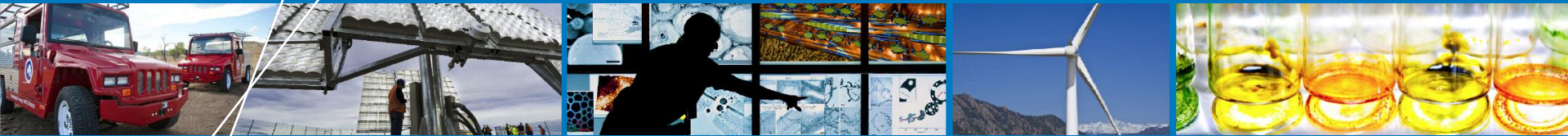


Using Power Purchase Agreements for Solar Deployment at Universities



Factsheet

Jenny Heeter

Eric O'Shaughnessy

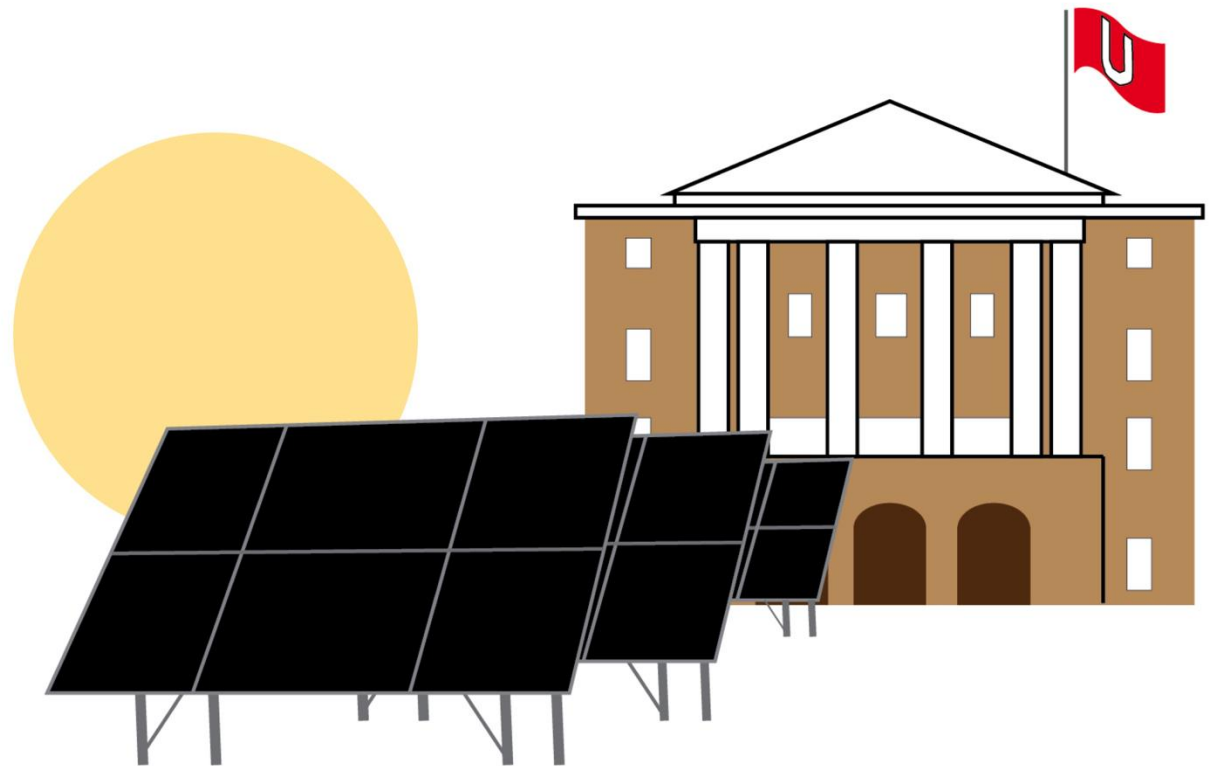
February 2016

Housekeeping

- Participants are joined in listen-only mode.
- Use the Q&A panel to ask questions during the webinar. We will hold all questions until after all speakers have presented.
- Slides from today's webinar will be shared later this week with all registered attendees.
- If you have technical difficulties with the webinar, contact the GoToWebinars Help Desk at 888.259.3826 for assistance.

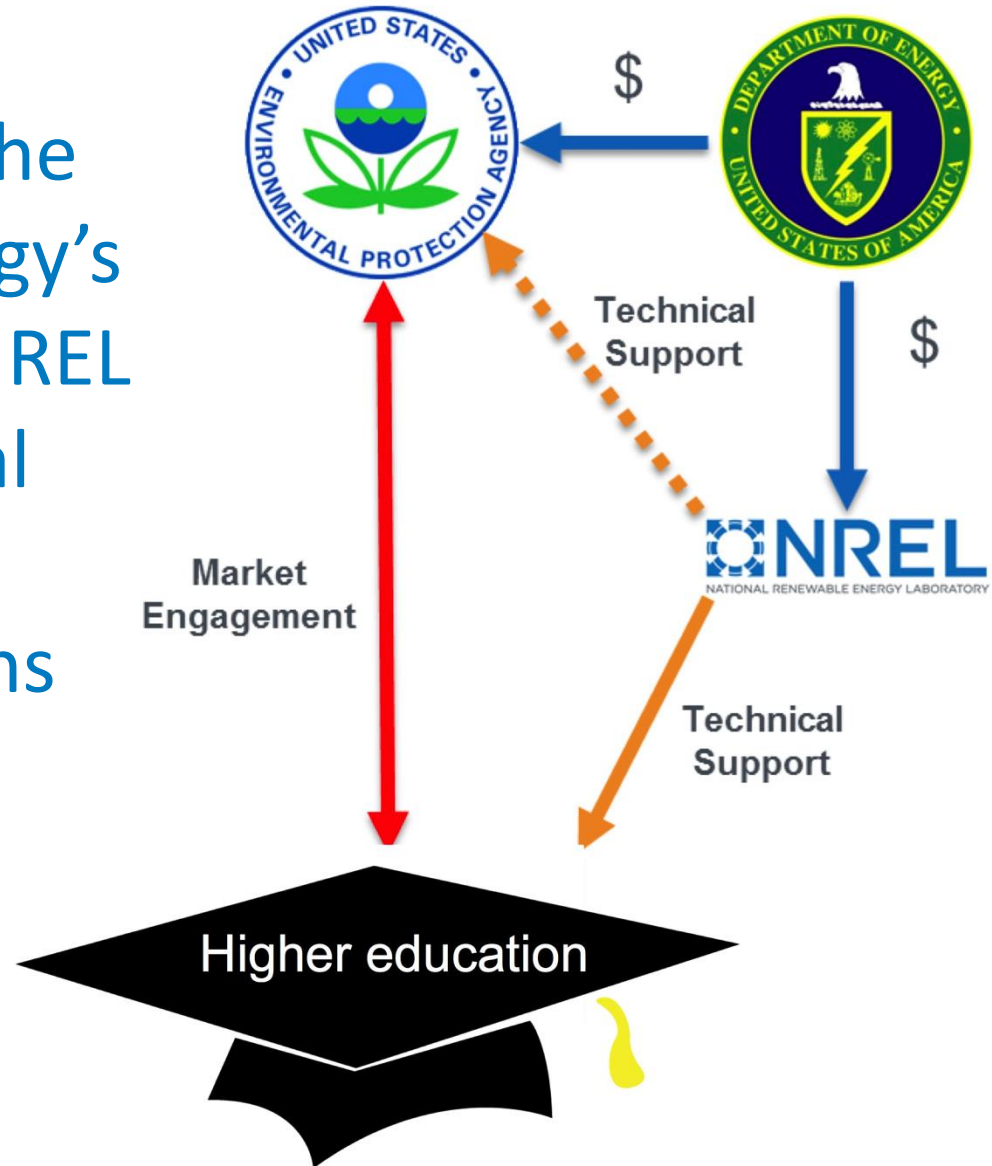
Webinar plan

- Background on NREL's Solar PV Assistance
- Using solar PPAs at Universities
- Q&A



NREL is Assisting Universities to Deploy PV

- With funding from the Department of Energy's SunShot Initiative, NREL is providing technical support to Higher Education Institutions



Solar Photovoltaic Implementation Assistance

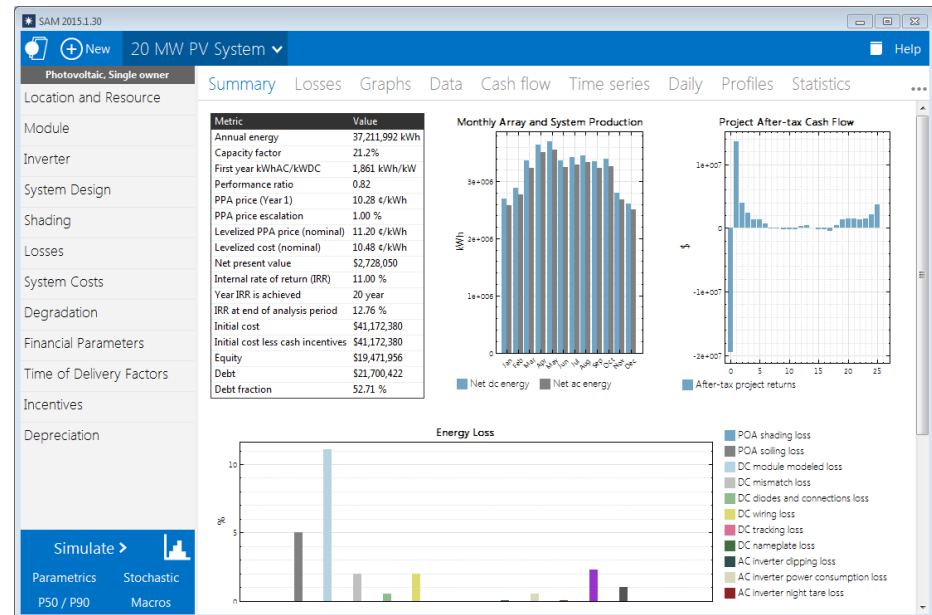
- NREL will provide short-term solar PV implementation assistance to decision-makers in the higher education sector through one-on-one consultations.
- Successful applicants will be partnered with expert NREL staff to determine the most effective use of assistance in deploying mid-scale solar PV.
- NREL will inform the university of existing resources and provide additional information specific to the organization's needs.
- Assistance per university is anticipated to be approximately 40 hours of staff time.

http://www.nrel.gov/tech_deployment/tools_universities.html

Popular Assistance Topics

- Reviewing RFP language
- Financial analysis of RFP bids
- Reviewing PPA contract terms
- Creating a collaborative PV procurement
- Understanding state and utility policy and PV incentive programs

NREL's System Advisor Model



<https://sam.nrel.gov>

Solar Photovoltaic Screenings

- Using the REopt model, NREL will conduct an initial techno-economic assessment of solar PV feasibility at selected universities.
- NREL will provide each university with customized results, including the cost-effectiveness of solar PV, recommended system size, estimated capital cost to implement the technology, and estimated life cycle cost savings.
- Results will be provided for two scenarios: optimizing for cost-effectiveness and optimizing for carbon reduction
- NREL can also offer a more detailed analysis under a strategic partnership projects agreement.

http://www.nrel.gov/tech_deployment/tools_universities.html

First Round Assistance Selections



PV Screening:

- Fairleigh Dickinson University
- Lake Superior College
- Luther College
- University of Minnesota Duluth
- Washington and Lee University
- Milwaukee Area Technical College
- Northern Arizona University
- University of Colorado, Colorado Springs

Implementation Assistance:

- North Carolina State
- Ohio University
- Kennesaw State University
- University at Albany
- Southern Connecticut State University
- Parkland College

Why a Fact Sheet on Solar PPAs for Universities?

NREL did interviews with 9 universities to understand financial barriers to campus solar deployment

“Hasn’t been easy”

“How did other universities do this?”

“So much complexity”

“There isn’t a single process”

“Hard to figure out how to make a decision”

“New to lawyers”

“The project didn’t pencil out”

“It allows us to do a lot”

“Projects are more attractive with no capital outlay”

“No maintenance”

“No money up front”

“PPAs are the model that we use”

“Low risk”

“Stable pricing”

“We didn’t have to put a lot of skin in the game”

Using PPAs for Solar Deployment at Universities

Background

Solar power purchase agreements (PPAs) have facilitated over 100 megawatts (MW) of solar deployment on campuses around the country.

This factsheet provides guidance to universities on the process of using PPAs and how PPAs can make economic sense for campus solar deployment.

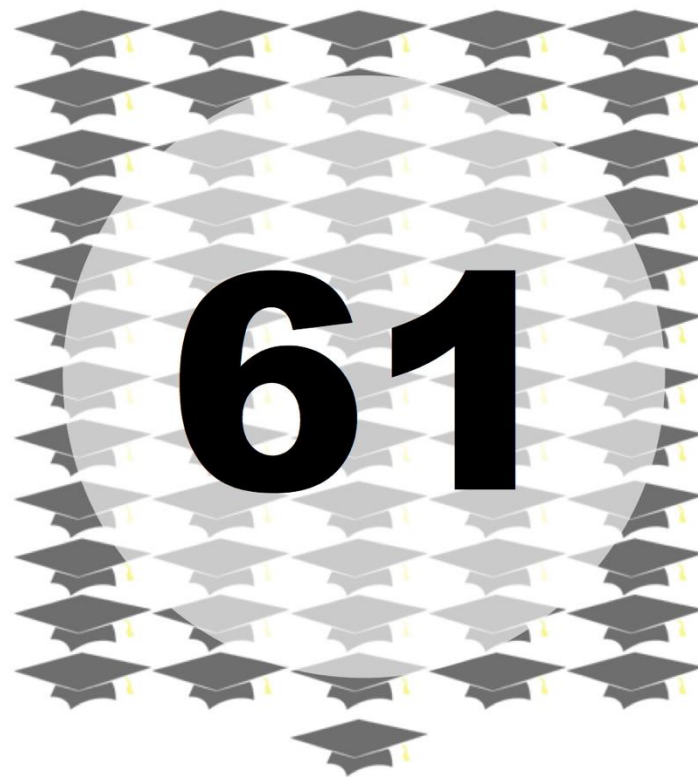
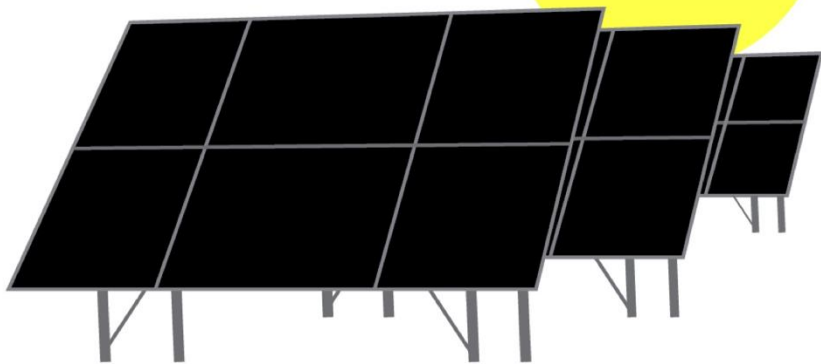
17.4 MW array at Mount Saint Mary's in Maryland,
procured with a PPA.



Campus PPAs: Key Numbers

>100 MW

of university solar capacity has been installed through PPAs



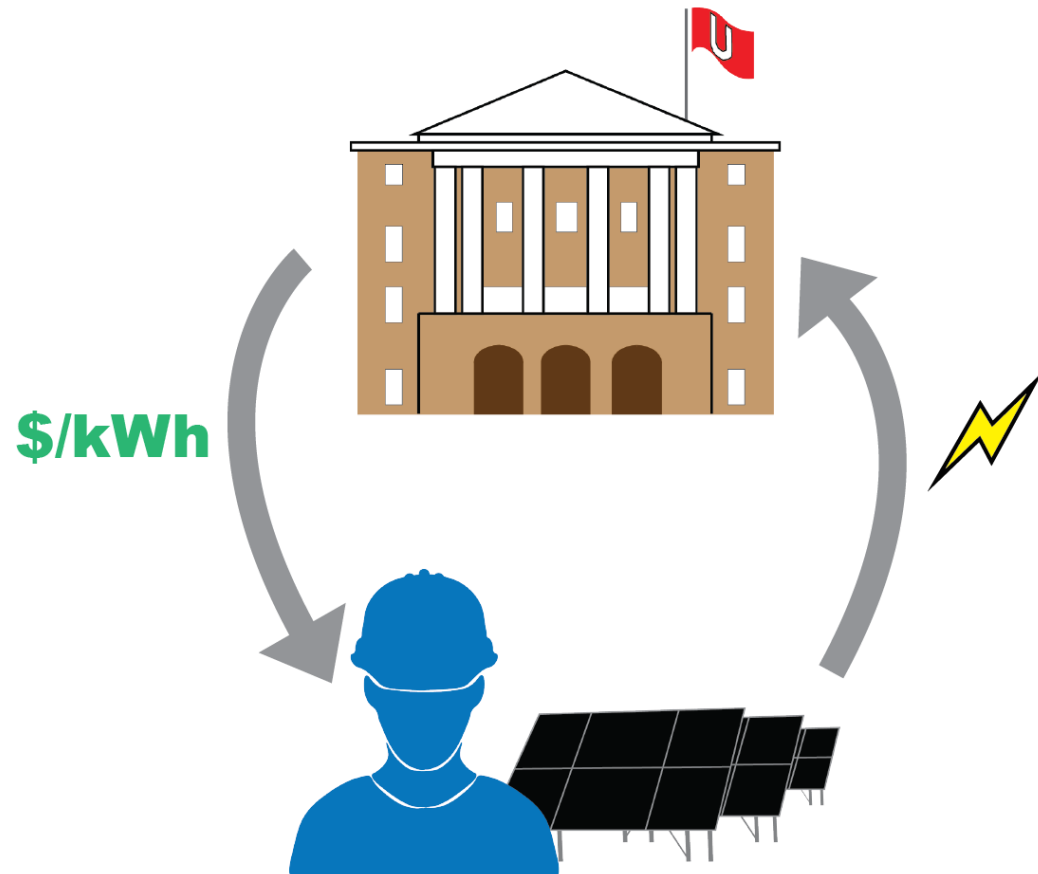
universities have signed a solar PPA

Source: Data from AASHE

How Does a PPA Work?

The university (offtaker) buys power at a negotiated PPA **rate** (\$/kWh) for a specified PPA **term** without taking ownership of the system.

The project **developer** or a **tax equity** investor owns the system. The developer is responsible for all permitting, installation, maintenance, and decommissioning.



The PPA Process

Step 1: Preliminary Assessment

- Assessment of PV suitability on campus
- Studying whether PV is an economically viable option or whether PV is in line with other university goals



Arizona State University has procured nearly 24 MW of solar capacity, mostly through PPAs

The PPA Process

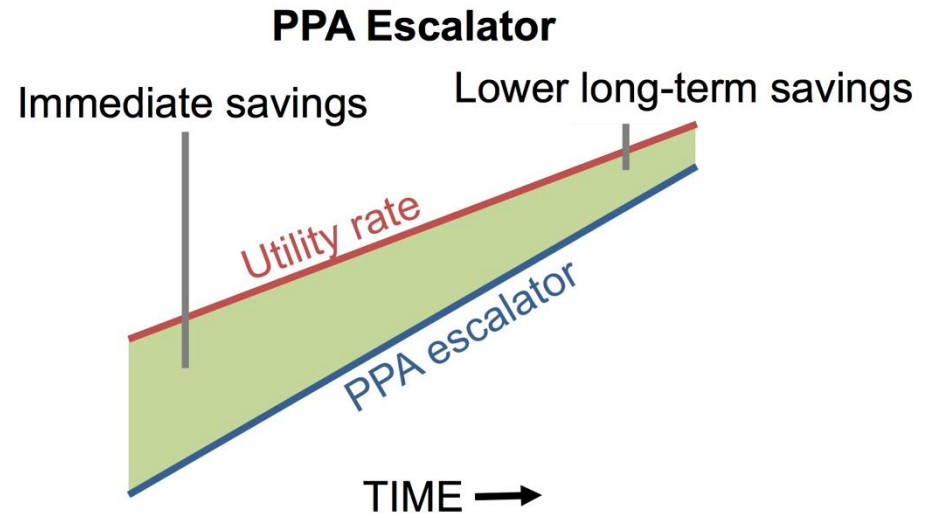
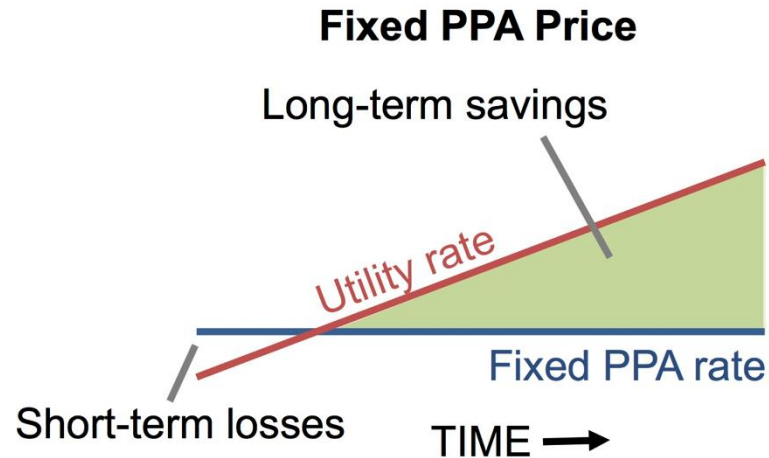
Step 2: Finding a Project Developer

- Request For Proposal (RFP) to solicit competitive PPA bids
- RFP: sufficiently prescriptive but flexible
- Terms: negotiable and non-negotiable
- Possible criteria: developer experience, financial stability, and willingness to provide performance guarantees

The PPA Process

Step 3: PPA Negotiation

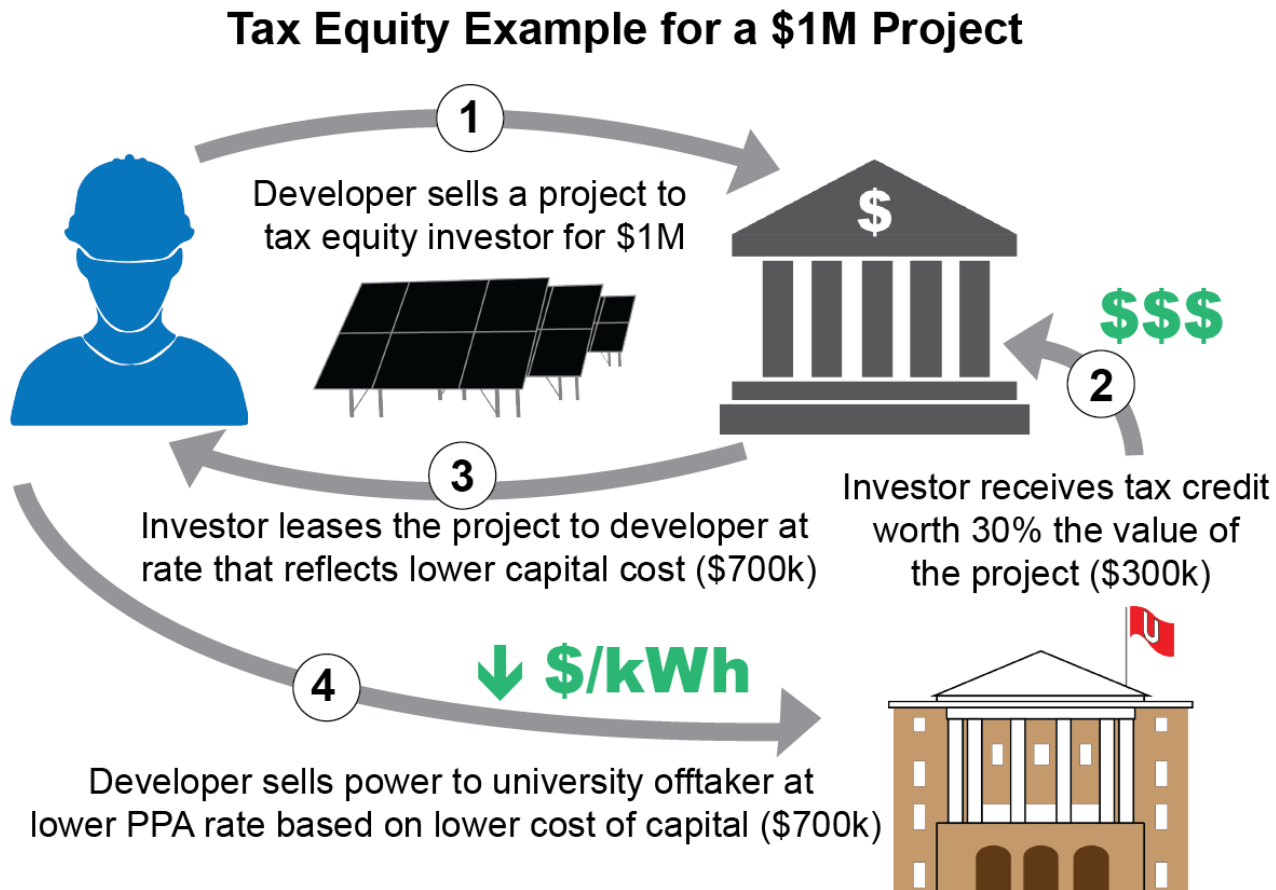
- Contract terms: generally 15 to 25 years
- Pricing structure: fixed or escalator?
- Who owns the renewable energy (RECs)?



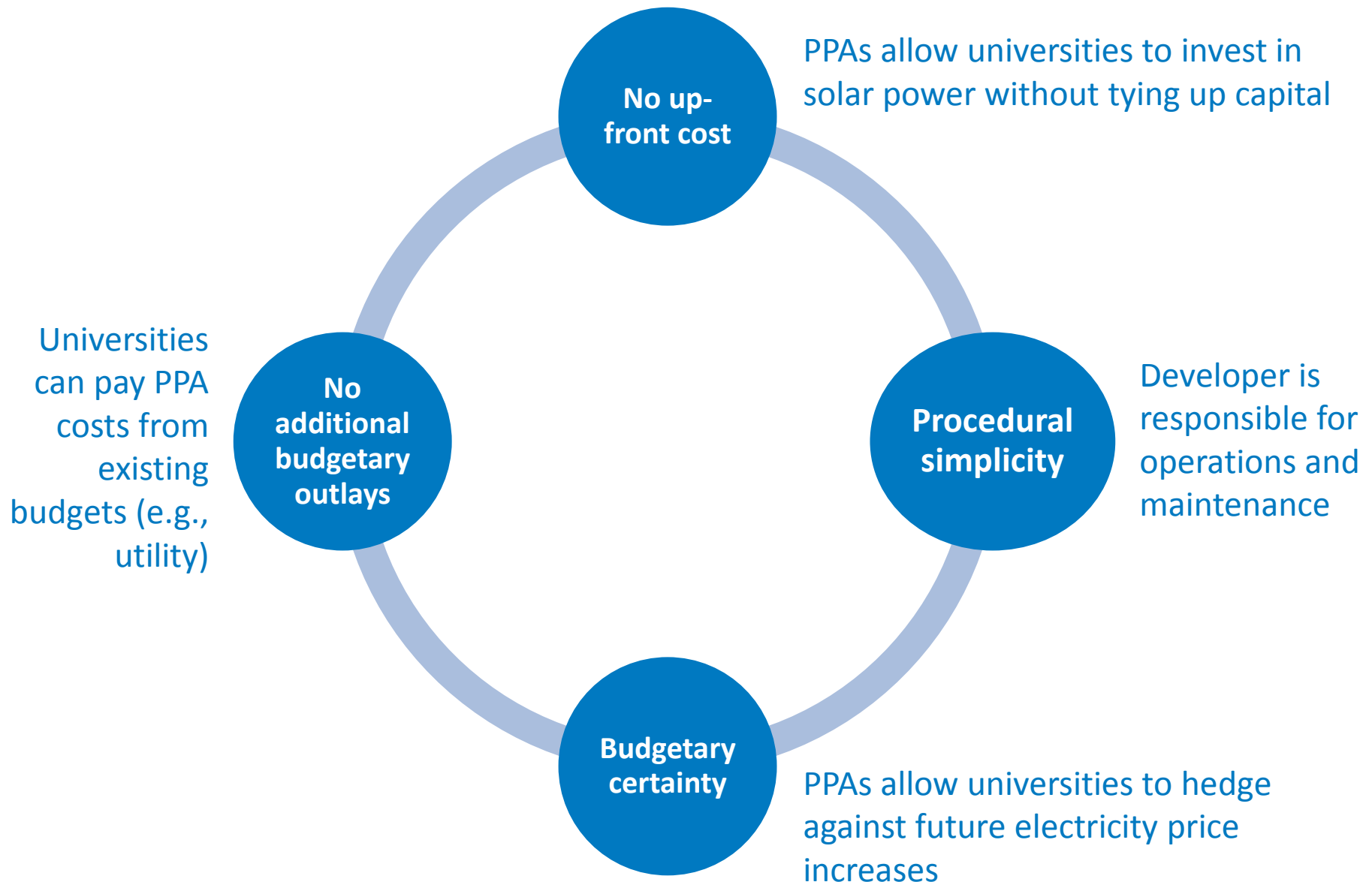
PPA Benefits

Tax Equity

- Allows tax-exempt entities to indirectly benefit from tax credits through a lower PPA price



Other PPA Benefits

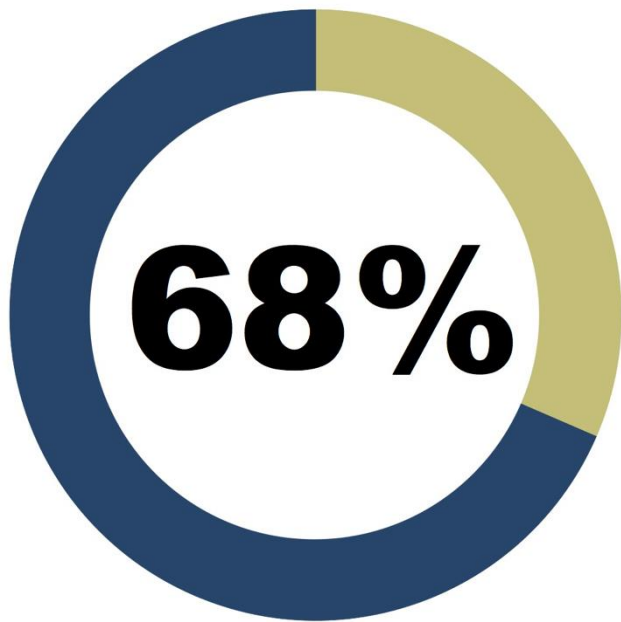


Challenges

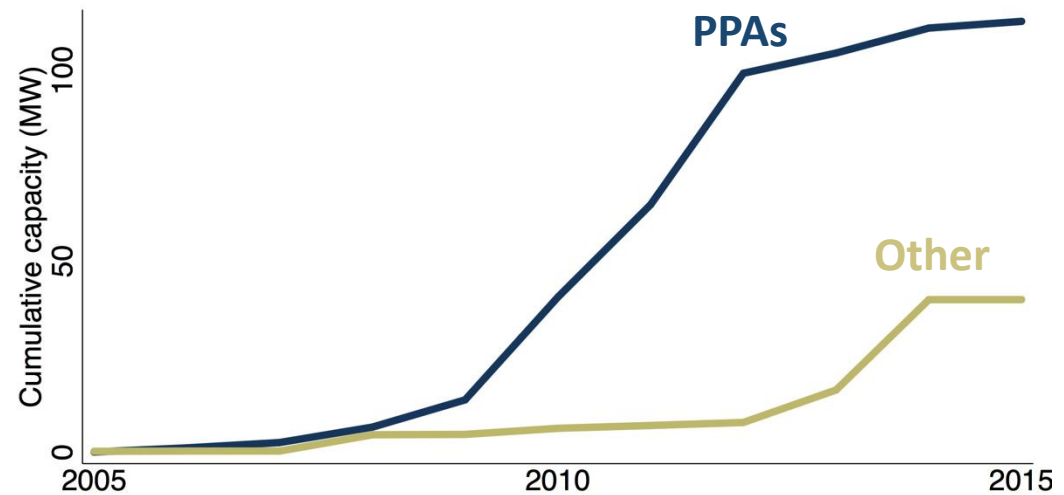
- On-site PPAs are not available in all states
- PPAs entail a learning curve for university staff
- Some university CFOs may be hesitant to enter into a long-term contract for power
- Low university creditworthiness can result in higher PPA prices

Trends in Campus Solar PPAs

PPAs have become the preferred method for solar procurement at many universities



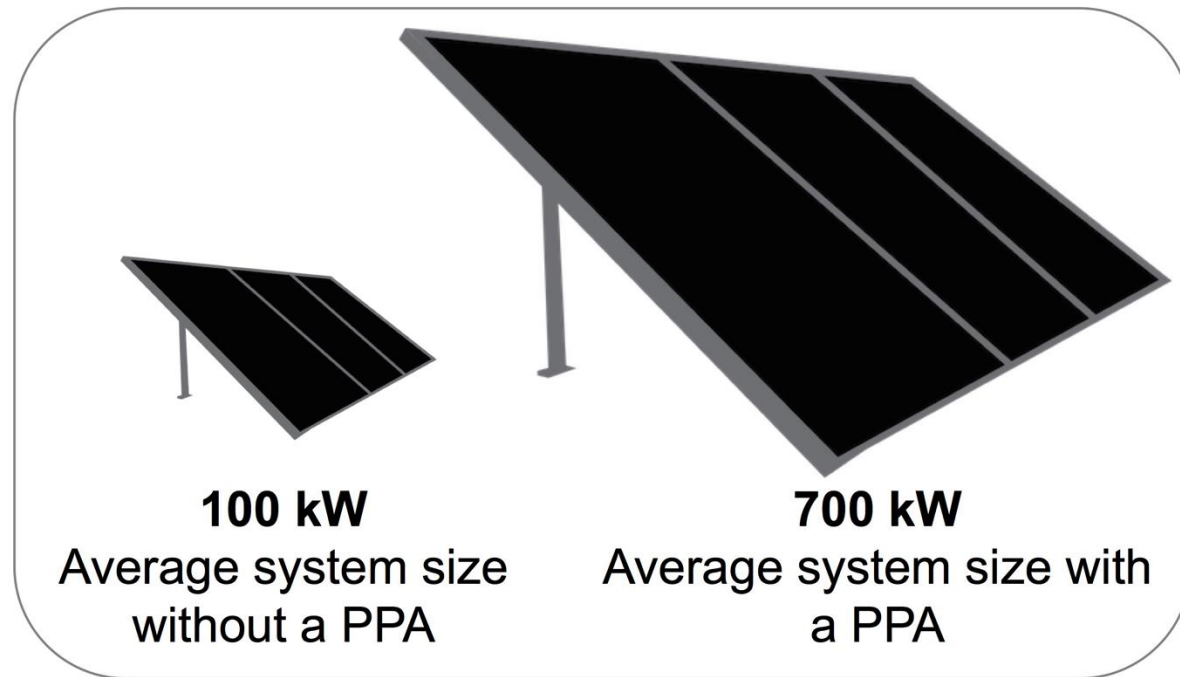
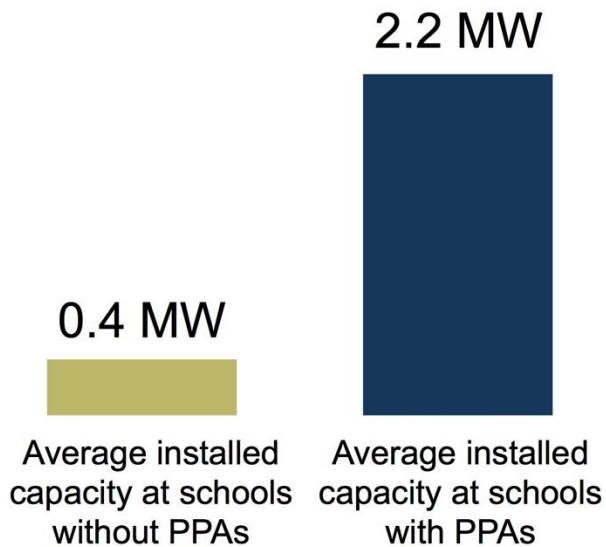
Percentage of university capacity installed through a PPA



Source: Data from AASHE

Trends in Campus Solar PPAs

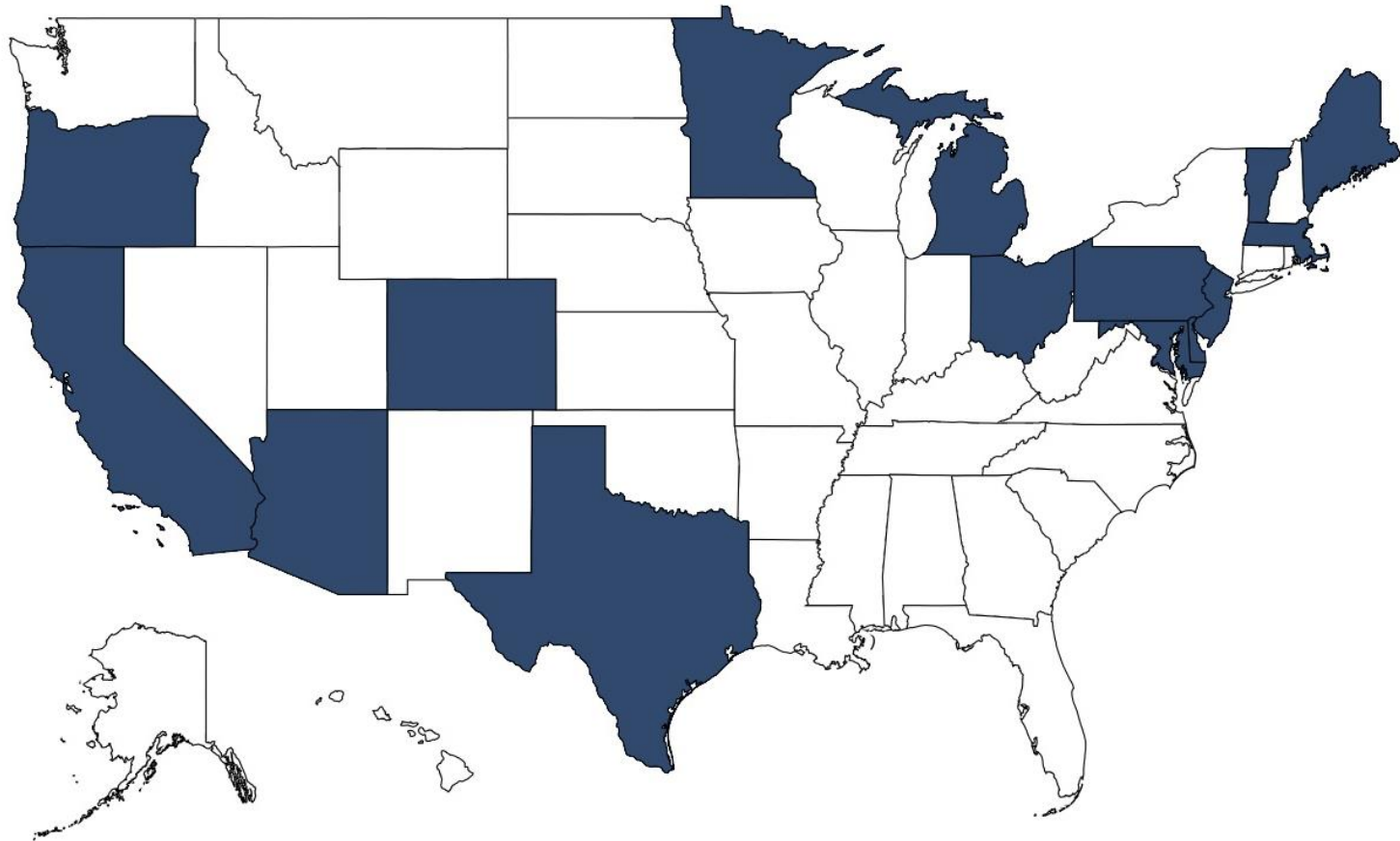
PPAs facilitate larger projects



Source: Data from AASHE

Trends in Campus Solar PPAs

Universities have used PPAs in at least 16 states



Source: Data from AASHE

PPA Resources

NREL Brochure “Using Power Purchase Agreements for Solar Deployment at Universities”
<http://www.nrel.gov/docs/gen/fy16/65567.pdf>

IREC’s Solar Power Purchase Agreements: A Toolkit for Local Governments (Includes an annotated model PPA)

<http://www.irecusa.org/publications/solar-power-purchase-agreements-a-toolkit-for-local-governments/>

Archived webinar: <https://vimeo.com/125871846>

Example PPAs:

Standard Commercial PPA version 1.1 (Developed by a working group of financial professionals)

https://financere.nrel.gov/finance/content/solar-securitization-and-solar-access-public-capital-sapc-working-group#standard_contracts

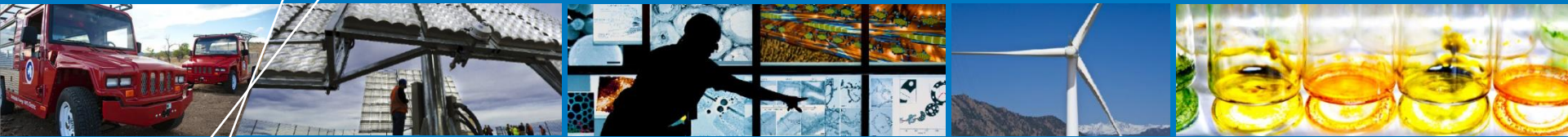
New York K-Solar PPA Template

<http://www.p12.nysed.gov/facplan/documents/K-SolarPPATemplatePerformanceWarrantyandPurchaserCreditAgreement.pdf>

IREC: Sample PPA (Word version)

http://www.irecusa.org/wp-content/uploads/2015/04/Final_Clean_PPA_Template.docx

THANK YOU!



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<Jenny.Heeter@nrel.gov>

Key Components and Terms

Assignability: The ability of the project developer to transfer site rights to another party.

Contract term: The period during which the offtaker agrees to purchase power from the system owner.

Escalator: Contract clause under which the PPA price increases over time, generally less than 3%.

Expiration: Conditions defining the offtaker's options at the end of the contract term, including whether the offtaker will have the option to purchase the system.

Environmental attributes: The ownership of the environmental attributes (renewable energy credits) of the system's output.

Liabilities: The contract defines the obligations of the offtaker and the system owner for system maintenance, repair, or other liabilities arising from unforeseen events.

Offtaker: The purchaser of renewable energy.

Performance terms: The PPA specifies the obligations of both the offtaker and system owner concerning the system's performance, including any exclusions under which either party is exempt from compliance with contract terms

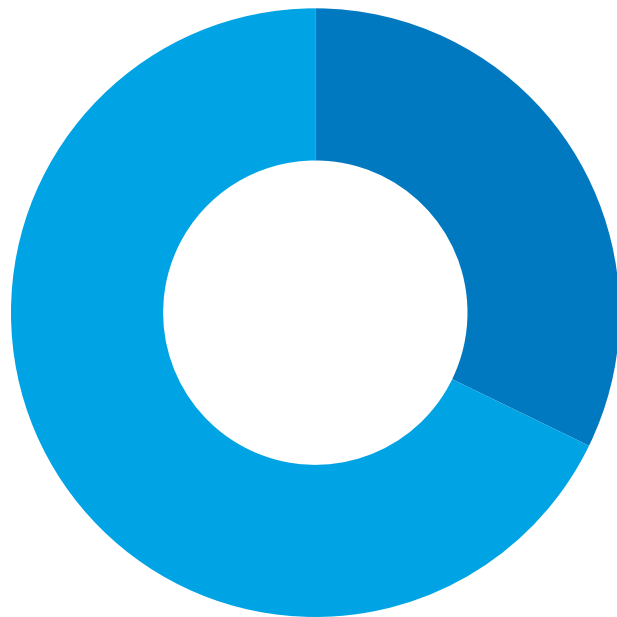
PPA price: The contract specifies the rate (\$/kWh) at which the offtaker will pay the project developer for the system's output.

Site right agreement: Agreement defining the developer's rights to access and use the offtaker's property for project development, operation, maintenance, and decommissioning.

Tax equity: Capital raised from a taxable entity in return for the receipt of tax incentives.

Polling Question Results

Did you have enough information to move forward with a PPA at your university?



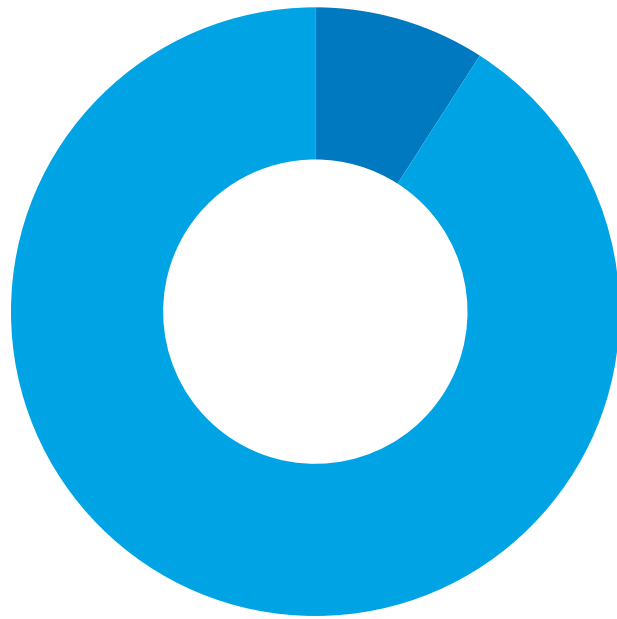
■ YES ■ NO

118 Answers

- YES 38 32%
- NO 80 68%

Polling Question Results

Has your university signed a solar PPA?



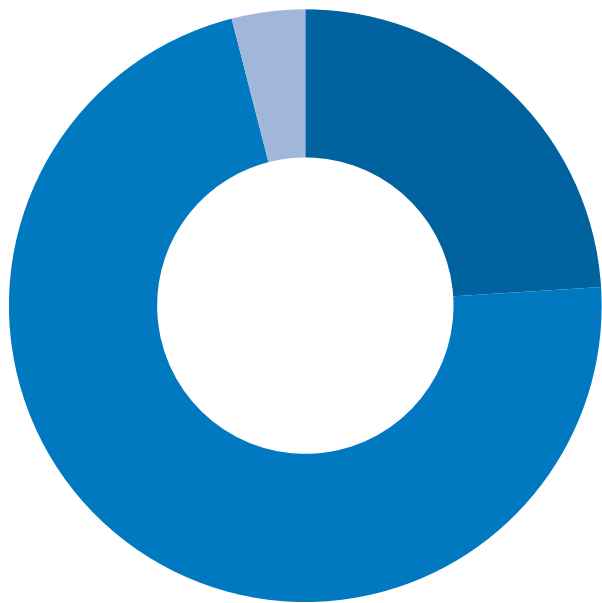
■ YES ■ NO

91 Answers

- YES 8 9%
- NO 83 91%

Polling Question Results

Does your university own the Renewable Energy Certificates (RECs) from the system?



■ YES ■ NO ■ FOR SOME YEARS

25 Answers

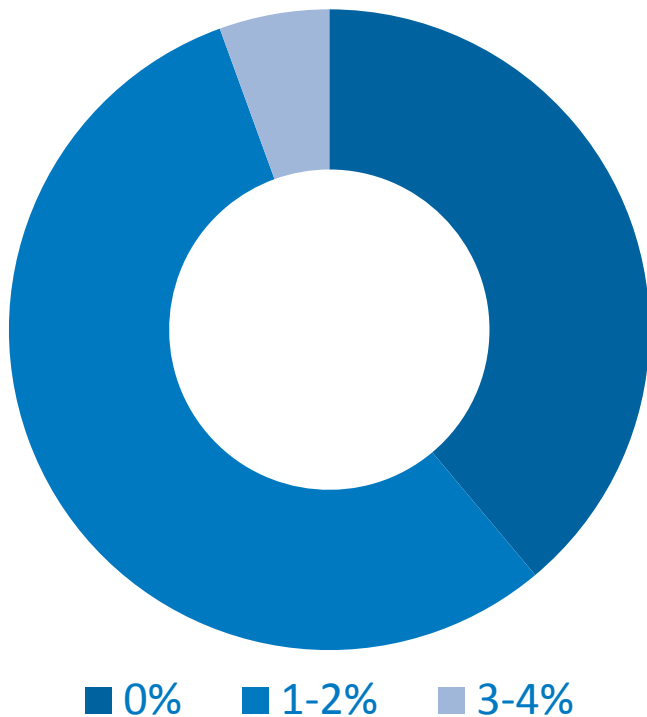
YES 6 32%

NO 18 68%

FOR SOME YEARS 1 4%

Polling Question Results

What annual escalator rate did your PPA use?

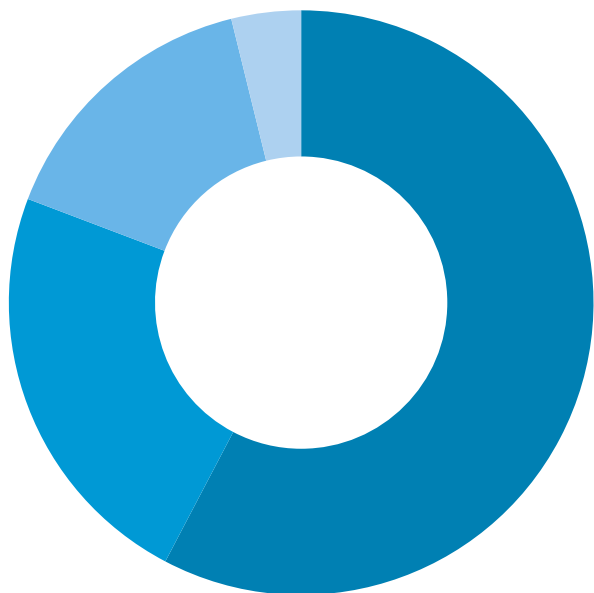


18 Answers

- 0% 7 39%
- 1-2% 10 56%
- 3-4% 1 6%

Polling Question Results

What was the biggest benefit of your PPA?



26 Answers

A 15 58%

B 6 23%

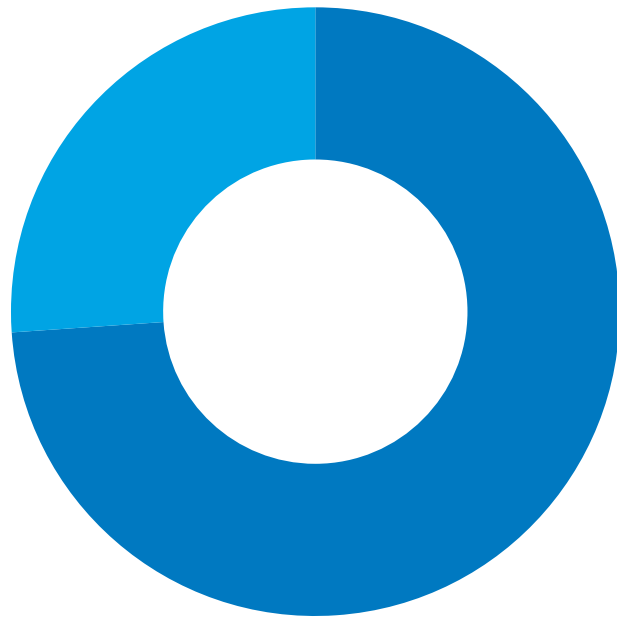
C 4 15%

D 1 4%

- A. No up-front cost
- B. Electricity price certainty and hedging opportunities
- C. No additional budgetary outlays
- D. Procedural simplicity and maintenance

Polling Question Results

Would your university sign another PPA?



■ YES ■ NO

23 Answers

- YES 17 74%
- NO 6 26%