owns or operates such a solar system that is located on premises owned or leased by an eligible customer-generator will be allowed to sell the electricity generated from such facility exclusively to the eligible customer-generator under a PPA. The Colleges would be eligible customer-generators. The PPA will provide for third party financing of the costs of the renewable generation facility. The aggregate limit of all PPA-based projects in the pilot program cannot exceed 50 MW, an amount that has not been approached to date.

The pilot program specifically limits arguments that have been made against the permissibility of PPAs by specifying that developers under a qualifying PPA are not public utilities and they do not need to provide 100% of a customer’s energy requirements. Conversely, the legislation specifically prohibits PPAs in Dominion territory that are not entered into pursuant to the pilot program. In other words, if you are going to enter into a third-party PPA, you will need to comply with the notice and reporting requirements of the program.

The program calls for the SCC to review the program in 2015 and every two years thereafter to determine whether the statutory limitations on the capacity of generation facilities included in the program should be continued, expanded or reduced.

To participate in the pilot PPA program, you will first need to provide written notification of your intent to participate via an email to renewable.energy.pilot@dom.com. You will work with Dominion to achieve interconnection approval, after which you may begin to purchase power from your third party supplier. You will also be required to provide monthly generation data from renewable facilities as stated in the SCC Order.

**Pilot Solar Purchase Program.** In March 2013, the Virginia State Corporation Commission approved a rate program for Dominion Virginia Power customers that install solar PV systems. The rate was approved at 15 cents per kWh with a 5 year contract. Both residential and nonresidential customers are eligible for the program. The program is capped 3 MW, with 60% of the capacity reserved for residential customers and 40% reserved for nonresidential customers. Customers must install a separate meter for the PV system and sell all of the generation back to Dominion. Customers will pay a charge for the meter.

Application materials are available on the program web site. Participation is based on a first-come, first-serve basis until it reaches the 3 MW cap. The program is considered a pilot program that will last for 5 years, at which point the Dominion will decide whether or not to move forward with a permanent program.

Note: Information in this Section V was prepared by Professor Mark Belleville at Appalachian School of Law and some of his law students. This information was provided in November 2015 and is believed to be current in December 2015.
VI. Curriculum Integration (optional)

Science & Engineering

Business and Economics

Legal

Sustainability and Environmental Science
(including energy efficiency, energy management, weatherization)

Other
(e.g., architecture & design, facilities management, arts, math)

Independent Study
(for credit)
VII. Student Involvement (optional)

Community service and volunteer activities

Professional training, certificates, or internships
(without course credit)

Service learning projects

Model Case studies
(e.g., Apco rate case – ASL/Lynchburg/Bridgewater; if for credit, then consider under Curriculum Integration)
Resources

Template Request for Proposals
- The first RFP issued by the Council of Independent Colleges in Virginia, which may serve as a template for future RFPs, is available at: http://commons.marymount.edu/cicvsola/
- The National Renewable Energy Laboratory maintains a solar contracts library at: https://financere.nrel.gov/finance/content/renewable-energy-contracts-library

Template PPA Agreements
- The template PPA agreement used in the first Council of Independent Colleges in Virginia RFP is available at: http://commons.marymount.edu/cicvsola/
- The National Renewable Energy Laboratory maintains a solar contracts library at: https://financere.nrel.gov/finance/content/renewable-energy-contracts-library

Solar-Ready Building Guidelines (new construction)