

RESILIENTPOWER

A project of **CleanEnergy**Group



Bringing the Benefits of Solar to Affordable Housing: The California Nonprofit Solar Stakeholders Coalition Plan

Part 2

Housekeeping



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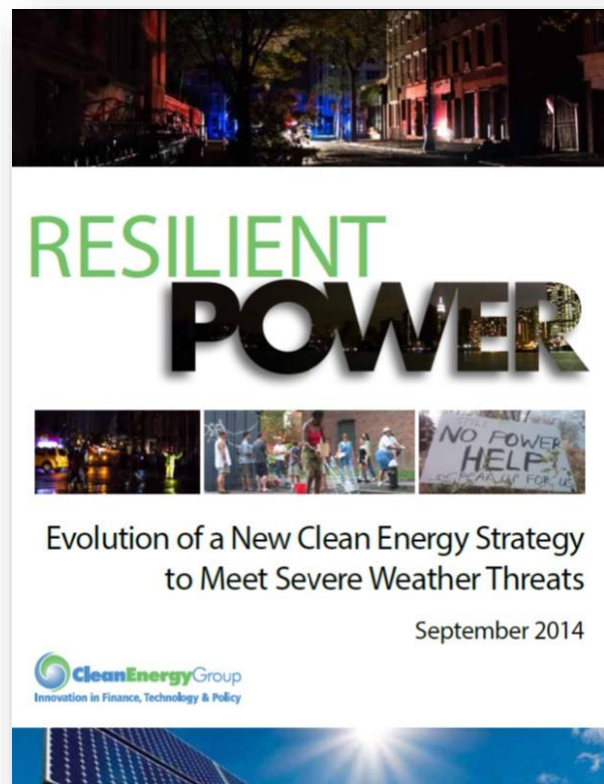
Submit your questions at any time by typing in the Question Box and hitting Send.

This webinar is being recorded.

You will find a recording of this webinar, as well as previous Resilient Power Project webinars, online at:

www.resilient-power.org

Who We Are



www.cleanegroup.org

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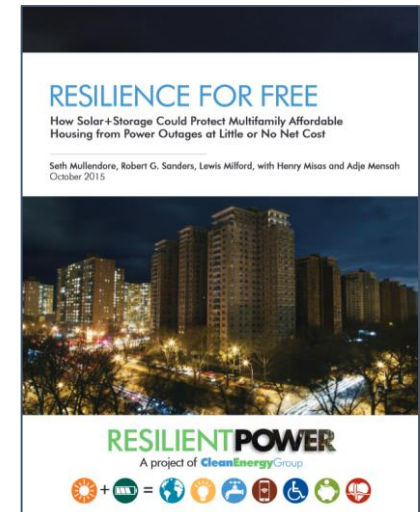
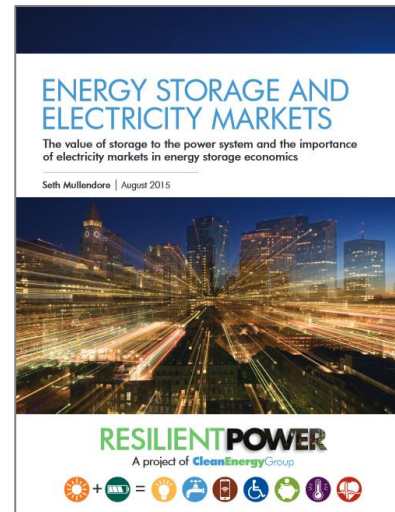
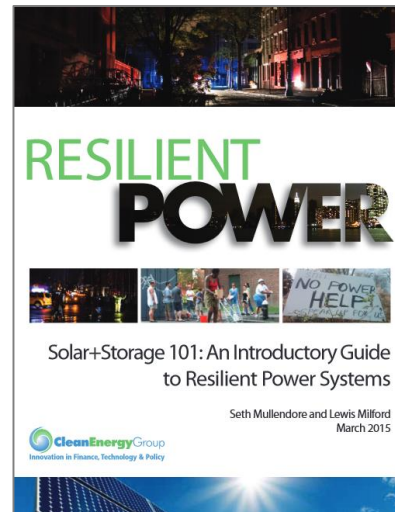
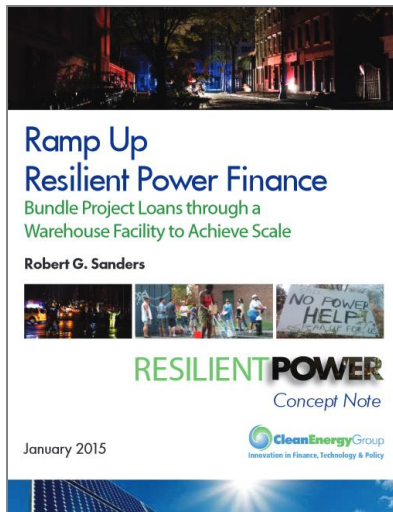


SURDNA FOUNDATION

Fostering sustainable communities in the United States

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

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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.

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Project Mailing List

CONTACT

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With the Resilient Power Project, Clean Energy Group and [Meridian Institute](#) are working to accelerate market development of clean energy technologies for resilient power applications that serve low-income communities and vulnerable populations during disasters and power disruptions, and to address climate adaptation and mitigation goals through expansion of reliable renewable energy deployment. 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 facing the country: Community Resiliency, Climate Adaptation, and Climate Mitigation.

Clean Energy Group's role in this process is to help inform, coordinate, and support federal, state, and local officials, policy makers and developers with the goal of deploying resilient power projects in communities across the country. In addition to providing program guidance to policy makers and limited technical assistance funding for project development, we also prepare reports and analysis on resilient power

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Today's Speakers

- **Maria Stamas**, Project Attorney – Energy and Climate, Natural Resources Defense Council
- **Seth Mullendore**, Project Director, Clean Energy Group
- **Wayne Waite**, Waite & Associates
- **Jim Grow**, Senior Staff Attorney, National Housing Law Project (Q&A only)
- **Kent Qian**, Staff Attorney, National Housing Law Project (Q&A only)



IMPLEMENTING AB 693

Proposal by Nonprofit
Solar Stakeholders
Coalition

ENERGY EFFICIENCY

REQUIREMENTS

- ❖ Program must have requirements equal to PUC §2852, including participation in federal, state or utility-funded energy efficiency programs or documentation of recent retrofit.
- ❖ Previous §2852 requirement limited to ESAP, but also included provision to use unspent funds for efficiency
 - *Program participants must enroll in ESAP program (not implemented)*
 - *Instead, alternative requirement for ASHRAE “Walk Through” Audit or program participation*
 - *Has resulted in limited energy efficiency improvements*

OTHER SUPPORTING RATIONALE

❖ Energy Efficiency First

- *Statutory Loading Order considerations: efficiency is more cost effective*
- *Investment in efficiency measures can reduce size of solar energy systems and enable solar funding to reach additional properties*

❖ SB 350 requires doubling of energy efficiency by 2030; SB 32 requires reducing greenhouse gas emissions 40% by 2030;

- *SB 350 doubling requirements can include those authorized in AB 758, including: broad range of energy assessments, benchmarking, cost effective energy improvements, public/private financing, outreach, education, workforce training.*

❖ Multifamily is underserved by existing utility programs

- *Affordable multifamily is underserved: less spending & treated homes*
- *Limited program integration: solar can be catalyst for energy efficiency investments*

ENERGY EFFICIENCY PROGRAM DESIGN

- ❖ Goal: 15% reduction in energy consumption based on ASHRAE level II or higher energy audit
 - ***Alternative compliance mechanisms, e.g. EUI benchmark***
 - ***3 year flexibility provision, will not delay solar installations***
 - ***11,250 additional homes could be powered w/ electricity annually***
- ❖ Affordable Housing Market Solutions:
 - ① **Need for upfront technical support and assistance**
 - ② **Whole building focus** (*common area and tenant units*)
 - ③ **One-stop program delivery** (*application to funding*)
 - ④ **Contractor selection**
- ❖ Phased Project Implementation
- ❖ Compliance (*based on implemented scope of work*)
- ❖ Energy Saving Verification (*linkage to AB 802 benchmarking*)

WHAT IS A ONE-STOP SHOP?



PROCESS: Key Steps

Intake and Data Collection

① Program Administrator (PA) intakes property information, utility data, and provides assistance to evaluate site conditions

Energy Audit/ Approve Work Scope

② ASHRAE Level II or higher audit conducted; Energy Improvement Plan approved by property owner and PA

Program Funding

③ PA facilitates resource leveraging with state and utility funded EE programs (*LIWP, EUC, MFEER, MIDI, and ESAP*)

Implementation

④ Property Owner contracts for efficiency measures; phased implementation to align with property investment opportunities

Benchmarking & Reporting

⑤ Compliance established by installation of measures; program EM&V supported in part by AB 802 compliance and reporting

FUNDING

- ❖ AB 693 Funding for Program Administration/ Technical Assistance
 - ***Support for technical support and assistance activities including energy audits***
- ❖ Existing energy efficiency programs
 - ***Large MF LIWP, Bay Area REN, So.Cal REN, MF-Energy Upgrade California, MF-Energy Efficiency Rebate, Energy Savings Assistance***
- ❖ Unspent AB 693 funding
 - ***Allocation of unspent funding to energy efficiency***
- ❖ New Funding
 - ***New program funding from California Climate Credit Cap & Trade, see Pub. Util. Code Section 748.5***
- ❖ Reallocation of ESAP
 - ***Reallocation of a portion of unspent ESAP budget to eligible MF properties participating in AB 693 program.***



Energy Storage in Multifamily Affordable Housing

Increasing Savings and Preserving the Value of Solar

September 29, 2016

Seth Mullendore
Project Manager
Clean Energy Group



PROPOSAL: ENERGY STORAGE

Energy Storage is eligible for program incentives as an integral component of a Solar Energy System

- Added value for property owners and tenants
- Insulate solar from changes to rate tariffs and net metering policies
- Include affordable housing in California's clean energy transition



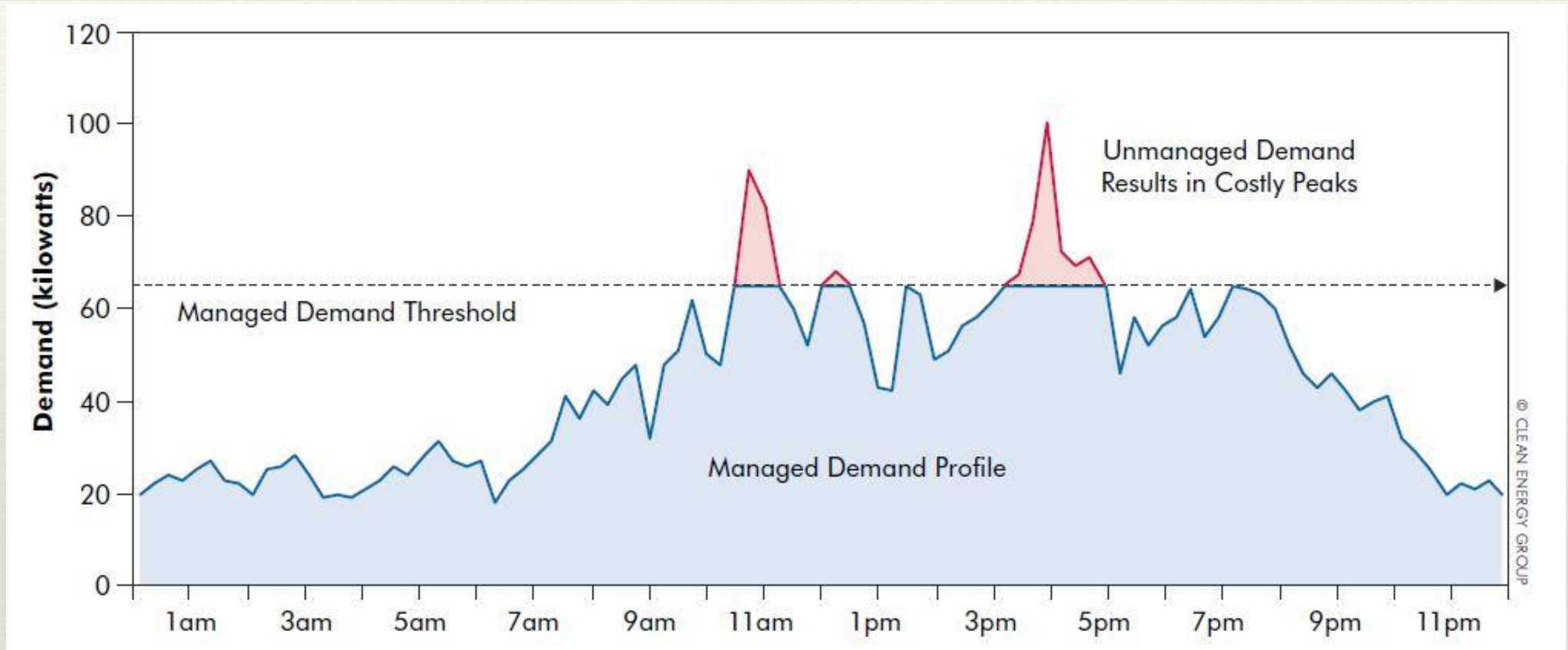
ADDED VALUE OF ENERGY STORAGE

Two primary value opportunities:

1. Reduced demand charges for common area loads
2. Shifting tenant grid electricity use to periods of lower electricity pricing under time-of-use rates



STORAGE DEMAND CHARGE SAVINGS



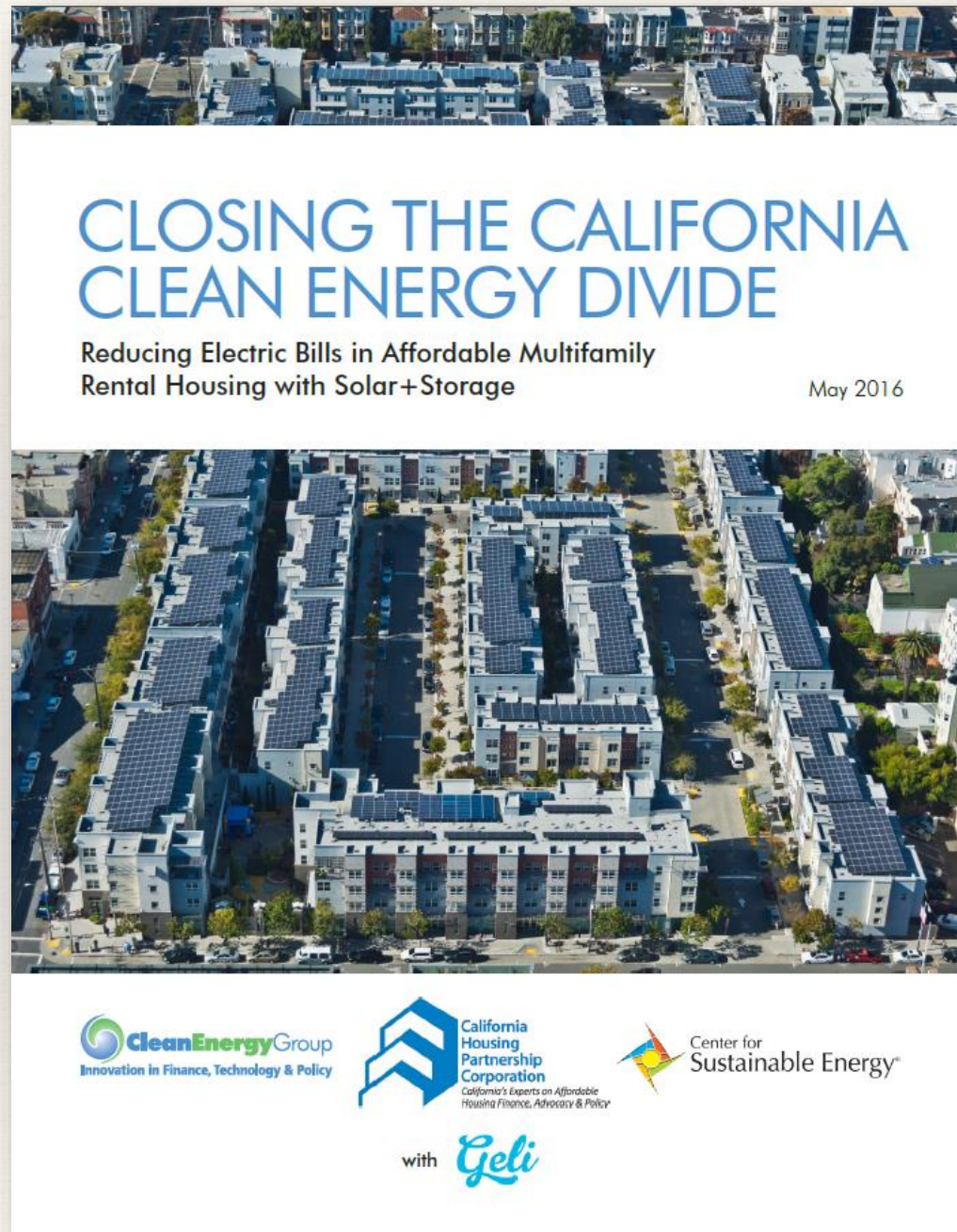
Peak reduced from 100 kW to 65kW = 35 kW reduction

@ \$10/kW = \$4,200 annual savings

@ \$20/kW = \$8,400 annual savings



SOLAR AND STORAGE ECONOMIC ANALYSIS



- ❖ 9 multifamily affordable housing properties
- ❖ Utility interval data
- ❖ Current utility rates: PG&E, SCE, SDG&E
- ❖ Real-world cost data



KEY FINDINGS

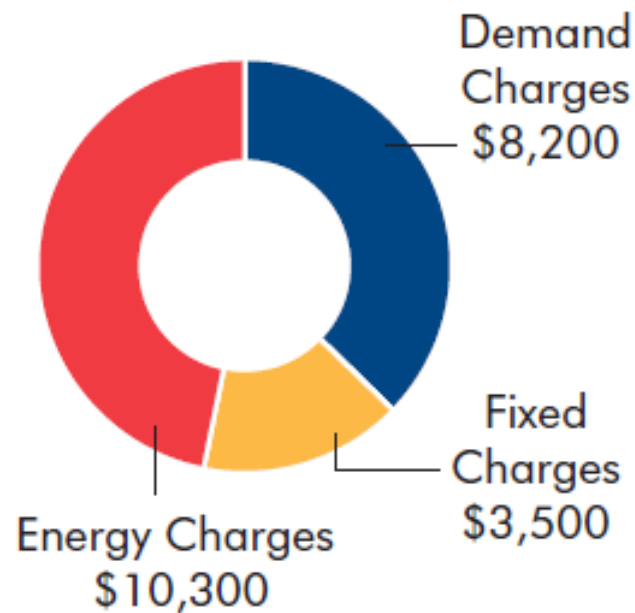
- Battery storage can almost double the building common area electricity bill savings achieved over the savings realized through solar alone.
- Battery storage can achieve incremental utility bill savings similar to solar for about a third of the cost of the solar system.
- Solar+storage projects can result in a significantly shorter payback period than stand-alone solar projects.



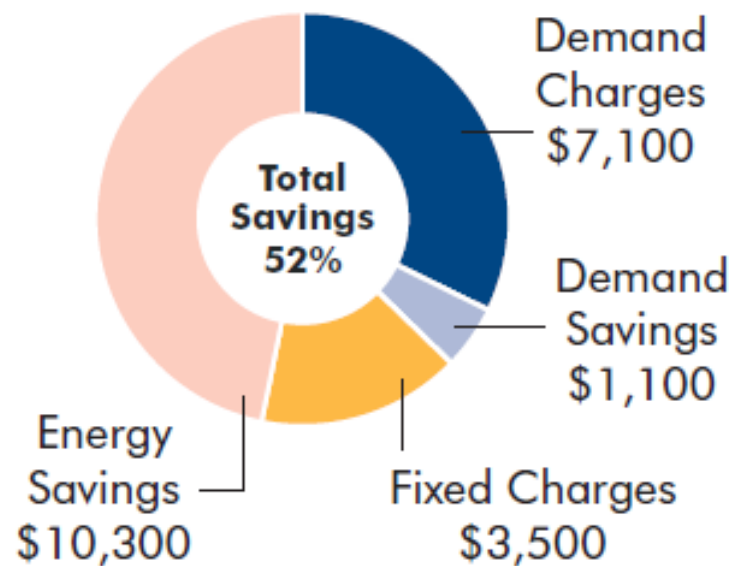
ANALYSIS RESULTS

Example of Impacts from the Addition of Solar and Solar+Storage on Electricity Bills

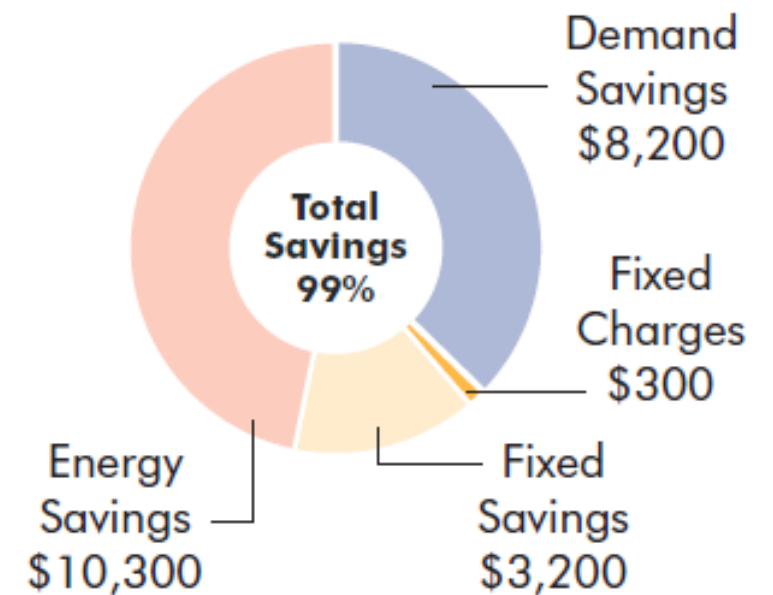
Original Electric Bill
\$22,000



Bill with Solar
\$10,700



Bill with Solar+Storage
\$300



SCE3 building original electric bill, electric bill and savings after deployment of solar, and electric bill and savings after deployment of solar+storage. Solar eliminates energy consumption expenses and lowers demand charges, saving \$11,400. The addition of battery storage eliminates demand charge expenses and lowers fixed charges, saving an additional \$10,300 per year.

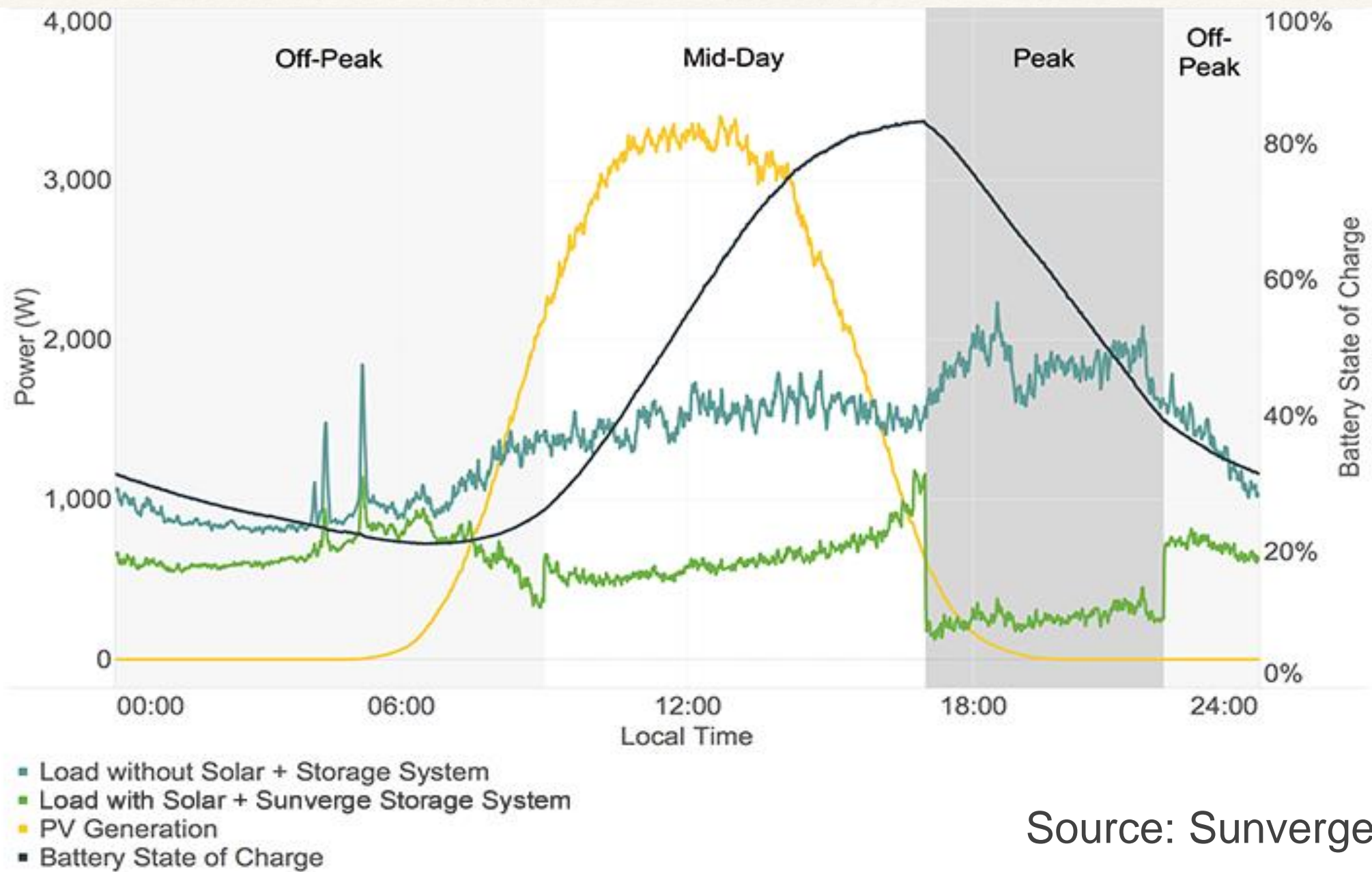


TENANT BENEFITS – Demand Savings

- Greater share of solar generation being allocated to offset tenant electricity usage
- Enable more participation by properties with limited suitable space for solar panels
- Shared savings model where tenants are allocated a portion of demand charge savings
- Apply some of expected savings to cover additional cost of making a building more power resilient during electricity outages

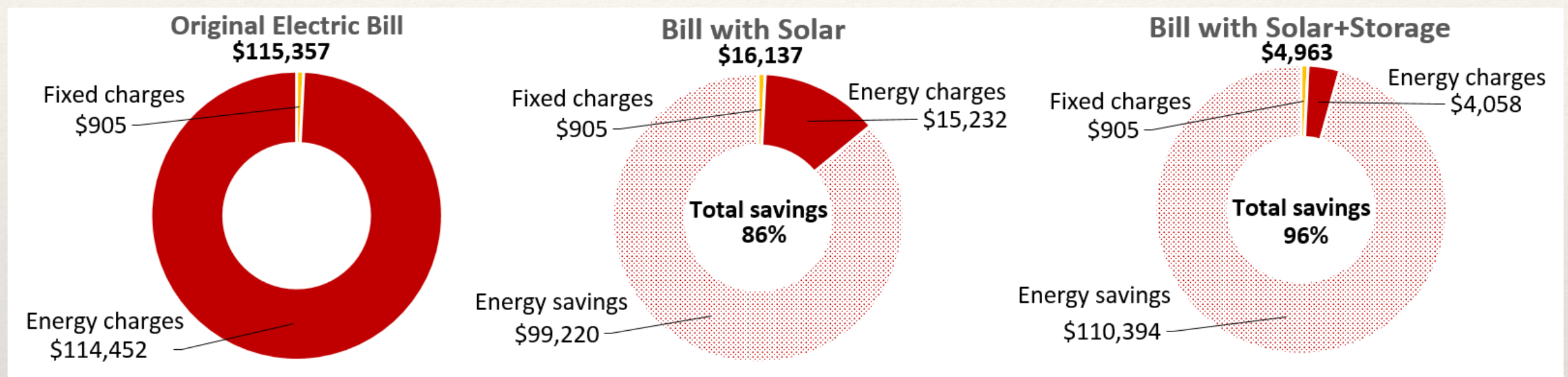


STORAGE TIME OF USE SHIFTING



TOU ANALYSIS RESULTS

Direct tenant benefit through lower electricity bill



SCE Residential TOU tariff:

- Summer peak = **\$0.48 / kWh**
- Summer off-peak = **\$0.12 / kWh**

PROPOSED ENERGY STORAGE INCENTIVE STRUCTURE

- Based on CA's Self-Generation Incentive Program
- Storage system > 10 kW = \$0.50 /Wh
- Storage system ≤ 10 kW = \$0.60 /Wh

Even if 100% of properties install storage, 300 MW solar deployment goal can still be achieved.



TENANT BENEFIT and INCENTIVE STRUCTURE

REQUIREMENTS – Tenant Benefit

ALLOCATION

- ❖ Electricity generated from installed solar energy systems must primarily offset electricity usage by low-income tenants.

BENEFIT

- ❖ Low-income tenants shall receive credits through tariffs that allow for the allocation of credits on utility bills.

CONTINUED ECONOMIC BENEFIT

- ❖ CPUC shall ensure that tariff structures ***continue to provide*** a direct economic benefit to participating low-income tenants.

TENANT BENEFIT PROPOSAL

ALLOCATION

- ❖ At least 51% of generation must go to tenants
- ❖ Optimum tenant allocation level: 70-80%
- ❖ Tenant allocations above 80% could affect financial feasibility

TENANT BENEFITS

- ❖ Virtual Net Metering needed to allocate tenant credits
- ❖ Concerns that new utility tariff might affect tenant utility costs and benefit levels
- ❖ 100% of the benefits from allocations to tenant units should be retained by tenants
- ❖ No Utility Allowance adjustments to capture tenant benefits

REQUIREMENTS – Incentive Structure

INCENTIVES MUST BE ALIGNED WITH COSTS AND OTHER RESOURCES

- ❖ **SOLAR COSTS:** Incentive levels for photovoltaic installations must be aligned with the installation costs for solar energy systems.
- ❖ **LEVERAGED RESOURCES:** Incentives levels must take account of federal investment tax credits and contributions from other sources.
- ❖ **LIMIT ON FUNDING:** No solar energy installation should receive an incentive greater than 100% of the total system's cost.

SOLAR COSTS

BACKGROUND

- ❖ MASH cost data is not a reliable baseline.
 - ❖ **MASH program evaluation identified weaknesses**
 - ❖ **Value-based pricing distorts PV costs**
 - ❖ **Program costs are inconsistent with NREL's evaluation of PV costs and do not account for economies of scale**

PROPOSAL

- ① Need for greater transparency
- ② Set cost baseline based on independent index
- ③ Methodology for factoring in cost reductions from leveraged resources and property contributions

COST ASSESSMENT

Cost Category	Description	Price/DC Watt (Roof PV)
(1) EQUIPMENT	Solar modules, inverters, racking, balance of materials, meters, wiring, conduit, load centers, combiner boxes, and carport installations/retrofits (if needed)	\$1.35
(2) INSTALLATION	Direct and indirect labor costs for installation of solar energy system	\$0.33
(3) PROJECT SITE PLANNING	PROJECT SITE PLANNING: Site design and engineering, permitting, and utility interconnection	\$0.37
(4) PROJECT DEVELOPMENT	Customer acquisition, project analysis and assessments, project financial underwriting, and contractor negotiation	\$0.12
SUBTOTAL:		\$2.17
(5) OVERHEAD	General and administrative (G&A) expenses—including fixed overhead expenses covering payroll, facilities, administrative, finance, legal, information technology, and other corporate functions adjusted based on state "cost of doing business" index	\$0.34
(6) PROJECT DEVELOPER FEES & PROFIT	PROJECT MANAGEMENT: Administration, overhead and development fees (20%)	\$0.43
TOTAL:		\$2.94

Coalition Estimate

- ❖ Based on integration of NREL residential and commercial PV costs.

Other Factors

- ① Economies of Scale
- ② Added Prevailing Wage
- ③ Carports
- ④ High rise
- ⑤ Taxes

LEVERAGED RESOURCES

- ❖ **Issues affecting calculation of cost offsets from ITC and LIHTC contributions.**
 1. ITC basis is reduced by amount of incentives.
 2. LIHTC basis is reduced by 50% of the claimed ITC.
 3. ITC benefit is reduced by % of nonprofit ownership interest.
(Note: The % of nonprofit ownership interest may negate the value of the ITC altogether, especially in 4% LIHTC transactions.)
 4. Must use correct tax credit percentage to determine LIHTC benefit. *(Note: A 4% LIHTC funded project does not cover 40% of the solar costs.)*
 5. LIHTC financing is paid out over 10-years so the value of LIHTC contributions should be discounted.

INCENTIVE FORMULATIONS

Tenant Units

PV Costs *minus* Leveraged Sources

- ❖ **Proposal for Determining PV Installation Costs:**
 - Use independent 3rd party cost data, such as NREL/LBNL solar cost.
- ❖ **Proposal for Leveraged Sources:**
 - Model typical financing scenarios for ITC and LIHTC with appropriate basis adjustments and discounting.
 - Require true up based on actual contributions.

Common Areas

PV Costs *minus* [Leveraged Sources + Property Contributions]

- ❖ **Proposal for Determining Property Contributions:**
 - Project Contribution: Maximum cost coverage is based on net cash flow (*under financing terms available*).
 - Project Cash Flow = *NET energy savings* available for debt service coverage less annual property costs obligations for project financings, O&M, and other costs associated with the solar energy system.

PROPERTY CONTRIBUTION CALCULATION

① Available Energy Savings

*Common Area annual kWh generation
x Applicable Utility Tariff*

Debt Service Coverage Ratio: 1.2

Subtract ongoing project costs from energy savings to calculate net cash flow:

② Project Cash Flow

- ❖ *Annual Operations and Maintenance for solar energy system serving tenants and common areas*
- ❖ *Reserves for scheduled equipment replacement*
- ❖ *Other costs (e.g. Insurance, ...)*

③ Property Contribution

Debt Supported by Estimated Cash Flow @
Available Financing Term [7.5% interest/20 years]
plus any applicable transaction costs or fees

ALIGNMENT of INCENTIVES

Common Area Cost Coverage	Estimated Incentive (\$/Watt)	% Cost Coverage From Available Debt Service	20 Year BREAK-EVEN POINT <i>(Required NEM \$/kWh)</i>	10 Year PAYBACK POINT <i>(Required NEM \$/kWh)</i>
25%	\$0.80	61.6%	\$0.245	\$0.31
30%	\$0.96	65.2%	\$0.23	\$0.294
40%	\$1.28	73.8%	\$0.203	\$0.262
50%	\$1.60	85.0%	\$0.176	\$0.229
60%	\$1.92	100.3%	\$0.15	\$0.196

Assumptions:

- Project costs: \$3.20/watt.
- Project financing: 7.5%/ 20 years
- O&M: \$0.015/kWh plus inverter replacement reserve
- Avg. Cost Recovery under current tariffs: \$0.15/kWh
- Underwriting debt coverage ratio: 1.2
- Property benefit based on utility cost inflation (no modeled Rate of Return)

INCENTIVE STRUCTURE

PROPOSAL

- ❖ Objective: Level playing field that aligns incentives with PV installations costs paid for by the property.
- ❖ Outcome: Balances costs paid by the property with available energy savings.

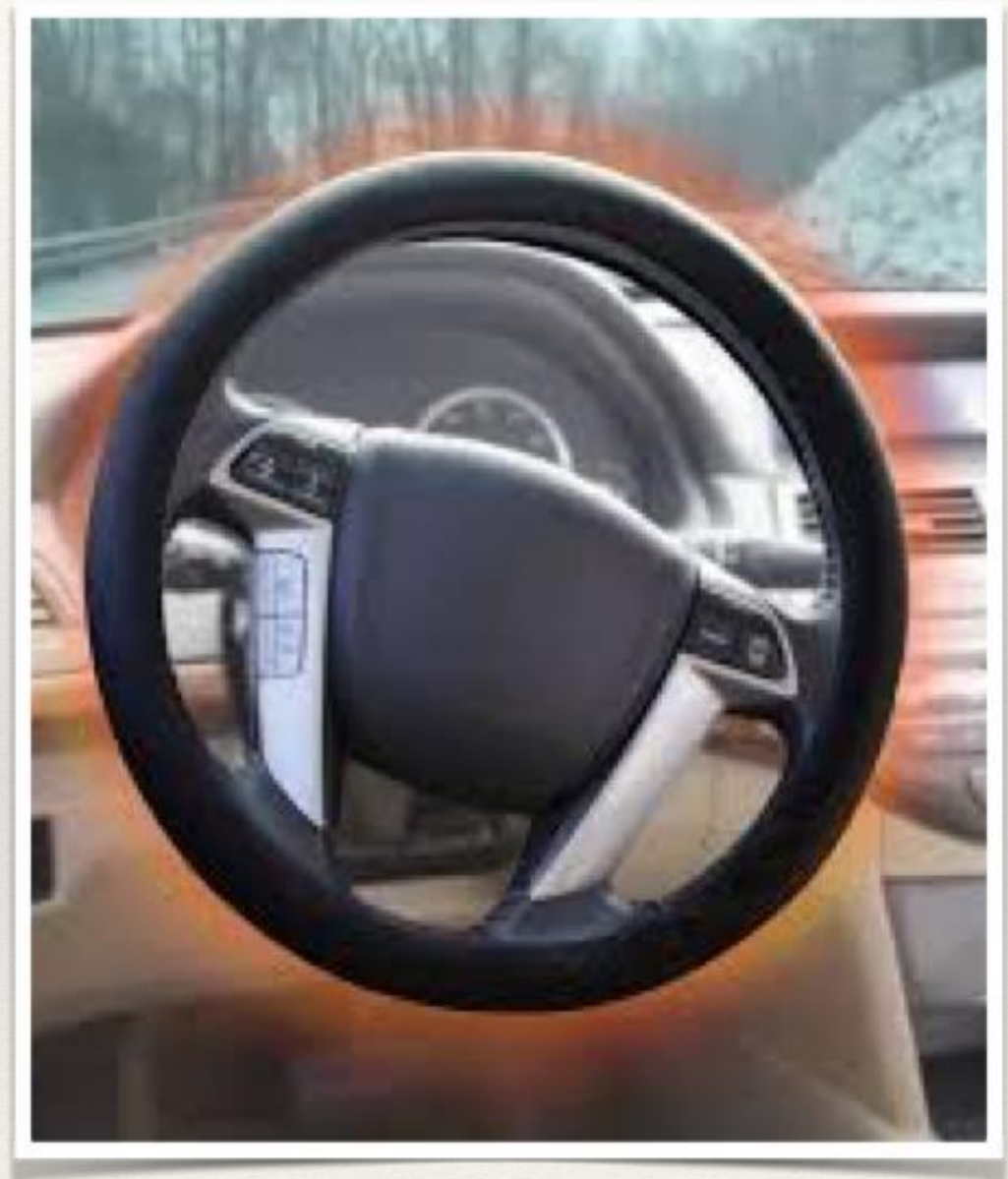
	MF Properties without ITC or LIHTC	MF Properties with ITC and without LIHTC	MF Properties without ITC and with LIHTC	MF Properties with ITC and LIHTC
Resident Unit Cost Coverage	100%	70%	70%	50%
Common Area Cost Coverage	60%	50%	40%	30%

INCENIVE STEERING RISKS

RISK: If incentives for common area installations are set too low (*i.e. not aligned with net cash flow and the amount of underwriteable savings*) the incentive structure may steers property owners into Third Party Ownership financing mechanisms.

CONCERNS:

- ❖ **Misalignment of TPO pricing with the level of incentives and installation costs**
- ❖ **Added cost to property owner compared to incentive options aligned with costs**
- ❖ **Reduced benefits to affordable housing**



FINANCING RISKS

❖ ESCALATORS

- Used to “retain” investor value.
- Adds costs on top of project development, profit, and operations and maintenance.
- Constitutes an unregulated utility cost increase.

Escalator Rate	1.5%	2%	3%	4%
Utility Cost Increase During Typical Agreement Period	32.70%	45.68%	75.35%	110.68%
Added Payments Made by Property Over Installation and Transaction Costs	15.6%	21.5%	34.5%	48.9%

❖ DISCLOSURES

- TPOs are not regulated. Need financial disclosures to evaluate financial outcomes and safeguard property financial stability.

Thank you for attending our webinar

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