IS THE SUN SETTING ON LOCAL GOVERNMENT SOLAR PROJECTS?

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SOLAR HAS BEEN AN ATTRACTIVE INVESTMENT

+ Electricity costs are significant
  • Water and wastewater utilities, can be the greatest single cost.
  • Often seen as unavoidable, escalating costs

+ Solar PV is a mature technology
  • Solar production is reliable and predictable
  • Construction and O&M costs are known or predictable
  • Multiple forms of financing are available
  • Mature contract documents
AND LOCAL GOVERNMENTS HAVE RESPONDED

+ Most agencies have reduced electrical costs
  • Energy efficient equipment and energy management
  • Rate audits (identify best utility rate)
  • Onsite generation such as solar, fuel cells and cogen
  • Energy storage

+ Options for interconnecting and financing
  • Net Energy Metering, RES-BCT, NEMA, battery and solar-friendly tariffs, FITs
  • Power purchase agreements (PPAs), leasing, GO and muni bonds
BUT THE LANDSCAPE IS CHANGING FOR SOLAR

- **Problematic**
  - Incentive reductions
  - Import tariffs
  - Utility rates changes

+ **Improving**
  - Installed cost is going down
  - State and federal renewable energy goals...

- **State and federal policies continue to change**
ISSUES SLOWING THE SOLAR MARKET FOR CA PUBLIC AGENCIES
INCENTIVE REDUCTIONS

- Federal tax incentives for solar are decreasing

- Local incentive programs are done

- Incentives built into utility rates are decreasing
The financial viability of “behind-the-meter” solar projects is dependent on utility tariffs

- TOU periods and rates were, until recently, thought to be predictable
- Afternoon peak load hours had been from 12 to 6 pm for at least four decades
Large scale installation of solar and wind energy generation has shifted the peak energy cost period to early evening when expensive fossil-fueled plants need to come online.
IMPORT TARIFFS IMPOSED IN 2018

<table>
<thead>
<tr>
<th>Safeguard Tariffs on Imported Solar Cells and Modules</th>
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<tbody>
<tr>
<td><strong>Tariff Increase</strong></td>
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<tr>
<td>Year 1</td>
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<td>30%</td>
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First 2.5 gigawatt of imported cells are excluded from the additional tariff.

<table>
<thead>
<tr>
<th>Steel and Aluminum Tariffs</th>
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<tbody>
<tr>
<td><strong>Steel</strong></td>
</tr>
<tr>
<td>25%, no sunset date</td>
</tr>
<tr>
<td><strong>Aluminum</strong></td>
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<tr>
<td>10%, no sunset date</td>
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South Korea, Argentina, Australia, Brazil exempted
ISSUES SUPPORTING THE SOLAR MARKET FOR CA PUBLIC AGENCIES
COMPONENT COST IS DECREASING

15-40% of System Price Declines Over Past Five Years Were Due to Module ASP Reduction

Source: GTM Research US PV Price Brief 2018
INSTALLED COST IS DECREASING
Requirements to meet state GHG and energy usage targets will require significantly increased solar PV deployment.

- **Executive Order B-18-12**
  - State owned buildings, new construction or major renovation must be ZNE
    - 50% after 2020; 100% after 2025
    - 20% GHG emissions by 2020 vs. 2010 baseline

- **ZNE required in Title 24 2019 CALGreen**
  - ZNE residential new construction 2020
  - ZNE commercial new construction 2030

- **SB 100**
  - RPS for IOUs = 44% by 2025, 52% by 2028, 60% by 2031.
  - 100% zero carbon electricity by 2046.

- **Executive Order B-55-18**
  - CA statewide carbon neutrality by 2046.
DEMAND MANDATE FOR RENEWABLE ENERGY

• State goal of zero net carbon by 2045
  • All natural gas thermal loads must be switched to renewables, which is most likely electricity
• Compliance for public buildings earlier than overall state goals
• Transportation electrification implies need for on-site generation during work hours
On-site storage is getting better and cheaper.

Adapts solar output to load and market conditions.

Helps address utility rate uncertainty.

Tipping Point
Battery costs are expected to drop below $100 per kilowatt-hour, making electric cars competitive on price by 2025.

Lithium-ion battery pack price

Note: Prices starting in 2017 are forecasts.
Source: Bloomberg New Energy Finance.
• NEM 3.0 planning starting at CPUC
• RES-BCT legislative revision/extension
• Community Solar legislation
• CCAs may offer rates/programs reflecting more renewables and local power
IS THE SUN SETTING ON SOLAR?

Not at all…

+ Energy costs are still significant and increasing
+ Solar PV installed costs are decreasing
+ California state mandates
+ Less risk in utility tariffs after recent restructuring
+ Energy storage costs are declining dramatically
  - Increase the value of solar generation
+ Solar *plus* storage will compete with the grid
+ Transportation electrification
HOW CAN YOU DECIDE IF SOLAR MAKES SENSE?

✓ State requirements for new construction and major renovations
✓ Low cost projects: larger portfolio, ground or roof mounted
✓ Consider other benefits: shade, environmental footprint, community leadership
✓ High local energy costs
✓ New utility tariffs that improve the economics of solar paired with energy storage
✓ Fleet electrification – offset increased energy demand with local generation and storage
The retail energy market in CA is highly dynamic

- Requires expertise to:
  - Understand existing and future tariffs/incentives
  - Insight into project cost trends and greatest efficiency
  - Financing mechanisms that reduce capex costs associated with new ZNE construction
  - Technical modeling tools to energy production, storage
  - Financial modeling to capture all costs and adequately represent lifecycle risks and returns

- Energy contracting expertise
- Solar and storage design, construction and commissioning expert oversight
- Operations and Maintenance contracting and ongoing operations phase oversight
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