
Solar Energy for Publicly Owned Treatment Works

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Solar Energy for POTW

CENTRAL STATES – WATER ENVIRONMENT ASSOCIATION

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Overview

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Why POTW's

Finance and Funding Issues

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Introductions

Metropolitan Mayors Caucus and Elevate Energy

- Non-profit groups. MMC is a council of governments.
- Initiated partnership. Responsible for outreach and coordination.

Grow Solar

- An initiative of the Midwest Renewable Energy Association. Promotes solar in MN, IL and WI.
- Funded by the US Department of Energy.

Illinois Green Economy Network (IGEN)

- Grow Solar grant manager for activities in Illinois.

IAWA & CSWEA

- Project guidance, outreach and coordination.

The Power Bureau

- Grow Solar technical advisor responsible for site evaluations and solicitations.

Solar Background: Technology

Solar Photovoltaic (PV) Technology

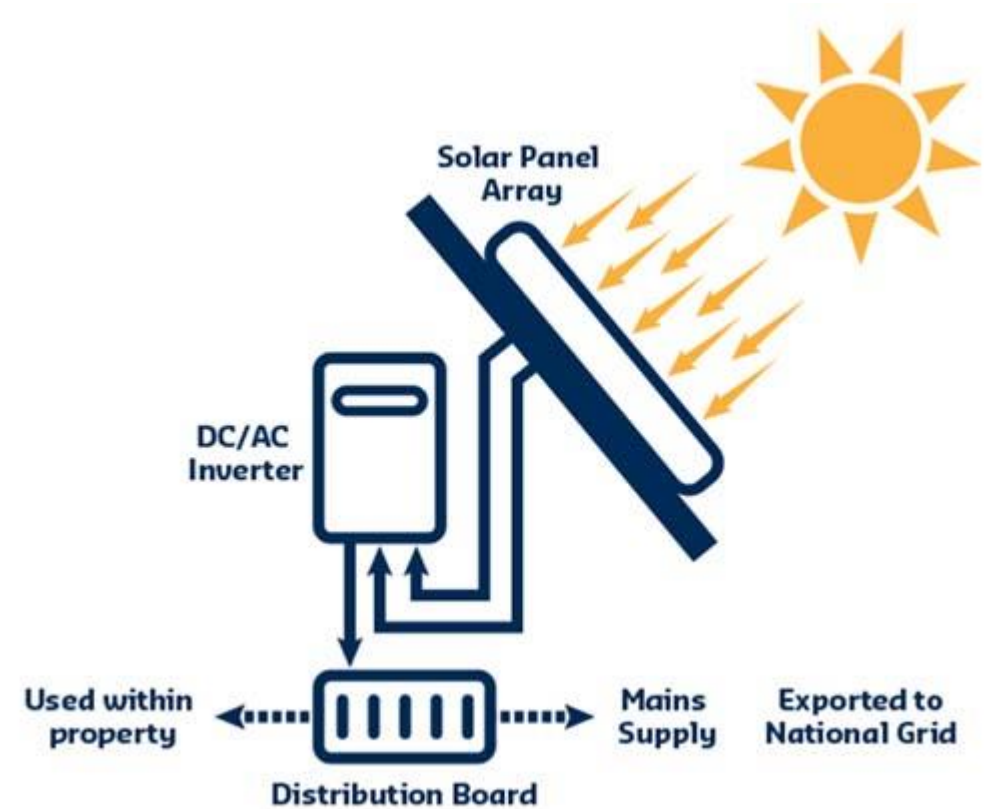
- Converts solar irradiance into electricity

Applications

- Single panels or multiple panels ('arrays')
- Roof-mounted or ground-mounted
- Distributed (on-site use) or grid connected (exported off-site)

Benefits

- Sustainable and non-emitting source of energy
- Long life-cycle for equipment (20+ years)
- Can offset all or a portion of traditional utility costs



Solar Background: Federal Policy

Investment Tax Credit (ITC)

- 30% tax credit for solar projects (commercial and residential)
- ITC Just extended through 2019, ramping down incrementally through 2021, and remaining at 10% starting in 2022

Accelerated Depreciation

- Commercial solar installations qualify to be depreciated on a 5-year property MACRS schedule
- With 50% Bonus Depreciation, owners may claim further depreciation in the first year
- Bonus Depreciation just extended through 2017, ramping down incrementally through 2019, 0% beyond 2020

NOTE: Tax credits available only to organizations paying taxes

Solar Background: IL Policy

Renewable Portfolio Standard (RPS)

- Sets a goal of 25% renewable energy by 2025
- Applies to areas in Illinois served by Commonwealth Edison, Ameren, and MidAmerican
- Goals must be met by electricity supply provider (either the utilities or a retail electricity supplier)
- Renewable Energy procurement facilitated by the Illinois Power Agency (IPA)

Solar Specific Items

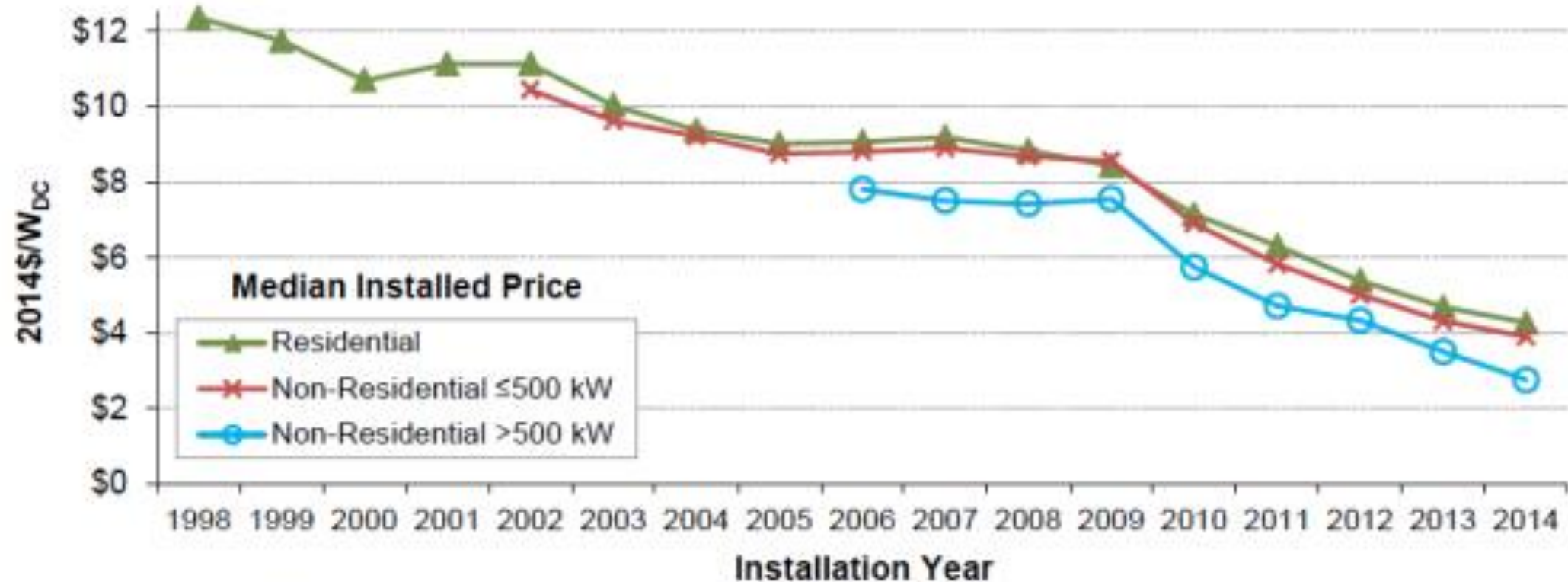
- Solar Carve Out: 6% of annual RPS goal
- Allows for net metering
- Compliance verified by the purchase of Solar Renewable Energy Credits (SRECs)

Solar Background: IL Policy

Supplemental PV Procurement

- Flaw in RPS and dynamics of municipal aggregation market caused backup of funding
- Renewable Energy Resources Fund (RERF) had \$150 million +
- Only \$30 million saved and set aside for “Supplemental Procurement” of SRECs generated by qualified PV systems on 5-year contracts
- The IPA is managing 3 procurement events – June & November 2015; March 31, 2016
- Future uncertain – legislation pending to fix the RPS and allow spending

Solar Background: Cost Trends



Note: Median installed prices are shown only if 20 or more observations are available for a given year and customer segment.

Solar Background: Finance

Typical sources finance for solar PV installations

Avoided Energy Costs

- Peak Period Energy Supply + Capacity

Tax Incentives

- Investment Tax Credit (30% of capital cost for installation) + Accelerated Depreciation (MACRS)

SREC Sales (1 SREC per 1,000 kWh of solar generation)

- \$20-150 per SREC

Grants

- Illinois Department of Commerce and Economic Opportunity
- Illinois Clean Energy Community Foundation (Not Currently Available)

Why POTWs

Large energy users

- Can support a range of potential solar project sizes and configurations
- Bears full cost of electricity

Net-Zero-Energy

- Focus on generating on-site power resources to support water treatment activities

Nimble and Capable Public Agencies

- Sustained focus on engineering and capital project planning
- Nimble decision-making authorities
- Suitable physical sites

Creditworthiness

- Make an attractive counterparty for solar developers

Key Considerations Regarding Solar PV Contracting Options

Key element	Own	Lease	PPA
Are there up-front costs?	Yes	No	No
Is there technology risk?	Yes	Yes	No
Can outside grants still be used	Yes	Yes	Yes
Can public sector monetize Investment Tax Credits?	No	Yes	Yes
Can public sector monetize MACRS Depreciation credits?	No	Yes	Yes
Is buyer responsible for Insurance?	Yes	Yes	No
Is buyer responsible for Operations and Maintenance?	Yes	Yes	No

Finance and Funding: Self-Finance

Host finances project on its own, but cannot capture tax incentives

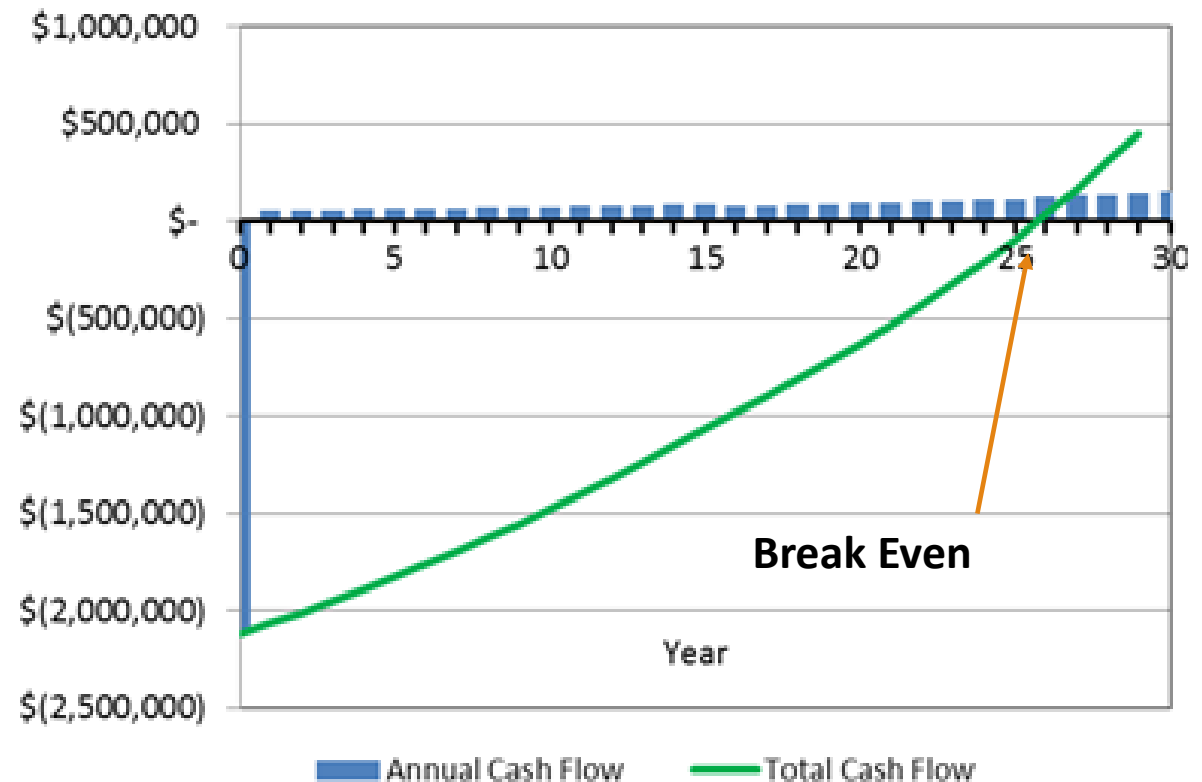
- Cash Reserves
- Operating Funds
- Grants

Advantages

- Low Cost of Capital
- Most transparent
- Only internal parties

Disadvantages

- Long term payback
- Cannot capture tax benefits



Cash Purchase without tax incentives (1MW, \$2M, \$0.09/kWh)

Finance and Funding: Third-Party Lease

Developer finances project capital with outside financial sources, and the host makes scheduled payments to the developer

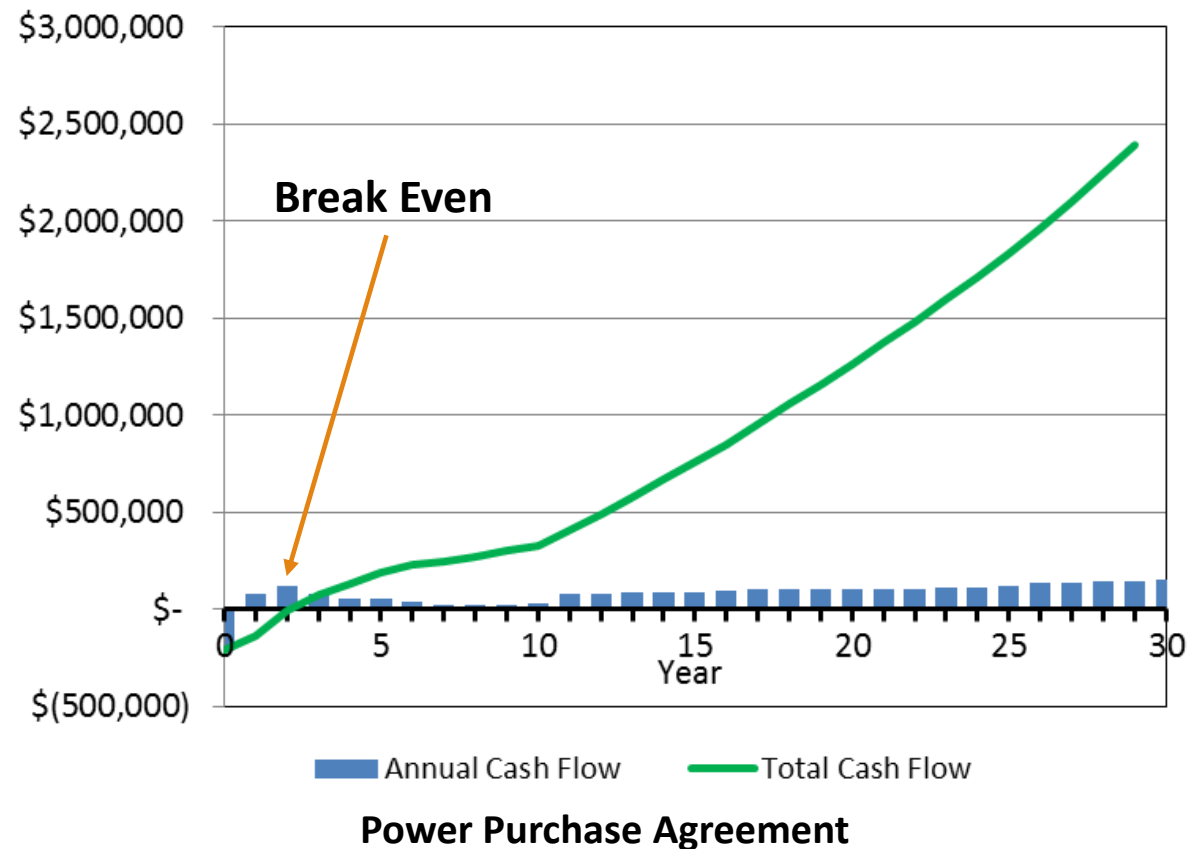
- Lease payments
- Power purchases

Advantages

- All tax incentives monetized, projects that were impossible without incentives now are viable

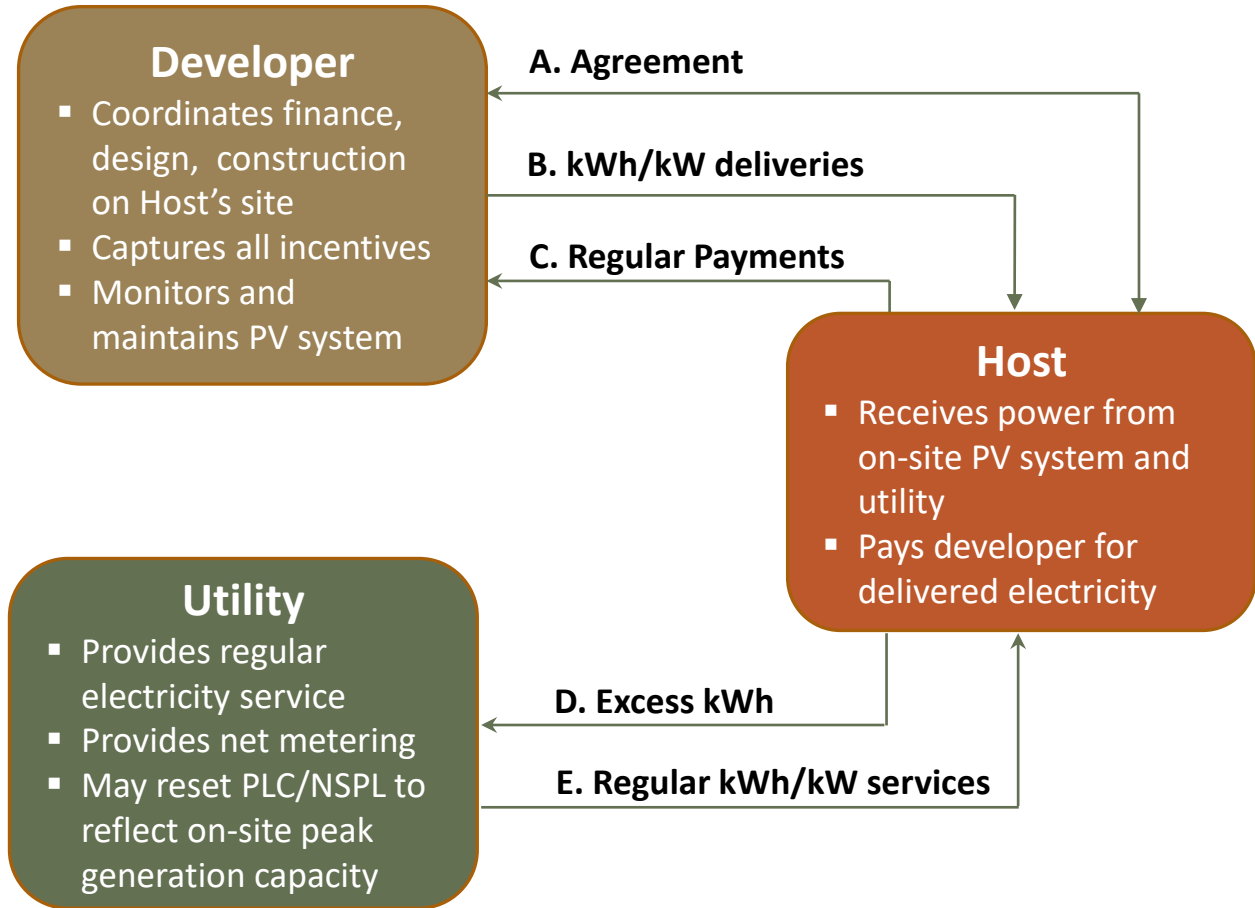
Disadvantages

- Higher cost of capital to host



Finance and Funding: Third-Party (PPA)

- A. Negotiated Agreement
 - Duration, prices, deliverables, etc.
- B. Energy Deliveries
 - As metered
- C. Regular Payments
 - Purchase the energy generated
 - Negotiated price and schedule
- D. Export Excess Energy to Grid
 - Through local utility
- E. Receive regular Utility Services
 - Continued relationship



Participating Agencies

Participating Agency	Type	Sites Analyzed	Received Bids	Favorable
DeKalb Sanitary District	POTW	Y	Y	Y
Downers Grove Sanitary District	POTW	Y	Y	Y
Glenbard Wastewater Authority	POTW	Y	Y	Y
Wheaton Sanitary District	POTW	Y	Y	Y
Greater Peoria Sanitary District	POTW	Y	Y	N
Will County	County	Y	Y	N
Lakes Region Sanitary District	POTW	Y	Y	N
Village of Schaumburg	Muni	Y	Y	TBD
Lake County	POTW	Y	N	--
City of Elmhurst	POTW	N	N	--
Fox River Water Reclamation District	POTW	N	N	--
City of Joliet	POTW	N	N	--
Rock River Water Reclamation District	POTW	N	N	--
City of Wood Dale Wastewater Operations	POTW	N	N	--

POTW Solar Project Approach

Objectives

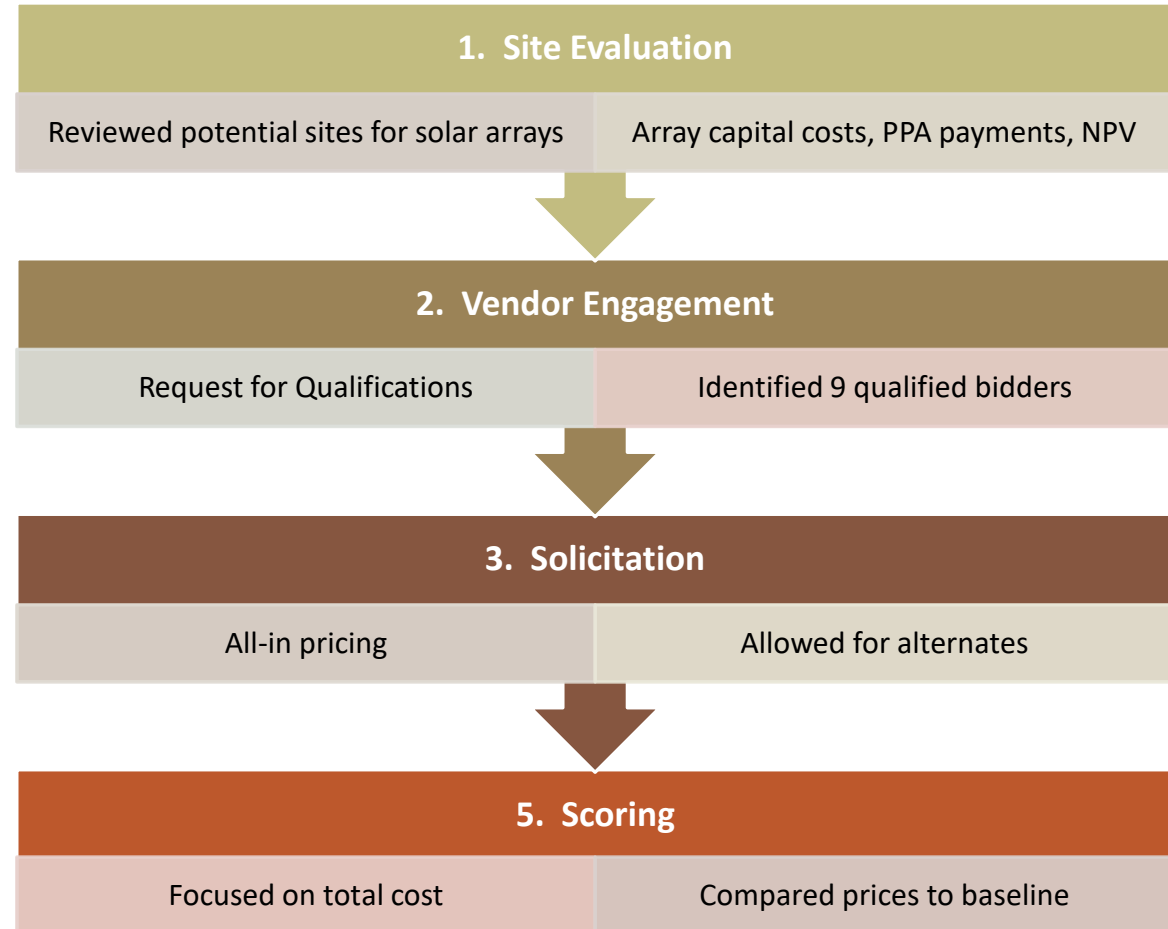
- Identify sites where solar could have high potential value
- Provide a pathway for soliciting offers from qualified solar developers

Benefits

- Provides a preview for project economics
- Allows POTW to eliminate low-value projects

General findings regarding solar value

- Higher value in ComEd region
- Power Purchase Agreements allowed for better economics than direct purchases



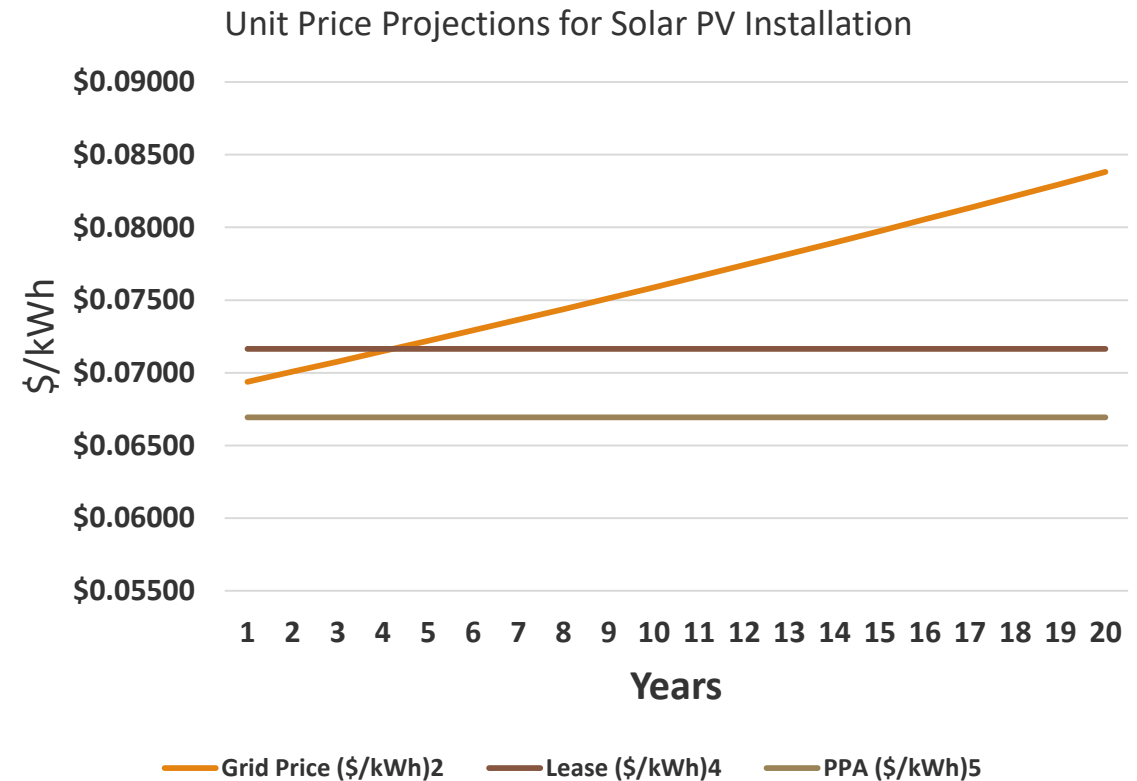
Case Study: DeKalb Sanitary District

Initial Project

- Identified 10 potential sites
- Ground- and roof-mounted systems

Economic Evaluations

- Using very conservative assumptions
 - 2 vacant sites eliminated
 - 6 remaining sites showed potential
 - 3 ground sites had the best potential (assuming a 1% per year increase in grid electricity supply)
- Current site electricity costs: \$0.069/kWh
 - Electricity supply (volume related elements only)
 - Distribution (volume-related elements only)
 - Taxes (volume-related elements only)



Case Study: DeKalb Sanitary District

Bid Results

- Lead bidder combined the three ground-mount locations into a single offer:
 - kW AC Capacity: 1,360.80
 - kWh AC Output Year 1: 1,805,509
 - kWh AC Output 20-Years: 34,394,955
 - Total Area Requirement: 208,200 sq. ft.
- Also included utilizing battery storage to improve system functionality

Economics (20 Year PPA)

- Fixed price without escalations
 - SRECs sold at \$100: \$0.049/kWh
 - SRECs sold at \$0: \$0.059/kWh



Discussion

Thank you for your time and consideration

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