

# Introduction to Solar Power Purchase Agreements

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DOER Leading by Example

# State-Sited Solar PV



Currently over **29 MW solar capacity at state facilities**, generating millions of kWh of electricity per year



Growing number of installations serving **distributed energy resource** integration role (e.g., pairing of solar with battery storage and electric vehicle charging stations)



Results in **electricity cost and demand charge savings** for state government operations + direct contributions to the declining emissions of the regional grid

# Potential Solar Funding Mechanisms

- Build-to-own requires upfront capital budget funds or self-financing
- PPA requires no state funding but will need staffing resources for planning, contracting, and construction

SMART Program incentive payments: 20-year fixed incentive rate, payment based on system generation

- SMART incentive rates vary depending on electric utility provider, solar capacity (size), project type (e.g., rooftop vs. canopy), and other factors



## State-owned Solar:

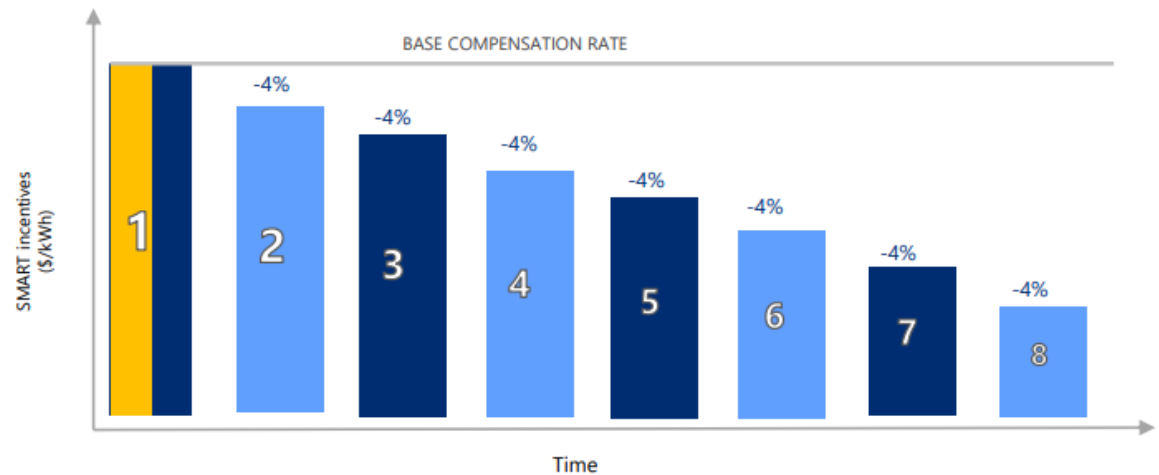
Incentive payments go directly to host site

## PPA Model:

Incentives paid to developer and are passed through to host site in the form of a lower PPA rate

# The "SMART" Program

- Fixed \$/kWh incentive payment to system owner over 20 years
- 8 original "blocks" of capacity – incentives decline as blocks fill up
- Incentive rate **directly proportional** to PPA rate
- Adders for project-specific characteristics
- Incentive levels differ by utility territory



**SYSTEM SIZE "MULTIPLIER"**  
(Capacity-based compensation rate)



**ENERGY USER**  
("Offtaker")



**ENERGY STORAGE INTEGRATION**



**LOCATION**



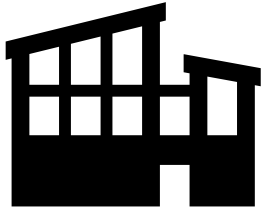
**Timing matters!**

# State Solar PV Procurement Options

## Build-to-Own PV System

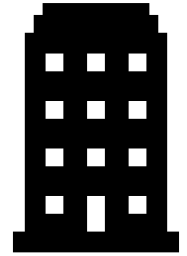
- *Procurement*
  - RFP through Chapter 149 or 25A
  - Standalone installation or part of a broader energy project
  - Host site pays for project costs
- *Pros*
  - Site can reap the full long-term fiscal benefits
  - No leasing issues
- *Cons*
  - Significant capital for upfront project cost
  - Host site responsible for specification development, procurement process, award, and construction project management
  - Requires budget for ongoing repair and maintenance
  - Could take longer than PPA model and lead to lower SMART incentives
- *After 20-25 Years*
  - Eventual decommissioning; host site responsible for associated costs

# Behind-the-Meter PPA



**Developer**

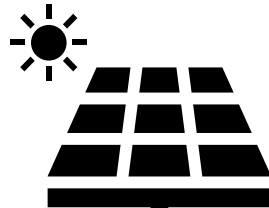
- Finances, installs, and owns solar PV
- Arranges long-term lease with host site as part of PPA
- Operates and maintains solar PV system
- Receives incentive payments and tax credits
- Monitors/optimizes ongoing performance



**Utility**

- Continues to supply host site with uninterrupted grid electricity service
- Provides net metering credits to host site (if net metering is available)

**Solar PV**

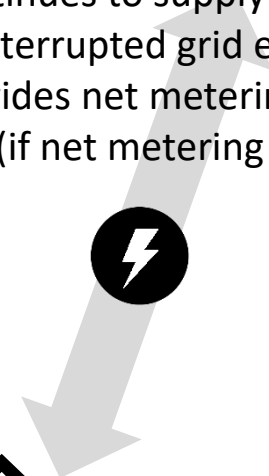


- Installed at host site at no upfront cost
- Various options for end of PPA term



**Host Site**

- Purchases electricity from developer for onsite generation at fixed rate through PPA (typically less than utility rate)
- Buys less electricity from the utility
- Not responsible for solar PV system O&M





## Power Purchase Agreement (PPA)

Customer pays a flat rate for power created by solar system

### Benefits:

- Simple payment structure
- Discount to utility rates



## Hybrid Power Purchase Agreement (hPPA)

Customer pays a reduced flat rate for solar power and agrees to benefit-share for storage system

### Benefits:

- Discount to utility rates for solar power
- Incentives aligned on energy storage performance

# State Solar PV Procurement Options

## Behind-the-Meter Power Purchase Agreements

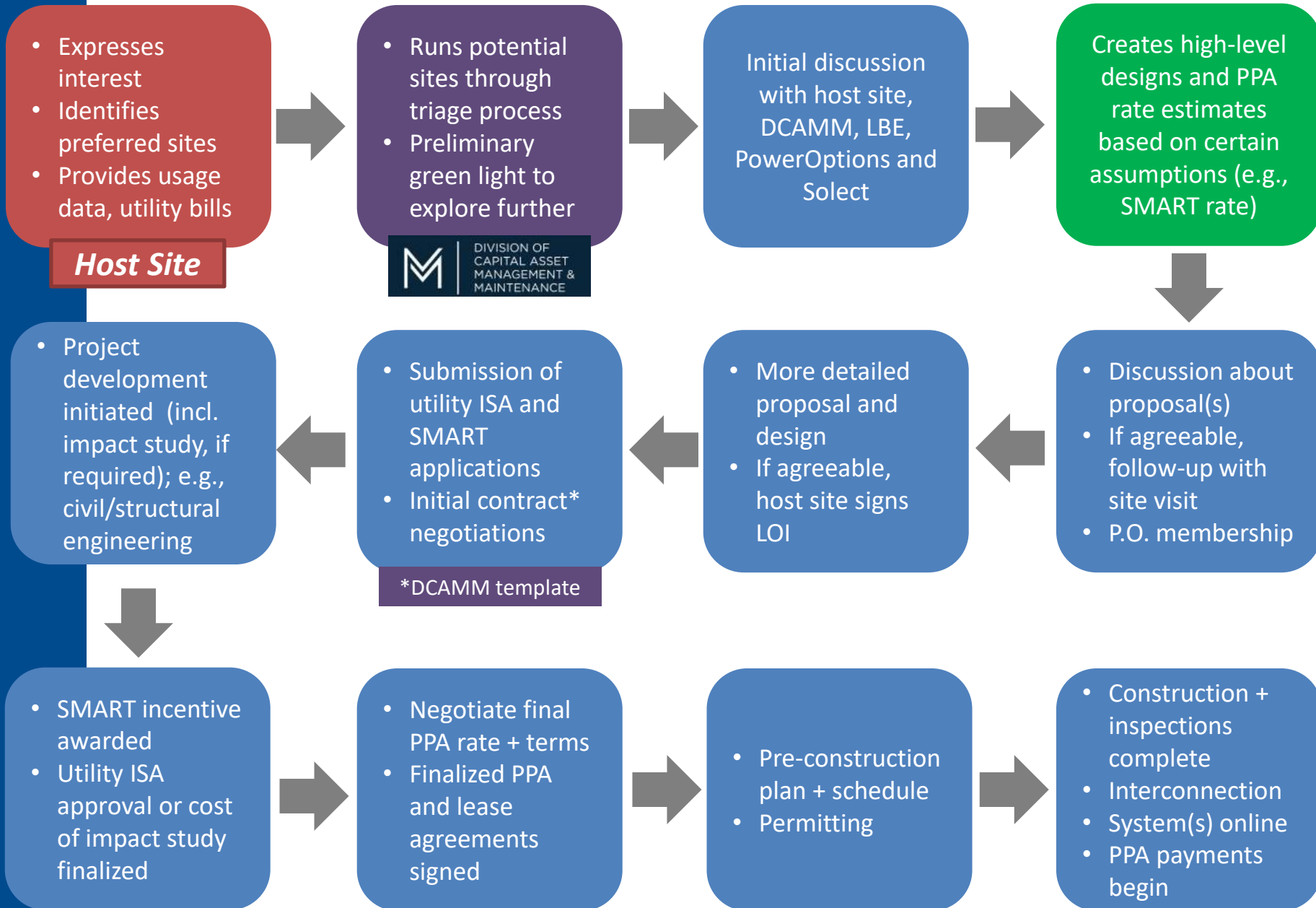
- *Procurement*
  - RFP with Asset Management Board **or** utilizing PowerOptions model (*up next*)
  - Developer owns, operates, and maintains array for 20-25 years
  - Host site receives electricity at discounted rate
- *Pros*
  - No upfront cost to host site
  - Fixed electricity rate for duration of agreement for kWh generated by system
  - Vendor responsible for site investigation and design, ongoing repair and maintenance
  - Accelerated contracting process
  - Developer can absorb incentives, including tax credits not available to public entities
- *Cons*
  - Potentially lower fiscal benefit over project lifetime
- *After 20-25 Years*
  - Extend the PPA
  - Host site may be able to purchase the system, potentially at nominal cost
  - Have developer remove the system



# PowerOptions PPA Model

- Public and non-profit entities are legislatively authorized to access PowerOptions power purchase agreements (PPAs) at their facilities without conducting their own competitive procurement process
  - Enabling statute: M.G.L. Chapter 164, Section 137
  - Several state PPAs completed to date through [PowerOptions solar program](#)
  - Solect Energy is currently PowerOptions' approved vendor for solar PPA projects

# Example Process Flow



# General Siting Guidelines: Rooftop

- Flat or sloped
- Less than 10 years old or due to be replaced soon
- Area greater than 10,000 square feet
- Minimal obstructions and shading
- Primarily north-facing
- Building is ~4 stories or less



# General Siting Guidelines: Canopies

- At least 20,000-50,000 square feet of parking lot area
  - 100+ parking spaces
- Area will be utilized as parking lot for 20+ years
- Minimal shading
- Sited away from any wetlands
- Building using at least 300,000 kWh of electricity located reasonably close by
- Preference for parking lots where some construction disturbance is acceptable
- Note: systems over 500kW will also require energy storage

