Higher Education Solar Development: Financial Issues

Smart and Sustainable Campuses Conference

April 5, 2016

EPA GREEN POWER PARTNERSHIP

Speakers and Agenda

- Speakers
  - James Critchfield, EPA Green Power Partnership
  - Robert Margolis, National Renewable Energy Laboratory (NREL)
  - Meghan Chapple, The George Washington University
- Agenda
  - Introduction to Green Power Partnership
  - Background on today's workshop
  - Financial Issues Presentations
  - George Washington University Experiences
  - Brief Survey Request
  - Questions and Answer Session

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Green Power Partnership Overview

- Summary
  - The U.S. EPA's Green Power Partnership (GPP) 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 emissions and air pollution
  - 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 more than 31 billion kWh of green power annually, equivalent to the electricity use of more than three million average American homes.

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Partner Snapshot

Current Status

- EPA's Green Power Partnership
  - 134 College and University Partners
    - 81 REC contracts
    - 62 Utility supply contracts
    - 86 onsite solar systems (35,554,856 kWh, 77 owned, 9 through PPAs)
    - 13 off-site PPAs
  - Green power use totaling nearly 2.7 billion kWh
    - Equates to nearly 4% of the voluntary green power market (8.5% of the green power used by Green Power Partners)
    - Equivalent to the annual electricity use of 245,000 average American homes

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WHY FOCUS ON SOLAR IN HIGHER EDUCATION

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Why Higher Education?

- Higher Education offers great potential:
  - **Homogenous cohort** of identifiable stakeholders
  - Long time and **respected pillars of local communities**
  - **Long-term view** on energy and sustainability issues
  - **Public commitments** of nearly 700 College and University Presidents to do more related to climate and RE
  - Clearly **identifiable set of financing options** including, third-party ownership, revolving loan funds, endowments, student funded initiatives etc.
  - **Tie-ins to educational mission**; training tomorrow's leaders regarding sustainability and renewable energy issues and opportunities
  - Natural **inter-institutional competitive spirit** in the areas of academia and college sports can be extended to and leveraged into solar energy use

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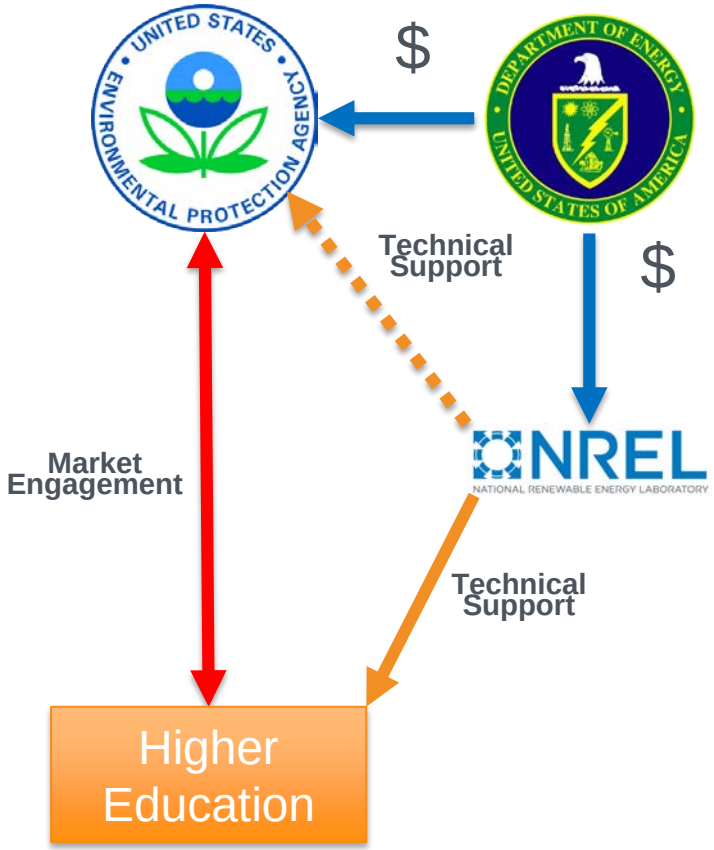
Federal Focus

- Collaboration is born out of a joint effort between EPA, DOE and the National Renewable Energy Lab to focus on mid-scale solar opportunities
- EPA role is to convene stakeholders, facilitate networking opportunities and disseminate both new and existing resources in an effort to address market barriers
- The National Renewable Energy Laboratory (NREL), funded through a DOE SETO SUNLAMP award, will provide technical support to EPA on tools and resources development, engagement and deployment activities undertaken through this initiative



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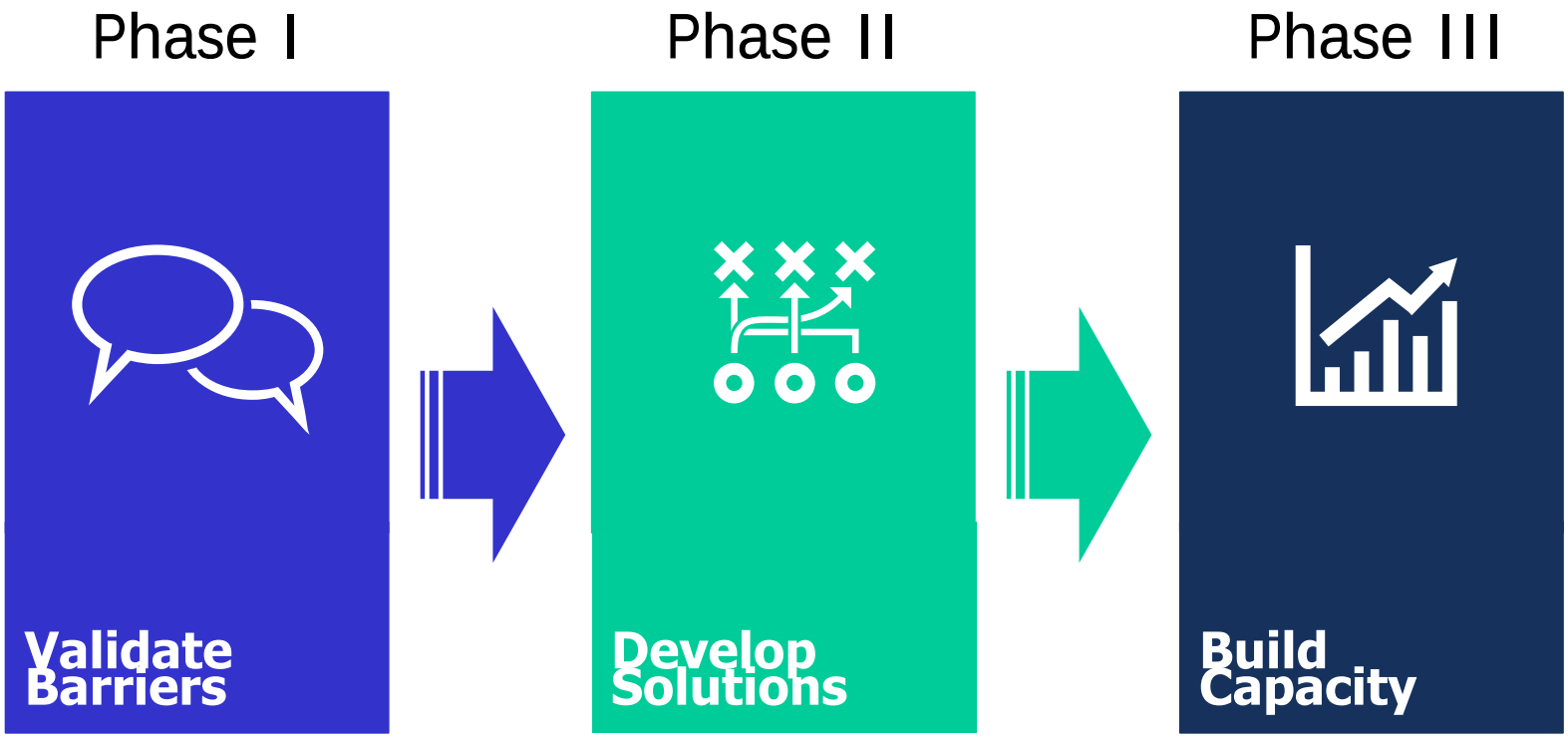
EPA's 18-month Approach



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Today's Objectives

- Discuss and identify common project development barriers unique to on- and off-campus solar project opportunities at institutions of higher education
- Validate solar development needs of individual attendees
- Exchange information related to individual experiences and practices
- Identify, discuss and provide technical and non-technical solutions to common barriers

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Down the Road

- EPA will disseminate solutions, tools, and resources to stakeholders on specific barriers or issue areas over next 18-months
  - Online Resource Directory
  - Basic information and guidance
  - Trainings
  - Templates
  - Case Studies
  - Tools

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NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Higher Education Solar Development: Financing Issues

Robert Margolis, NREL

David Feldman, NREL

Smart and Sustainable Campuses Conference

Baltimore, MD

April 5, 2016

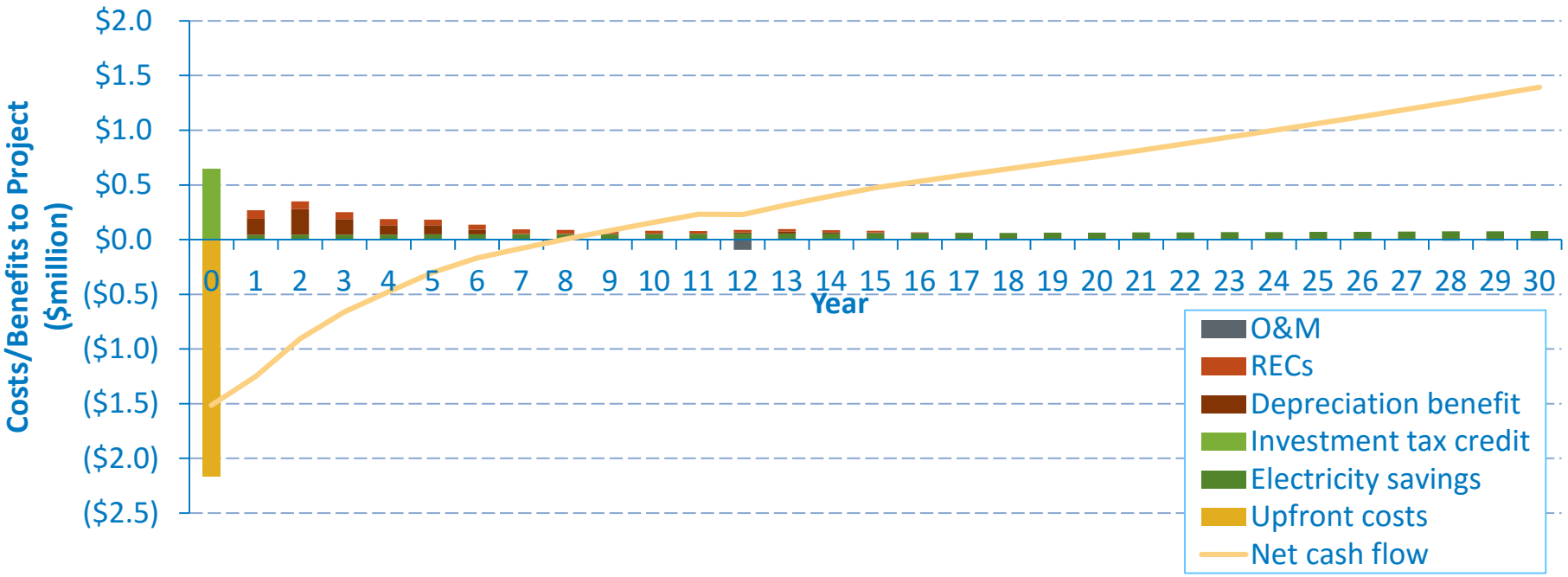
Overview

- Main drivers of project economics
- Common financing methods for PV
- Challenges & Opportunities for higher ed sector
- Assessing economic project feasibility

Benefits of a PV System

- **Electricity generation**
  - Can reduce energy bills through net-metering (or other bill credit mechanism)
  - Can sell electricity – typically at price lower than retail rates – so it is usually better to use energy on-site
- **Federal tax benefits**
  - Tax credit worth 30% of the cost of system
    - 30% credit is scheduled to phase down, starting in 2020
  - 5-year accelerated depreciation schedule (MACRS)
    - Allows owners to write-off a significant amount of the expense in a very short amount of time, rather than over the life of the asset
- **State and local incentives**
  - Not every state or jurisdiction has incentives
  - Come in many forms, including tax credits and exemptions, grants, and Renewable Energy Certificates (RECs)

Example of Costs and Benefits of PV



- **Large upfront cost of PV system with long operating life and low operating costs**
- **Fairly predictable electricity production over the life of the asset, though avoided energy costs and REC values are likely to vary**
- **High/prohibitive cost to relocate asset**

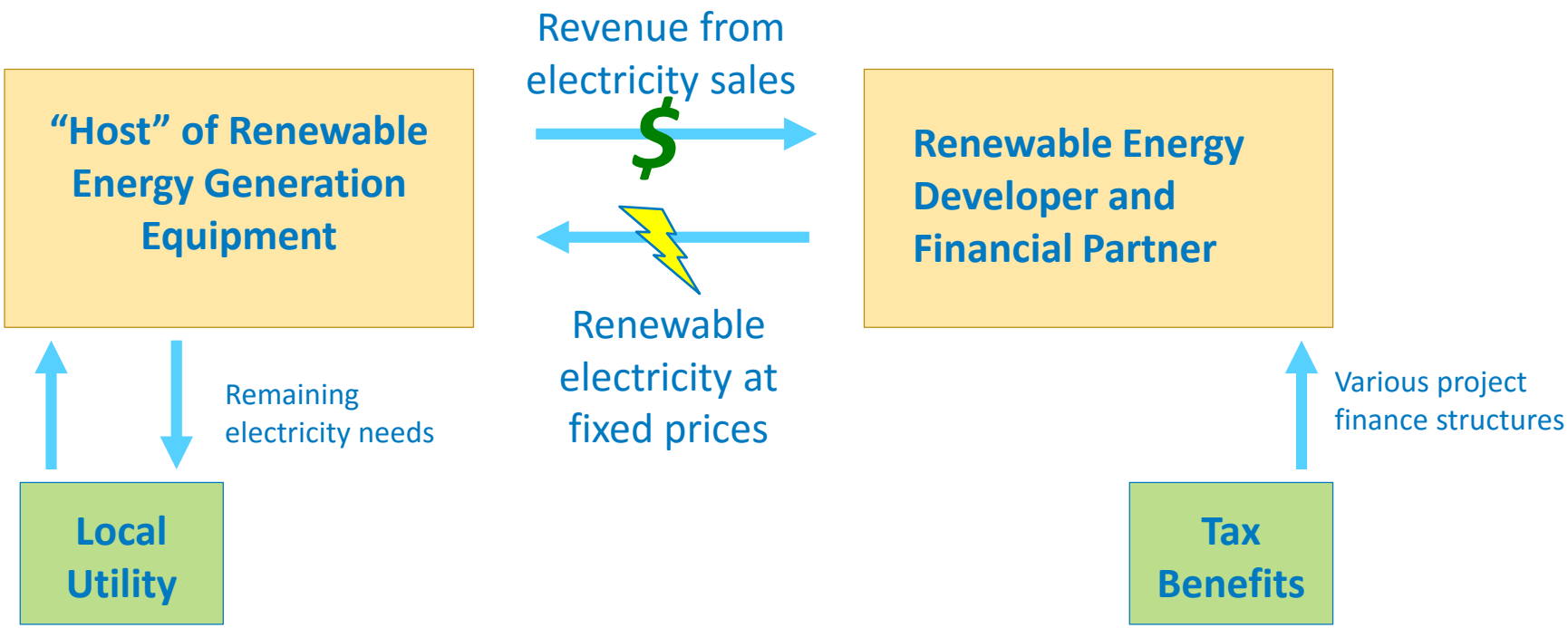
Note: all figures are only representational; individual projects will vary by location and project specifics. All values are net of taxes

Common Financing Methods in Commercial Sector

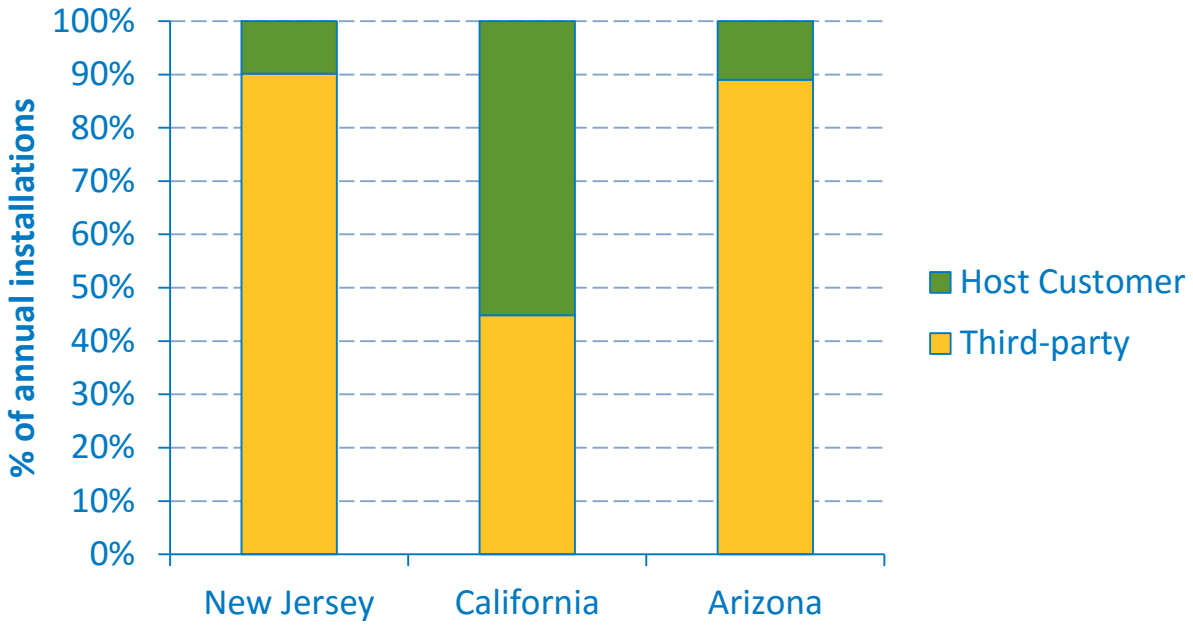
- **Host-ownership**
  - Purchase system through funds from balance sheet or receive bank loan
    - The advantage of a loan is that there is no significant upfront capital expenditures. If term of loan is long-enough duration, and reasonable interest rate, the loan payments will be offset by a reduction in electricity expenses – cash flow neutral/positive
  - Utilize tax benefits, lower energy bills
- **Third-party ownership (TPO)**
  - Third-party purchases PV system and receives all tax benefits, grants, RECs, etc.
  - Third-party either sells electricity generated by system, or leases the system, to host, ideally at a lower rate than what is paid to electric utility (saving host money from day one)
    - Host also often has the option to pre-pay some portion of contract at a lower rate, and then pay little or nothing for the remainder of the contract
    - Host can also buy the environmental benefits of system, though in certain states these benefits are very expensive
- **Offsite or onsite**
  - Most PV systems used by commercial customers are onsite; however, a growing trend within the industry is for companies to buy electricity from offsite systems (virtual PPA)
  - Offsite systems lose value as they have to pay utilities to get power to the site; however they can benefit from economies of scale and/or more suitable locations
  - Offsite systems are also good for space constrained customers

Third Party Power Purchase Agreement

The customer agrees to **host** the system and **purchase** the electricity



Ownership Patterns in Non-Profit Sector



- **TPO dominates some but not all markets in the non-profit sector**
  - State specifics, such as incentives, can influence which financing model is used
    - California offers a higher incentive rate for non-profit host owned systems

Sources: (2010-2015) NJCEP; CSI Database; APS & Salt River Project.

Benefits of Third-Party Ownership

- **Designed to efficiently allocate risks & benefits of renewable energy generation**
  - Host does not need to have (or plan for) ability to use tax attributes associated with solar ownership
  - Likely less corporate resources allocated to non-core business
    - O&M, REC trading
  - Less system risk – if system does not work in 10 years, no capex deployed
- **Potential for cheaper electricity**
  - Depending on comparative costs of capital
- **Does not appear on host's balance sheet**
  - Potentially not important for large companies, however smaller companies need to worry about existing debt covenants
- **Good alignment between host and operator goals**
  - Third-party wants system to generate as much electricity as possible (more revenue)
- **PPA/lease is typically structured so the hostpays less than it would without system, through life of contract**

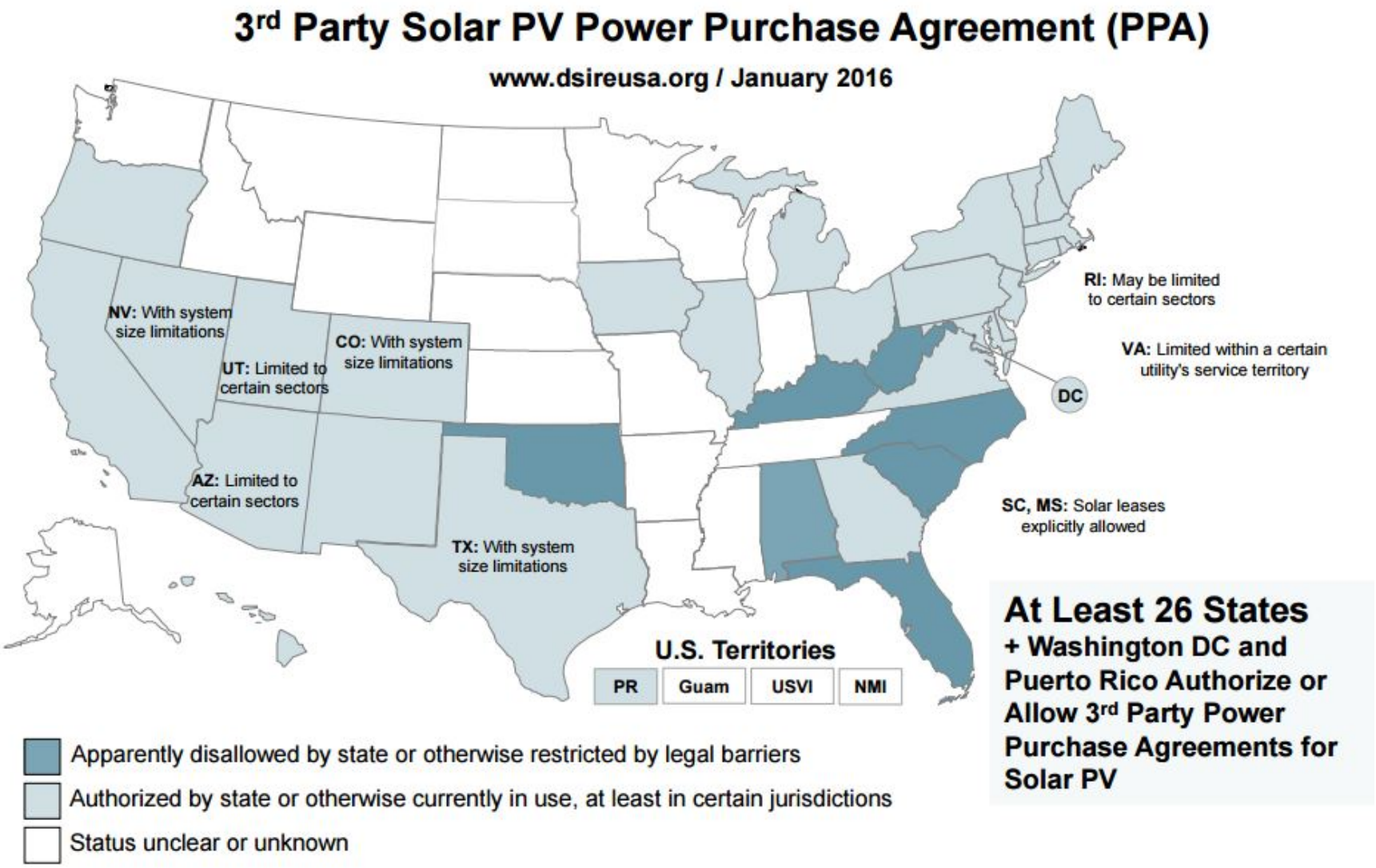
Benefits of Host Ownership

- **Maximize returns by**
  - Not passing incentives to a financier: potentially yields the highest NPV if host can take advantage of benefits and/or get low-cost funding (e.g., low cost loan)
  - Retaining solar tax benefits and rebates
  - Taking advantage of asset depreciation benefits
  - Retaining any environmental attributes generated by the system
  - Avoiding transaction costs of TPO (legal, financing, etc.)
- **Host does not have to decide what to do at end of contract (like in TPO)**
- **Host has more control in the event of sale of property/system**
- **Potentially reduces the total time required to develop solar project**

Challenges for the Higher Ed Sector

- **Requires a large amount of upfront funding to build a PV system of significant size**
  - Many schools are capital constrained
- **Challenging for non-profit schools to benefit from federal and state tax incentives**
  - The federal and state tax incentives are only available to tax-paying system owners
  - System owner also cannot sell the system for the first 5 years or will have to return a portion of federal tax credit
  - Federal law prohibits system owner from receiving tax credit if they lease the system to a non-taxpaying entity (e.g., non-profit, government entity)
- **Power Purchase Agreements are not legal in every state**

State Policies Regarding 3rd Party PPAs



Source: DSIRE database

Host-Ownership Considerations for Higher Ed

- **Financing Options**
  - Traditional methods: endowment financing, alumni/grantor funding
  - Grassroots initiatives: student fees, internal carbon fees
  - Solar-specific bank loans
- **Considerations**
  - Will not be able to utilize tax benefits (especially the 30% ITC)
  - Many states have solar incentives specifically for non-profit and government institutions
  - All benefits are non-taxed
    - Benefits to commercial entities have negative tax consequences
  - May have access to very low-cost financing
    - Higher-ed organizations also have more than one bottom-line (e.g., carbon goals, facility can be used for student learning)
  - Higher ed institutions can often think more long-term than commercial institutions – well aligned with ownership of a long-term asset
    - Can incorporate solar into longer-term site/sustainability planning

TPO Considerations for Higher Ed

- **Financing Options**
  - Power Purchase Agreement (PPA): onsite or through virtual PPA
  - Host system for third-party which sells it to other customer
    - Higher ed institution can benefit from lease payment revenue

- **Considerations**
  - Third-party will be able to utilize tax credits
  - Solar incentives specifically for non-profit and government institutions may still be received if the system is owned by a third-party
  - Third-parties are typically profit-driven, so are likely to have a higher cost of capital
  - TPO not available in every state.
    - Cannot lease system (Third Party would need to forgo ITC)
    - PPA's are not legal in every state
  - Host will not own system at end of contract

Assessing Project Feasibility

- **Different metrics for determining economic feasibility**
  - Host-owned
    - Return on investment (i.e. rate of return (RoR))
    - Payback period
    - Net Present Value (NPV) of cash flows
    - Levelized Cost of Energy (LCOE)
  - TPO
    - Discount to utility electricity rates
    - Monthly/yearly savings
- **Important assumptions to determine viability**
  - Current and future utility rates
  - Cost of system (including maintenance)
  - Expected electricity production (http://pvwatts.nrel.gov/pvwatts.php)
  - Cost of capital
- **Compare LCOE of system with utility rates**
  - NREL's System AdvisorModel (SAM) (https://sam.nrel.gov/)
  - The Cost of Renewable Energy Spreadsheet Tool (CREST) (https://financere.nrel.gov/finance/content/crest-cost-energy-models)
- **Consider including non-economic metrics**
  - Emissions reductions (carbon, mercury, NOx/SOx)

Speaking CFO Language

- **Discuss economic metrics that are most compelling**
  - Project rate of return
  - Reduction in energy expenses
- **Hedge against future energy prices**
  - At least a portion of electricity costs will be known for 15-30 years
- **Long-term investment (or contract) in PV is similar to other long-term investments made by Universities**
  - Endowments often make long-term investments in illiquid assets (e.g., timber investments, private equity)
  - Universities often make significant investments in long-term infrastructure (e.g., buildings, sports facilities)
- **Solar can contribute towards sustainability goals**
  - Value of environmental attributes

Examples of PV Deployed by Universities

- Arizona State University (AZ): 86 installations, totaling 24 MW. Systems consist of carports, rooftops, and ground-mounted systems. Financed through PPAs

- Mount Saint Mary's University (MD): 16 MW ground-mounted facility. The University leased the land to a developer and purchased the power from the PV system

- Butte College (CA): 4.6 MW system which generates enough electricity from its solar arrays to more than offset the entire college's electricity cost. The systems were done in three phases and funded by rebates, issued bonds, bank financing, and reserves from the college

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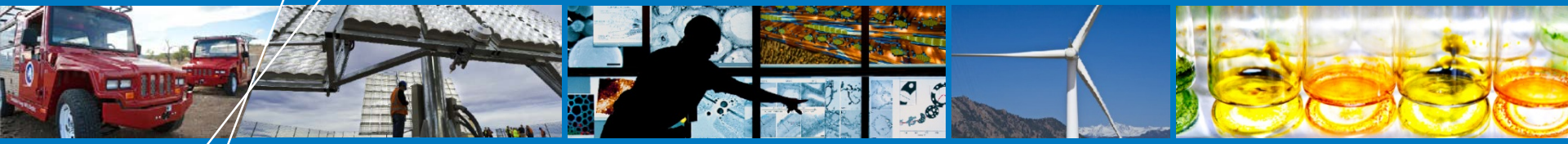
Thank you!



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WASHINGTON, DC

Capital Partners Solar Project

April 2016

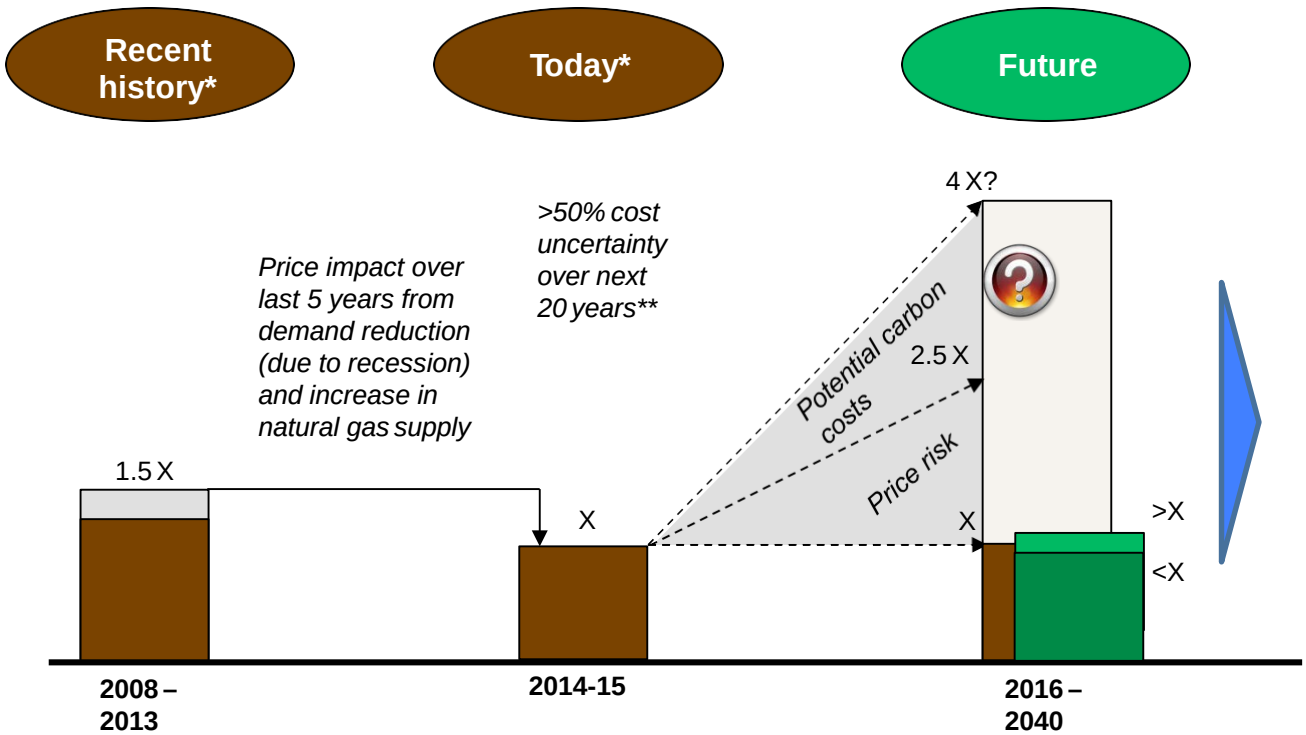
Meghan Chapple
Sr. Advisor on Sustainability
Director Office of Sustainability

Project Overview

- In 2014 GW launched the Capital Partners Solar Project.
- The project generates electricity at three project sites for the George Washington University (GW), American University (AU) and the George Washington University Hospital (GWUH). GW is the anchor with 70% of the purchase.
- It was a 2-year process between initial strategy and contract, supported end-to-end by CustomerFirst Renewables (CFR)
- Competitive selection of providers with ~30 project bids; Duke Energy Renewables (DER) won.
- During 2015, the project delivered more than 20,000MWh of renewable energy to GW, which is equivalent to 12,364 acres of U.S. forests capturing carbon for one year.

Large Scale Opportunity

Generation Portion of Electric Bill
$/MWh

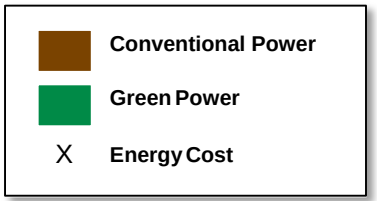


*Secure PPA for renewable solu1on****

- *20%+ cost savings poten1al rela1ve to conven1onal power*
- *100% increase in price certainty*

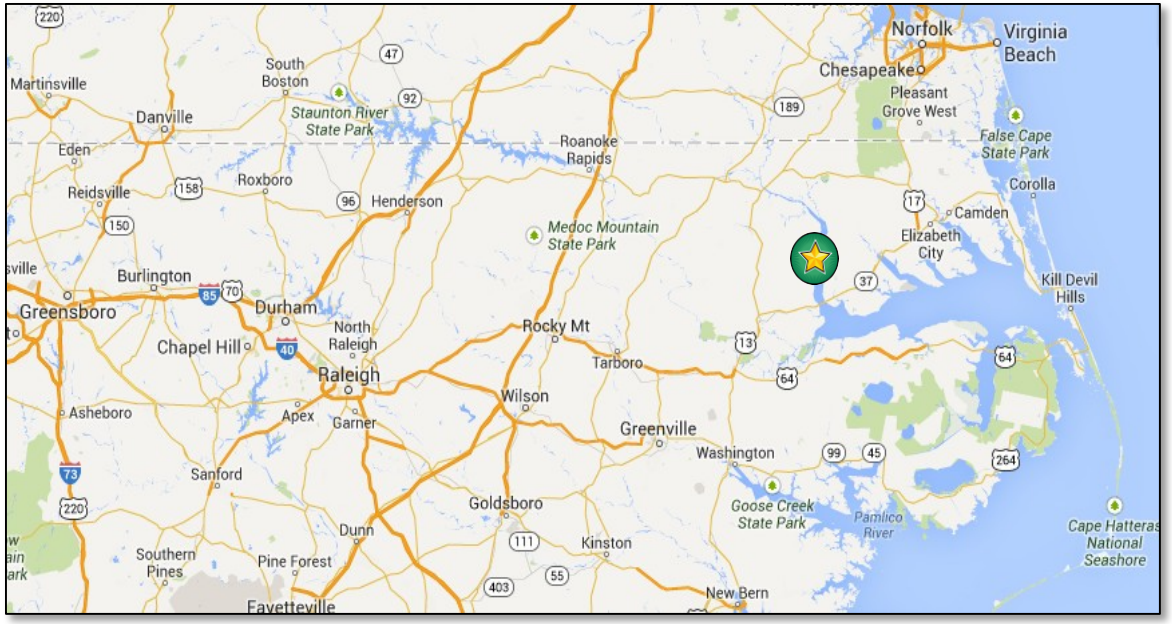
Key Success Factors

- Minimize PPA price at the renewable site
- Minimize cost and risk of moving power to facilities



* Purchase conventional power from traditional market suppliers.
** Assumes 0% to 5% nominal price escalation in future electricity prices over the next 20 years; excludes future cost of carbon.
*** Assumes renewable solution sized to deliver 50% of customer needs; NPV savings are estimated over 20 years.
Source: Customer records; 2013-14 procurement process; CFR analysis

Capital Partners Project Site



Location Area of Sites

Illustrative Site Layout

Site A Layout
28 MWdc / 20 MWac

- Project requires 3 sites to produce 123,000 MWh in first full year of operation (52 MWac)
- Initial site completed 12/31/14
- Other two site locations finalized by 12/31/15

Source: Capital Partners Solar Project

Challenges

- Aligning **disparate views** of what defined success within and across organizations
- Overcoming a **lack of market transparency** on renewable market prices
- Needing to understand **all-in impact** on buyer economics, not just project cost
- Building **buyer understanding and confidence** in novel solution that pushed the envelope
- Designing and negotiating **innovative contract provisions** that addressed buyer sensitivities
- Committing to a solution and **long-term contract** for energy unlike what had been done before at each purchasing institution
- **Sustaining process momentum** alongside short-term, day-to-day responsibilities of each institution's operations

Getting to a Deal

1. Established a **cross-functional team that owned process**
2. Involved **experienced, external support upfront** to run the process
3. Leveraged the **benefits of partnership** to build confidence to keep moving forward (i.e., “we are all in this together”)

Q&A
DISCUSSION

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Questions?

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