RESILIENT POWER

A project of CleanEnergyGroup

Replacing Power Plants with Low-Income Residential Solar+Storage

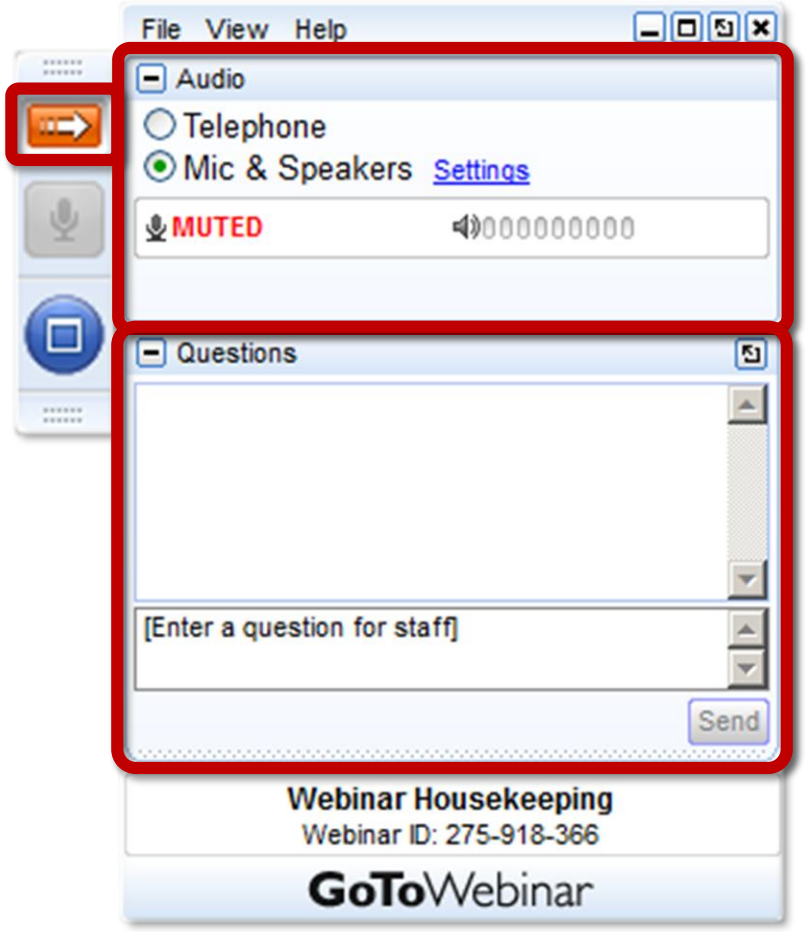
October 10, 2019

Hosted by Seth Mullendore, Clean Energy Group

CleanEnergyGroup

Innovation in Finance, Technology & Policy

HOUSEKEEPING



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This webinar is being recorded. We will send an email, within 48 hours, with a link to the webinar recording and presentation slides. CEG’s webinars are archived at www.cleanegroup.org/webinars


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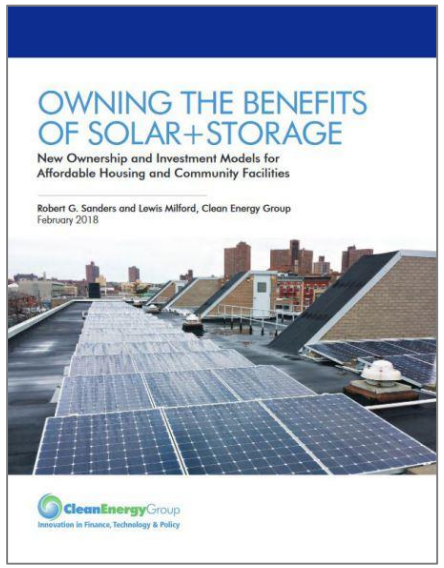
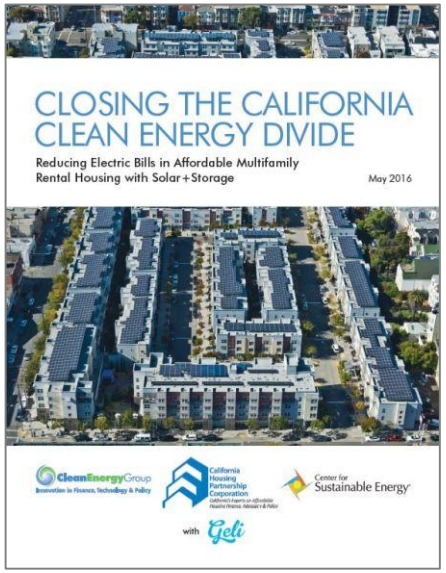
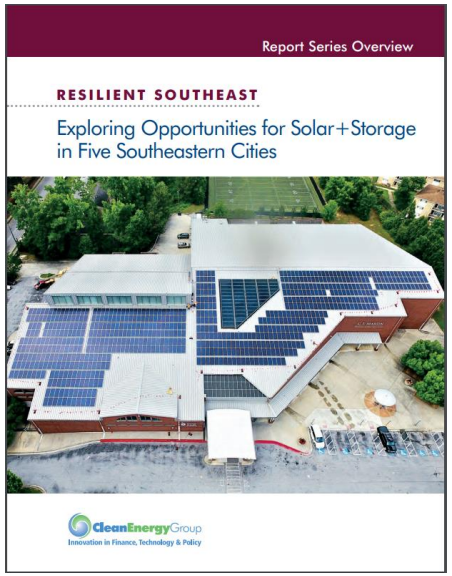
THE RESILIENT POWER PROJECT

- Increase public/private investment in clean, resilient power systems (solar+battery storage)
- Protect low-income and vulnerable communities, with a focus on affordable housing and critical public facilities
- Engage city, state and federal policy makers to develop supportive policies and programs
- Visit www.resilient-power.org for more information and resources







SUPPORTING 150+ PROJECTS ACROSS THE COUNTRY

Boulder: Nonprofit transportation center serving elderly and disabled residents

Boston: Multiple housing properties representing 1,000+ units of senior and affordable housing

DC: First solar+storage resilience center at affordable housing in DC

Puerto Rico: Supporting the installation of solar+storage at multiple community medical clinics

New Mexico: Added resilience for remote wildfire operations command center

Replacing Power Plants with Low-Income Residential Solar+Storage

Webinar Panelists

JP Ross
Senior Director of Local Development, Electrification and Innovation, East Bay Community Energy

Michael Norbeck
Senior Manager, Grid Services, Sunrun, Inc.

Seth Mullendore
Vice President & Project Director, Clean Energy Group

Thank you for attending our webinar

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Find us online:

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Upcoming Webinars

Innovation in Finance, Technology & Policy

QuEST: Optimizing Energy Storage Tool

November 6, 2019
2:00 PM - 3:00 PM ET

This webinar will provide an introduction to QuEST, an open-source software application suite for energy storage valuation. QuEST was developed by Sandia National Laboratories as a free, public tool to assist in energy storage valuation for various use cases.

Register at: https://register.gotowebinar.com/register/1957434564736847372

Read more and register at www.cleanegroup.org/webinars

East Bay Community Energy – CEG Webinar
Replacing Power Plants with Solar

PRESENTED BY: JP ROSS
Senior Director of Local Development, Electrification and Innovation

OCTOBER 10, 2019

WHAT IS EBCE?

- East Bay Community Energy (EBCE) is the Community Choice Aggregator (CCA for Alameda County)
- Electric utility serving 560k meters/1.3M residents in Alameda County
- Annual load of 6TWh and $450M/yr revenue
- Board oversight by elected officials
- EBCE reinvests earnings back into the community to create local green energy jobs, local energy programs, and clean power projects

EBCE Electricity Products

Bright Choice

Brilliant 100

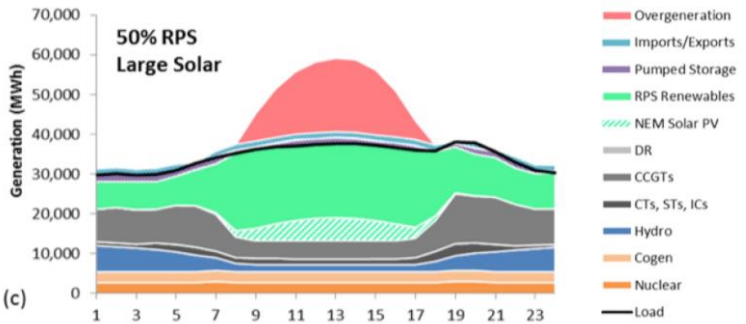
Renewable 100

CALIFORNIA CLEAN ENERGY FUTURE

California's Policy for renewable energy and electrification

- SB100 - 100% renewable energy by 2045
- Solar is the most cost effective resource - both behind the meter and utility scale
- 5 million electric cars by 2030 with $2.5B invested in charging
- 40-270GW of solar and 30-90GW of storage will be needed to meet increased load depending on level of integration solutions

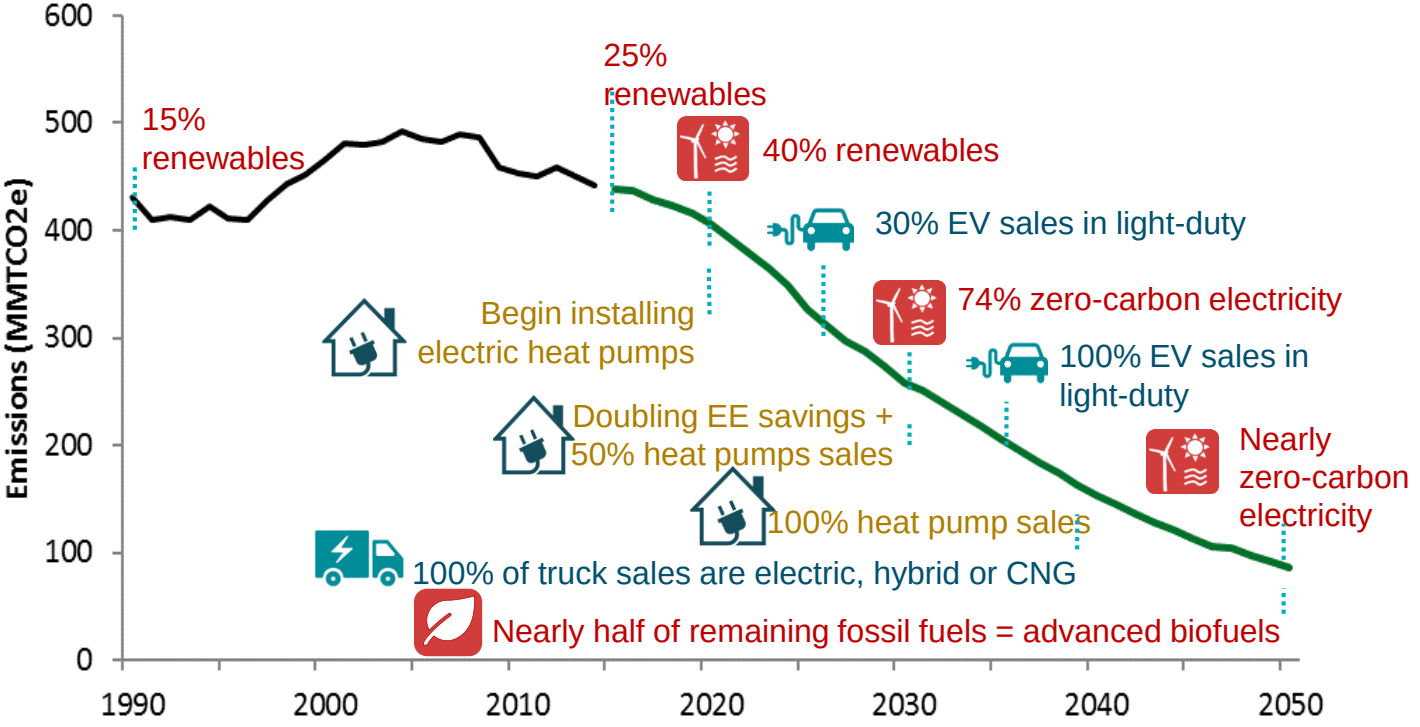
Storage is key to integrating solar resources



E3's "Investigating a Higher RPS in CA" (2014)

DECARBONIZING IS A LONG ROAD

(80% reduction below 1990 by 2050)



Source: E3 report on "Deep Decarbonization in a High Renewables Future" June 2018, CEC-500-2018-012

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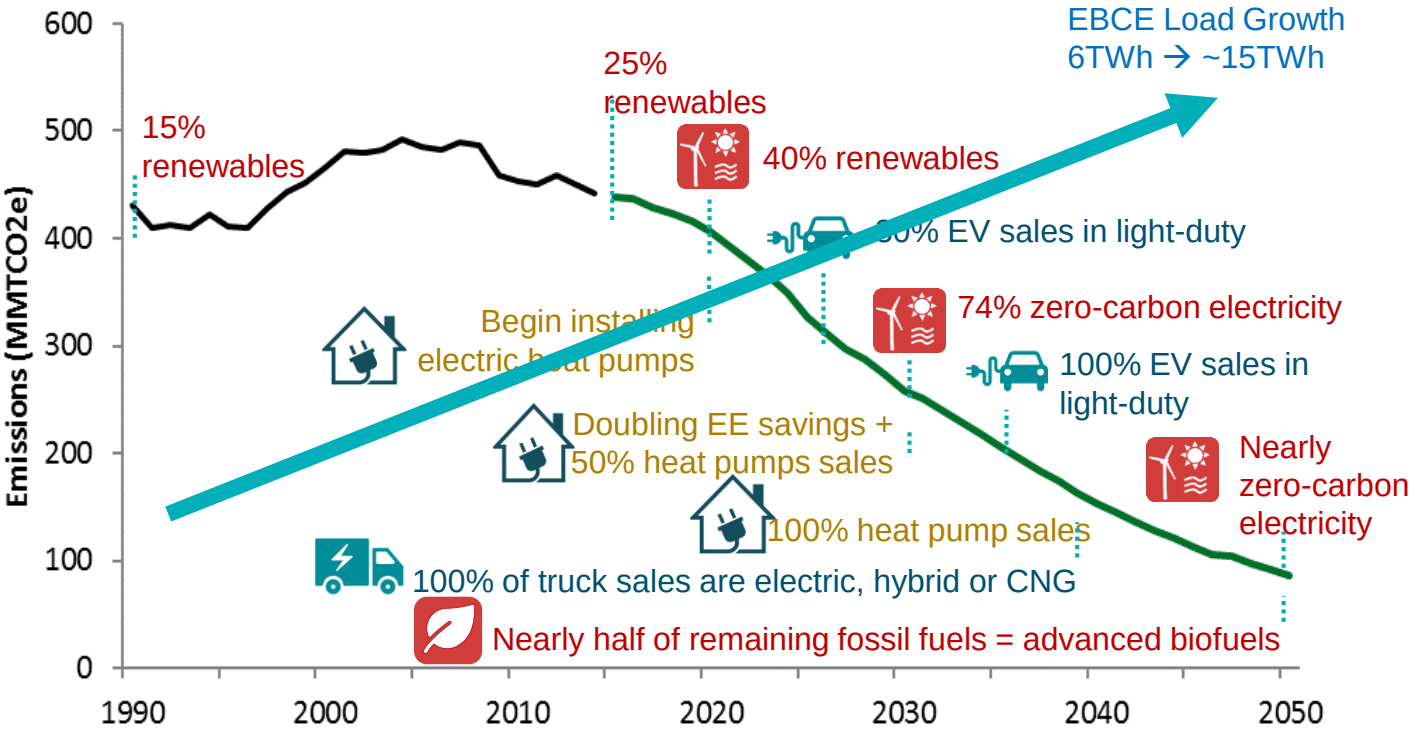

Source: E3 report on "Deep Decarbonization in a High Renewables Future" June 2018, CEC-500-2018-012

RESOURCE ADEQUACY ON THE DECLINE

- Retirements tightening Resource Adequacy
- Import capacity is also constrained as coal retirements and increased renewable standards will limit exports from WECC states

Expected Resource Retirements by 2030	GW Retiring
Nuclear (Diablo Canyon)	2.3 GW
Once through Cooling (OTC)	3.6 GW
Combined Heat and Power (CHP)	~2 GW
Out of State Imports	4.5 GW
Total Retirements/At Risk Imports	12.4 GW

NEW MODELS KEY TO A CLEAN GRID

- EBCE has contracted for 550 MW of new solar and wind with 137MW of storage
- Average price of new solar is $22/MWh
- EBCE has over 250MW of existing solar and 15MW of storage in service territory
- New stationary storage and battery electric vehicles must play a role in addressing emerging RA constraints
  - Existing behind the meter storage is 4MW with 13MW in progress
  - By 2025 Electric vehicles will have >10x EBCE peak load in battery capacity
- PG&E PSPS events will increase appetite for behind the meter storage
- The SunRun OCEI project is a key to unlocking vast potential

THANK YOU

JP Ross

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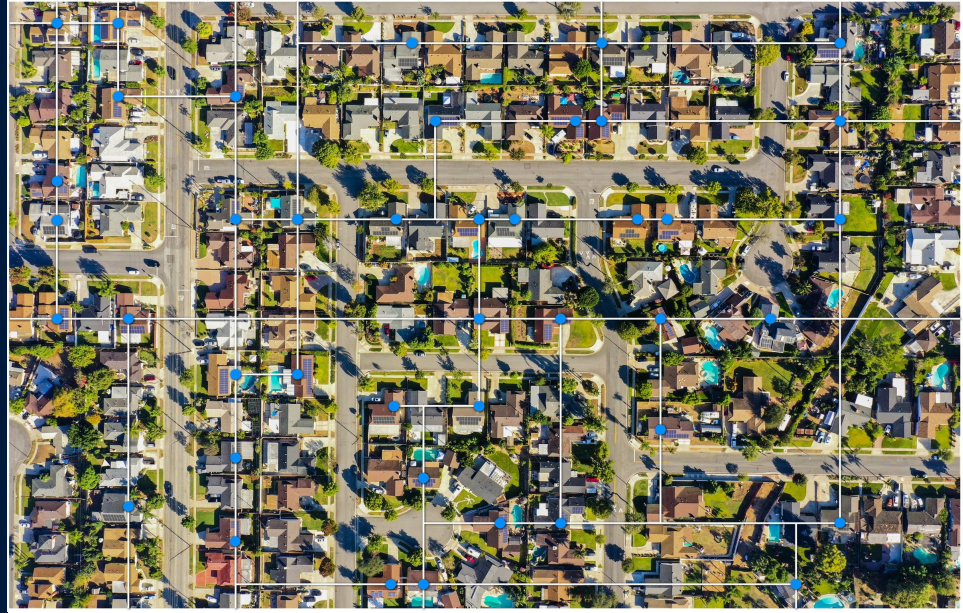
sunrun



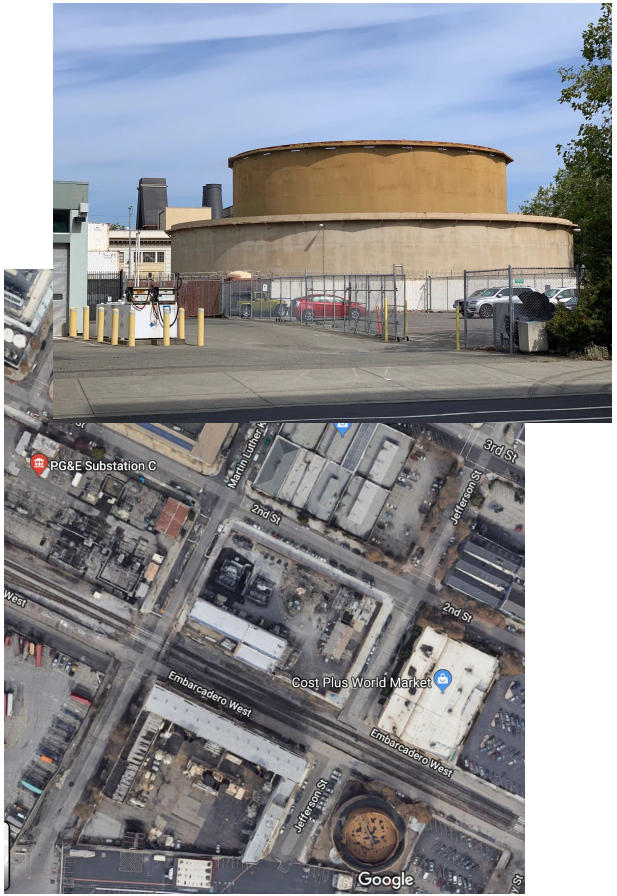
Replacing Legacy Power Plants with Community-Focused Solar+Storage

Sunrun and EBCE's Collaboration via the Oakland Clean Energy Initiative

10 October 2019

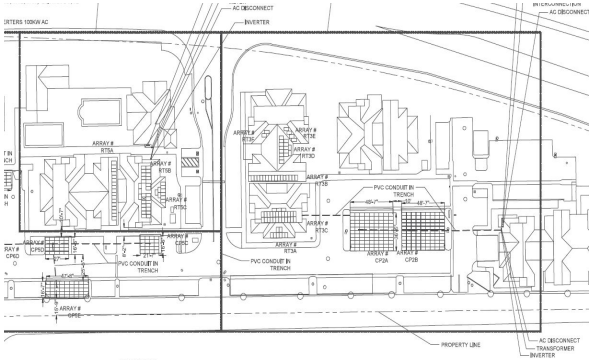
The Challenge

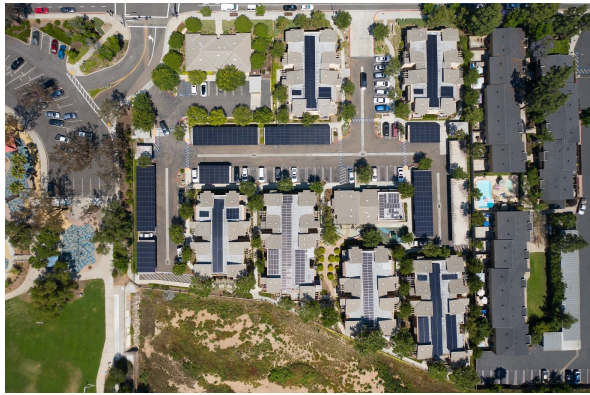
- 1970s-vintage, jet fuel-fired power plant, located in Jack London Square area, downtown Oakland
- Based on its location and operating characteristics, plant has been deemed critical for grid reliability under transmission system contingency scenarios (N-1-1) by CAISO and has operated under Reliability Must-Run contract in recent years
- Plant only runs a limited number of hours per year, but pollutes significantly when it does
- Plant pollution disproportionately impacts low-income communities and communities of color in West Oakland, who are already burdened by emissions from Port of Oakland and other nearby industrial activity
- CAISO, Dynegy/Vistra, and PG&E want to find a solution that will allow for plant retirement, while maintaining grid reliability
- EBCE needs to procure capacity products proportionate to its load (plant retirement makes less capacity available), while bringing clean energy solutions to communities it serves



Our Solution

- Sunrun will install solar PV and battery energy storage at affordable multifamily housing sites in West Oakland and elsewhere in Alameda County
- Solar will deliver bill savings to residents via Virtual Net Energy Metering tariff
- Storage will provide backup power for critical common-area loads (e.g., lighting, elevators, HVAC) in each building
- Sunrun will aggregate storage assets into a Virtual Power Plant, to deliver capacity (Resource Adequacy) to EBCE, through participation in CAISO markets via Proxy Demand Resource (Demand Response) tariff
- Capacity delivered from Virtual Power Plant will facilitate plant retirement while maintaining grid reliability in Oakland load pocket
- **Bill savings, resilient power supply, reducing pollution in priority environmental justice community: win-win-win**





Our Collaboration with EBCE

- Together, Sunrun and EBCE will deliver clean energy, bill savings, and resilient backup power to communities of concern in Alameda County
- We will also use the contract we've signed together as a starting point, to help create efficient, scaled delivery of capacity products from aggregated, customer-sited resources
- This will empower our communities to play an active role in building a cleaner, more resilient grid
- We look forward to bringing the model we build here to more communities - in CA and elsewhere - and expanding it to include sites like schools, community centers, fires stations, and others that can serve as critical community resiliency resources at a time when grid service disruptions are becoming ever more common in response to severe weather events and other challenges

Feel free to contact us at Sunrun to see how we can work together!

Thank you!

Michael Norbeck
Senior Manager, Grid Services
michael.norbeck@sunrun.com