
June 15, 2017
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Who We Are

www.cleanegroup.org

www.resilient-power.org
Resilient Power Project

• Increase public/private investment in clean, resilient power systems
• Engage city officials to develop resilient power policies/programs
• Protect low-income and vulnerable communities
• Focus on affordable housing and critical public facilities
• Advocate for state and federal supportive policies and programs
• Technical assistance for pre-development costs to help agencies/project developers get deals done
• See www.resilient-power.org for reports, newsletters, webinar recordings
Resilient Power Project

RESILIENT POWER PROJECT

To reduce impacts and dangers of power outages in communities now and in the future, the Resilient Power Project works to provide technology and policy solutions to address three challenges: Community Resiliency, Climate Adaptation, and Climate Mitigation.

The Resilient Power Project, a joint initiative of Clean Energy Group and Meridian Institute, is focused on accelerating market development of resilient, clean energy solutions for affordable housing and critical community facilities in low-income and disadvantaged communities. The Project is targeted to the deployment of solar PV combined with energy storage (solar+storage) – to power essential services during extended power outages and to reduce the economic burden of energy costs in vulnerable communities. The goal is to further clean energy equity by ensuring that all communities have access to the economic, health, and resiliency benefits that solar and energy storage technologies can provide.

Clean Energy Group’s role in this process is to inform, coordinate, and assist in the planning and implementation of resilient power projects in underserved communities, in both rural and urban areas, across the country. In addition to providing program guidance to policy makers and technical assistance to developers and community organizations, we also prepare reports and analysis on resilient power programs and projects, clean energy financing, and related topics.
Panelists

• Seth Mullendore, Project Director, Clean Energy Group

• Wayne Waite, Waite & Associates
Solar Risk:
How Energy Storage Can Preserve Solar Savings in California Affordable Housing

June 15, 2017
Seth Mullendore
Project Director
Clean Energy Group
Assessing Solar Risk

• 50-unit affordable housing property in San Diego
• Evaluate impact on solar bill savings due to changes in NEM policies and utility rates
• Explore ability of energy storage to offset anticipated losses to solar value
Proposed policy and rate changes could erode bill savings from solar by 56 percent for affordable housing property owners.

Affordable housing tenants could see a 29 percent reduction in solar savings.

Adding energy storage to solar can unlock additional bill savings, reversing solar losses.

By increasing savings, energy storage could improve project financing feasibility, boosting project cost coverage by as much as 60 percent.
Shifting Time-of-Use (TOU) peak pricing periods later in the day

2. Introducing Non-Bypassable Charges for exported solar energy

3. Increasing utility Demand Charges
Shifting TOU Periods

San Diego Gas & Electric

Current TOU solar production:
46% peak
54% semi-peak

Proposed TOU solar production:
23% peak
77% off-peak
The combined impact of shifting time-of-use pricing periods, non-bypassable charges, and proposed higher demand charges would reduce the annual bill savings delivered by a commercial solar system in San Diego by 56 percent. The annual savings shown in this chart represent a 52-kilowatt PV system producing 75,000 kilowatt-hours per year for an affordable housing property with an annual peak demand of 35 kilowatts billed under the San Diego Gas & Electric TOU-AL rate tariff.
Adding Energy Storage

Adding storage to solar can unlock additional value streams:

- Solar time-shifting
- Demand charge management
- Utility rate tariff switching
Storage Can Reverse Solar Losses

Storage Provides Property Owner with More Savings than Solar Alone, an Increase in Savings of $5,635 per year

<table>
<thead>
<tr>
<th>Current Annual Solar-Only Savings</th>
<th>Projected Annual Solar-Only Savings</th>
<th>Time Shifting $874</th>
<th>Reduced Demand Charges $4,761</th>
<th>Annual Savings with Storage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$7,581</td>
<td>$3,320</td>
<td></td>
<td></td>
<td>$8,955</td>
</tr>
</tbody>
</table>

Adding a 60-kilowatt/90-kilowatt-hour battery system to the 52-kilowatt PV system analyzed in Figure 3 can completely offset the loss in solar bill savings due to proposed rate changes (represented by the difference between current [green] and adjusted [grey] annual saving). The combination of reduced demand charges and shifting solar use from low-cost to high-cost electricity periods increases annual savings by more than $5,000, with over 85 percent of the savings coming from reductions to demand charges.
Rate Switching = 8x Solar-Only Savings

Switching Utility Rate Tariffs with Storage Can Provide Property Owner with Savings of $24,000 per Year over Solar Alone

Using the same 60-kilowatt/90-kilowatt-hour battery system analyzed in Figure 4 to hold the property’s peak demand below 20 kilowatts would allow the affordable housing owner to switch the property to a new rate structure without demand charges, San Diego Gas & Electric’s TOU-A tariff. This rate tariff has higher electricity use charges, which also increases the value of the solar system. The combined savings due to the elimination of demand charges, lower fixed charges, and increased solar value results in an annual bill savings of nearly $28,000—far more than could be achieved through solar alone.
For Tenants, Changes = 29% Loss

Proposed Changes Reduce Tenant Annual Savings from Solar by $138, a 29% Loss

- Current Annual Savings: $484
- Solar Value: -$68
- Non-Bypassable Charges: -$70
- Projected Annual Savings: $346

The combined impact of shifting time-of-use pricing periods and non-bypassable charges would reduce the value of a residential solar system in San Diego by 29 percent. The annual saving shown in this figure represent a two-bedroom rental unit served by a 2.5-kilowatt PV system producing 3,608 kilowatt-hours per year for an affordable housing tenant billed under the San Diego Gas & Electric CARE TOU rate tariff.
California Policy Implications?

Results raise questions regarding policies to incentive solar for affordable housing:

- How many affordable housing properties will be impacted? How many can storage help?
- What are the barriers to deploying storage with solar for affordable housing?
- Should solar programs include incentives for storage technologies?
National Policy Implications?

Figure 1. 2016 Action on Net Metering, Rate Design, & Solar Ownership Policies

Seth Mullendore
Project Director
Clean Energy Group
Email: seth@cleanegroup.org
Phone: (802) 223-2554
Project and Tenant Economics:

How do changing utility costs and energy savings affect project feasibility and tenant benefits?

Wayne Waite
Waite & Associates
Energy Foundation Grant
waynewaite@solarplusolutions.net
• Is solar PV a reliable hedge against changing utility policies/costs for property owners?

• Can solar PV systems generate net positive economic benefits for tenants?

• What strategies are needed to protect investment value?
Conversion to mandatory TOU rates may increase cost burdens for almost 30% of low-income tenants - (31.6%)
Average annual increase to demand change rates has outpaced increase to electricity use charges

Source: Sage Renewables (https://www.sagerenew.com)
COMMON AREA SYSTEM COVERAGE

Assumptions:
• 6.5% interest
• 20 year financing
• 1.2 DSCR
• No ITC

Implications:
• Potential out year financial risks
• Diminished value proposition and project feasibility
• Need for new revenue streams and strategies to avoid utility costs
TENANT SYSTEM COVERAGE

Assumptions:
- 6.5% interest
- 20 year financing
- 1.2 DSCR
- 80% tenant benefit

Implications:
- Steep financial gap to scale solar to tenant units & deliver benefits
- Need for added program resources to reach tenants
- Potential for higher tenant cost burdens without benefit protections

Cost Coverage for Tenant Unit PV System From Cash Flow

- 56.3% Stand Alone PV Under Current Tariffs
- 40.2% Stand Alone PV Under New Tariffs
- 17.4% Stand Alone PV After 80% Tenant Benefit

(Percent of Capital Costs)

- Non-Bypassable Charges
- Devaluation from TOU tariff changes

Tenant Benefit (80% of Solar Credits)
FACTORS AFFECTING TENANT BENEFITS

Modeled Tenant Benefits - PV System Offsetting 70% of Tenant Electricity

Reductions to Tenant Solar Value (PV System Offsets 70% of Tenant kWhs)

- Estimated Annual Value of Tenant Solar Credits
- New TOU Rates
- Non-Bypassable Charges
- Adjustments to Baseline Utility Allowance Levels
- Recapture of Tenant Solar Credits

TENANT ENERGY SAVINGS ARE IN JEOPARDY

$400.00

$120.00

$39.00

Level of Tenant Benefits (Dollars per Year)

$ - $100 $200 $300 $400

- Pre-Solar CARE Benefits Level
- New TOU Periods
- NBCs

Residual Benefits of Stand-Alone PV

CARE DL TOU
New TOU Periods
NBCs

Potential Rent Increase from Solar Installation

(utility Allowance Adjustments)

Residual Benefits of Stand-Alone PV

PV Project Providing 70% kWh Offset

ADJUSTMENT TO TENANT SOLAR VALUE
Modeled Tenant Benefits - PV System Offsetting 30% of Tenant Electricity

Recoverable Tenant Benefits

$172.00

New TOU Rates Changes (SDGE)

Non-Bypassable Charges

Adjustments to Baseline Utility

Allowance Levels

Pre-Solar CARE

Benefits Level $50.00

Recapture of Tenant Solar

Credits

($54.00)

NEGATIVE

TENANT BENEFITS

TENANT ENERGY

SAVINGS ARE IN

JEOPARDY

Level of Tenant Benefits (Dollars per Year)

Estimated Annual Value of

Tenant Solar Credits

Solar Value

CARE DR TOU

Value Adjustments from Utility

Tariff Changes

New TOU Periods

NBCs

Potential Rent Increase from Solar Installation

(Utility Allowance Adjustments)

Net Lost from Stand-Alone PV

PV Project Providing 30% kWh Offset

ADJUSTMENT TO TENANT SOLAR VALUE
STORAGE – Property Coverage Boost

**Implications:**
- Energy storage opens up multiple new revenue streams
- Properties that can opt into alternative tariffs without demand charges significantly increase cash flow and financing options
- Integrated energy investments can improve the effectiveness of the program and may reduce incentive requirements
STORAGE – Tenant Benefit Gains

Implications:

- Tenant benefits are not a significant investment driver for energy storage systems
- Tenant benefits from storage are ancillary to cost savings from property demand charges and other revenue streams
- Energy storage provides added safeguard for tenant benefits

**Enhancement to Tenant Unit Cost Coverage from Storage**

Investment adds measure to safeguard and supplement possible tenant benefits
Thank you for attending our webinar

Seth Mullendore
Project Director
Clean Energy Group
Seth@cleanegroup.org

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www.resilient-power.org
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