RESILIENT POWER

A Project of Clean Energy Group

New Initiatives in Community Resilient Power

January 30, 2015

Hosted by

Lewis Milford
President, Clean Energy Group

Housekeeping

All participants are in "Listen-Only" mode. Select "Use Mic & Speakers" to avoid toll charges and use your computer's VOIP capabilities. Or select "Use Telephone" and enter your PIN onto your phone key pad.

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

This webinar is being recorded.

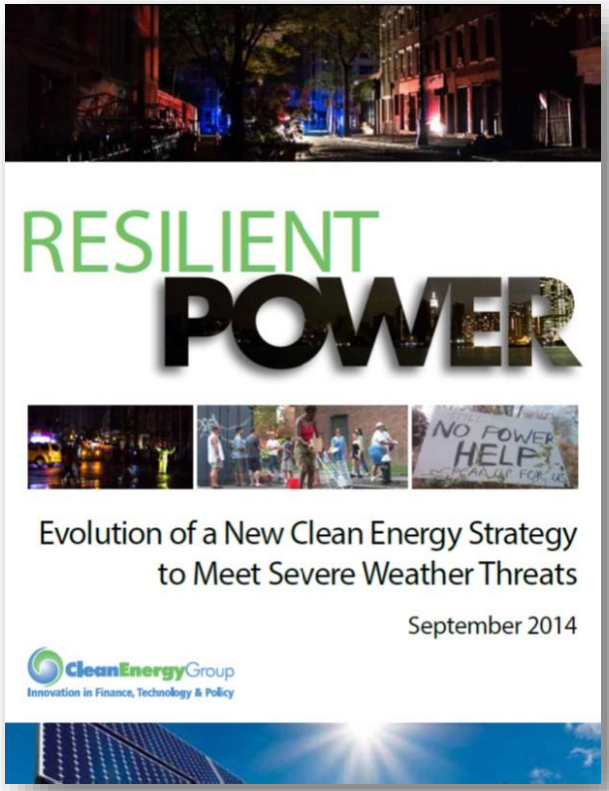
You will find a recording of this webinar, as well as previous Resilient Power Project webinars, online at:

www.cleanegroup.org/ceg-projects/resilient-power-project/webinars/

and at

vimeo.com/channels/resilientpower

Who We Are



CleanEnergyGroup
Innovation in Finance, Technology & Policy

Meridian Institute
Connecting People to Solve Problems

CleanEnergy States Alliance

THE JPB FOUNDATION

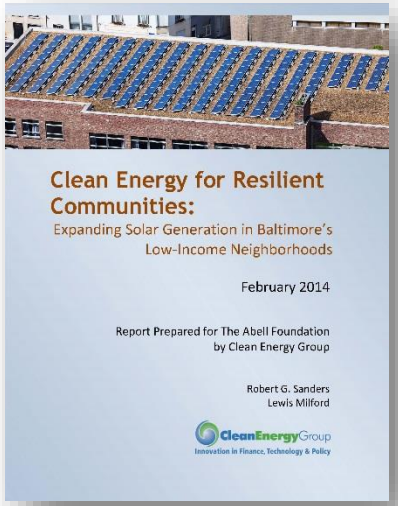
SURDNA FOUNDATION
Fostering sustainable communities in the United States

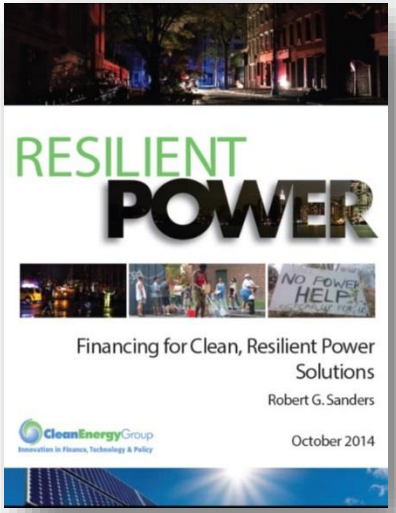
THE KRESGE FOUNDATION

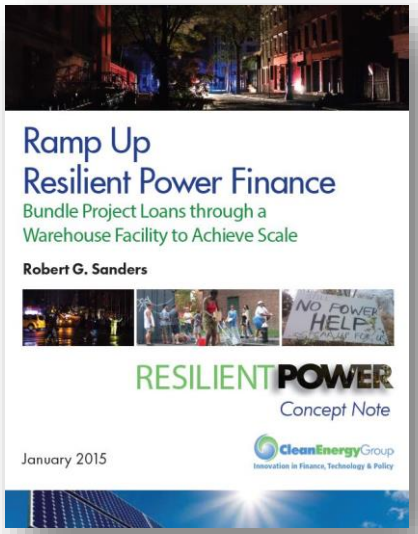
www.resilient-power.org
www.cleanegroup.org

CEG Resilient Power Project

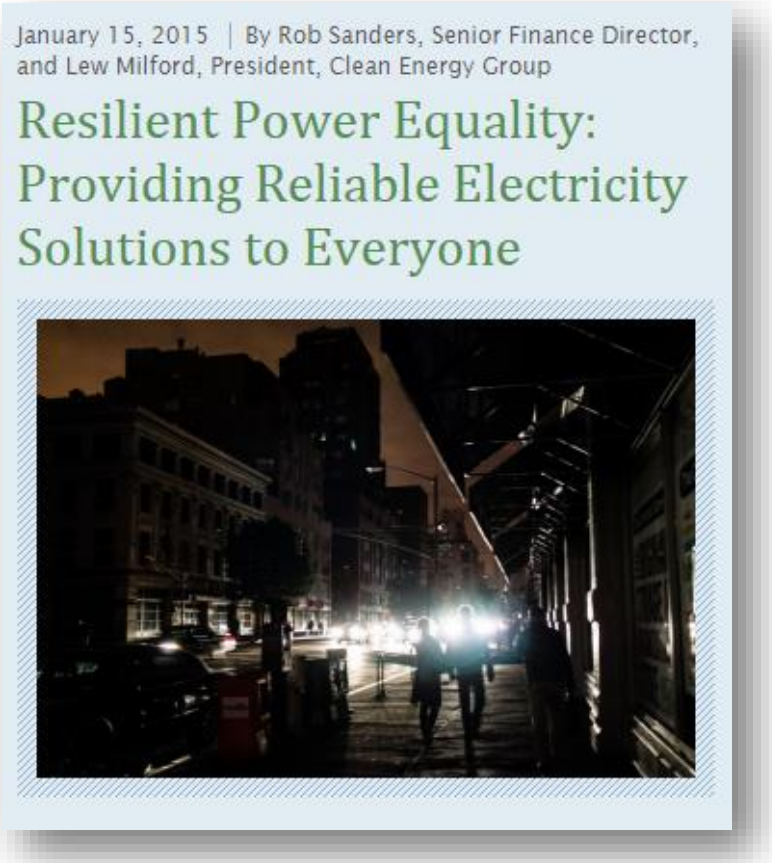
- Goal: significantly increase public/ private investment for clean, resilient power systems.
- Engage city officials to develop resilient power policies/ programs, link to state energy policies.
- Protect low-income and vulnerable communities; focus on affordable housing
- Technical assistance & targeted support for pre-development costs for resilient power projects to help agencies/ project developers get deals done.
- See www.resilient-power.org for reports, newsletters, webinar recordings







Today's Topic :
Community Resilient Power


January 15, 2015 | By Rob Sanders, Senior Finance Director, and Lew Milford, President, Clean Energy Group

Resilient Power Equality: Providing Reliable Electricity Solutions to Everyone

When it comes to reliable energy technologies to protect against power outages, there is a disparity between the haves and the have-nots.

Call it "resilient power inequality."

http://bit.ly/Resilient-Power-Equality-Blog

Today's Guest Speakers

- **Rob Sanders,** Senior Finance Director, Clean Energy Group
- **Jared Lang**, Sustainable Development Manager, National Housing Trust
- **Tom Osdoba**, Vice President of Green Initiatives, Enterprise Community Partners

CleanEnergyGroup
Innovation in Finance, Technology & Policy

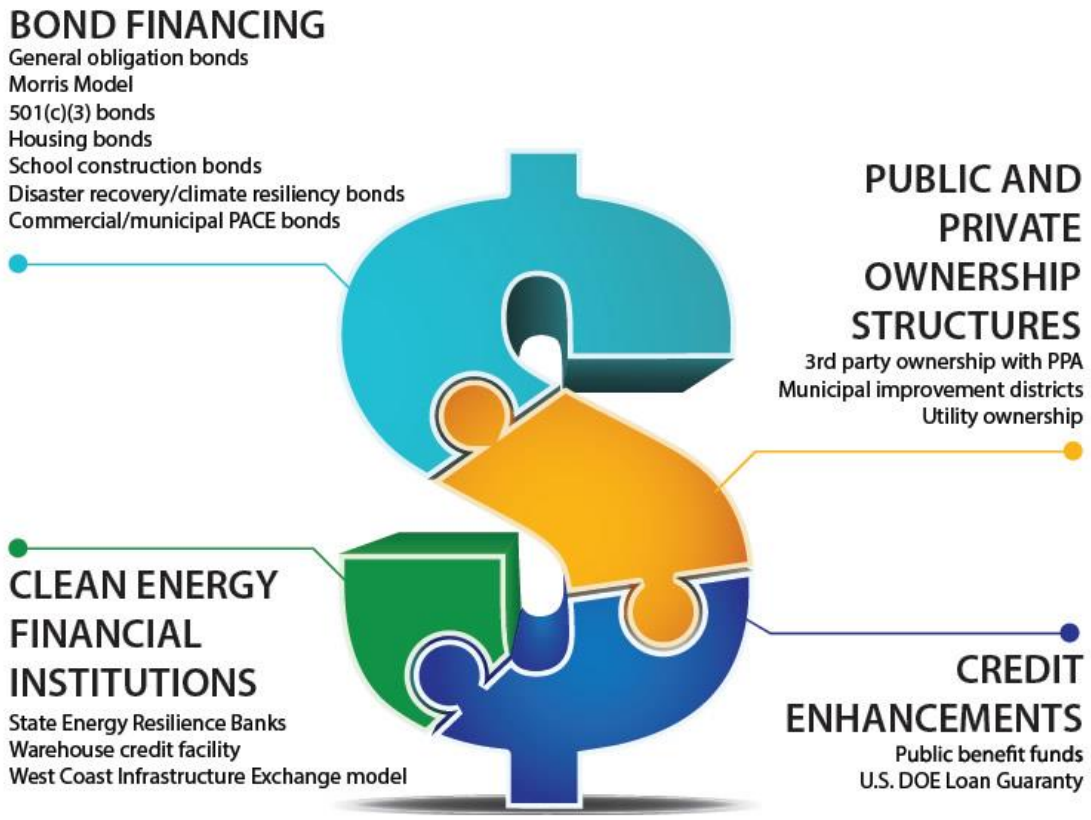
NATIONAL HOUSING TRUST

Enterprise℠

Innovative Financing Models

Once decision is made to pursue resilient power project – how do you finance it?

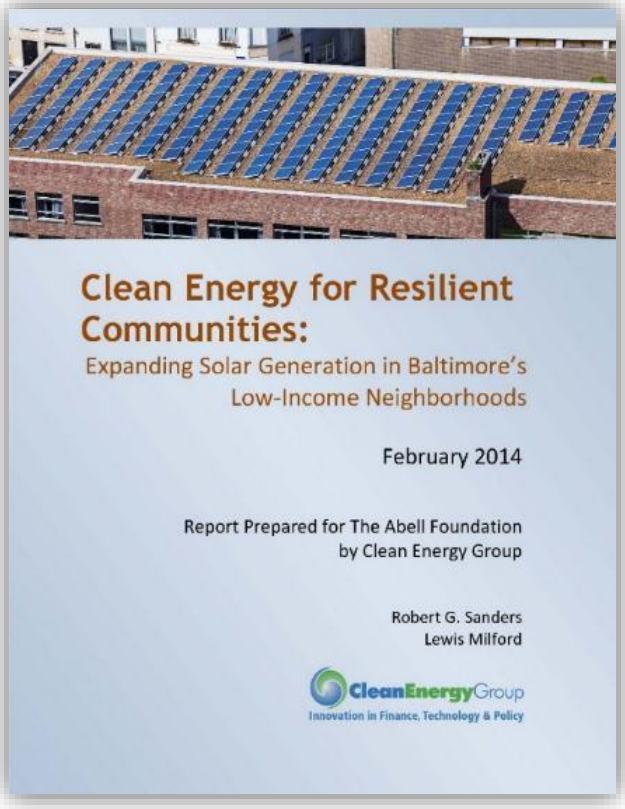
Municipalities, housing/ community developers have broad range of options.



Source: Clean Energy Group

Community Resilient Power: Baltimore

- How can cities deploy more solar in low income communities and be more power resilient?
- CEG report built on Baltimore's DP3 Report that evaluated critical facilities/ infrastructure.
  - Focus on community buildings
  - Bonds and credit enhancement mechanisms
  - Public buildings and nonprofit-owned facilities.
  - Third-party ownership, lease-financed
  - Foundation PRIs
  - Public schools, libraries, police/fire stations.
  - Explore legal exposure under ADA.
  - The full report can be downloaded at http://bit.ly/RPP-ResilientCommunities.

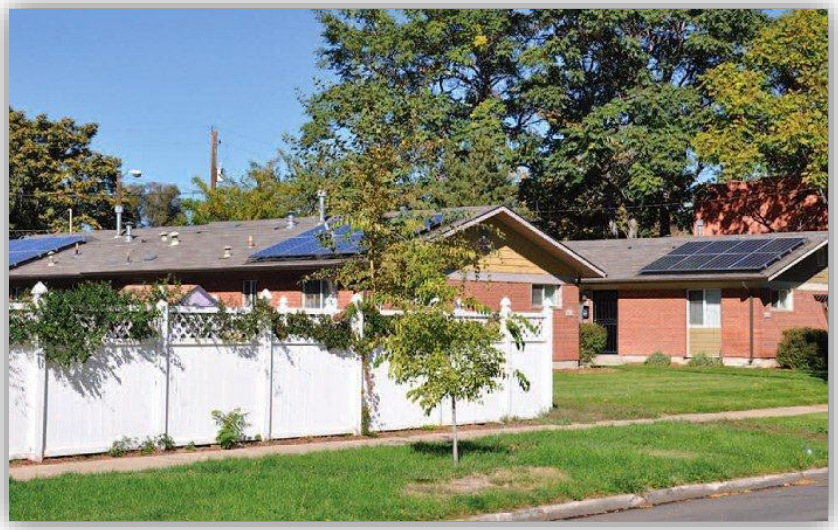


Resilient Power for Affordable Housing & Assisted Living Facilities

- **SuperStorm Sandy**: 375,000 New Yorkers—including 45,000 public housing residents—lived in mandatory evacuation zone.
  - Many low-income, elderly & disabled in NYC public housing were stranded.
  - No heat, backup generators, emergency boilers, or working elevators.
  - Many had no other affordable place to stay, no means of leaving their neighborhoods because mass transit did not operate.
- Battery storage systems combined with on-site generation are needed for residents to shelter in place.
- Many resilient power projects structured with no up-front costs.

CEG Resilient Power TA Fund

- CEG works with owners/ developers of multifamily affordable & supportive housing, community facilities
- Provide limited project predevelopment funds for near term resilient power projects:
- Project scoping
  - Review building plans
  - Analyze utility bills (peak shaving)
  - Identify critical loads to be covered for how long
  - Preparation of detailed project budget & proformas
  - Submission of funding & financing applications
  - Coordination/ integration with solar PV developer



NYC – Affordable/Supportive Housing

- Bright Power – 3 NYC multifamily housing projects
- Via Verde (Bronx) retrofit – existing 66 kW PV plus 150 kW gas emergency generator
  - Existing generator covers some critical loads (elevators & lighting)
  - Solar PV + storage will cover water booster pumps, etc.

Hybrid Approach is Needed

- Financing is just one key public resource that is needed to accelerate the deployment of resilient power for critical facilities and infrastructure.
  - Technical assistance
  - Targeted support for pre-development costs
  - Consistent, supportive policy

Jared Lang

SUSTAINABLE DEVELOPMENT MANAGER,

NATIONAL HOUSING TRUST

About National Housing Trust

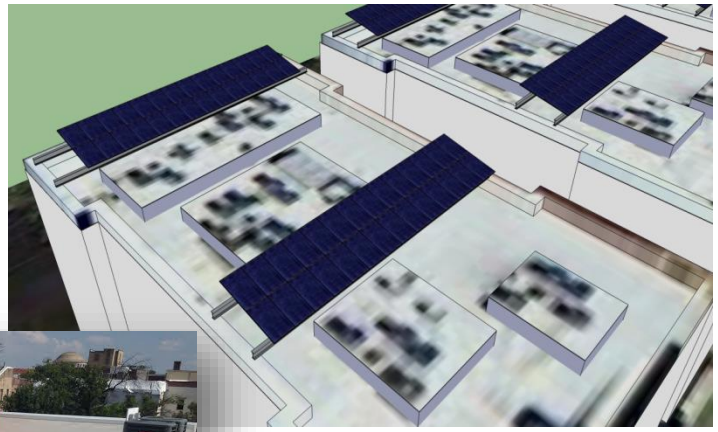
- **National Housing Trust** (NHT) is a national nonprofit engaged in housing preservation through public policy advocacy, real estate development, and lending.
- The National Housing Trust has preserved or helped to preserve more than 25,000 affordable homes through real estate development, lending, and technical assistance.
- Leveraged more than $1 billion in financing.

About NHT/Enterprise Preservation Corp

- Owns & Operates 3,000 affordable rental units along the East Coast and Illinois; encouraging for-profit or non- profit partnerships.
- Achieved green certification (Enterprise, Earthcraft or other) on 8 properties in its portfolio.
- First Enterprise Green Certified property in Washingon, D.C. (Galen Terrace).
- Typical > 20% energy reduction in new projects.

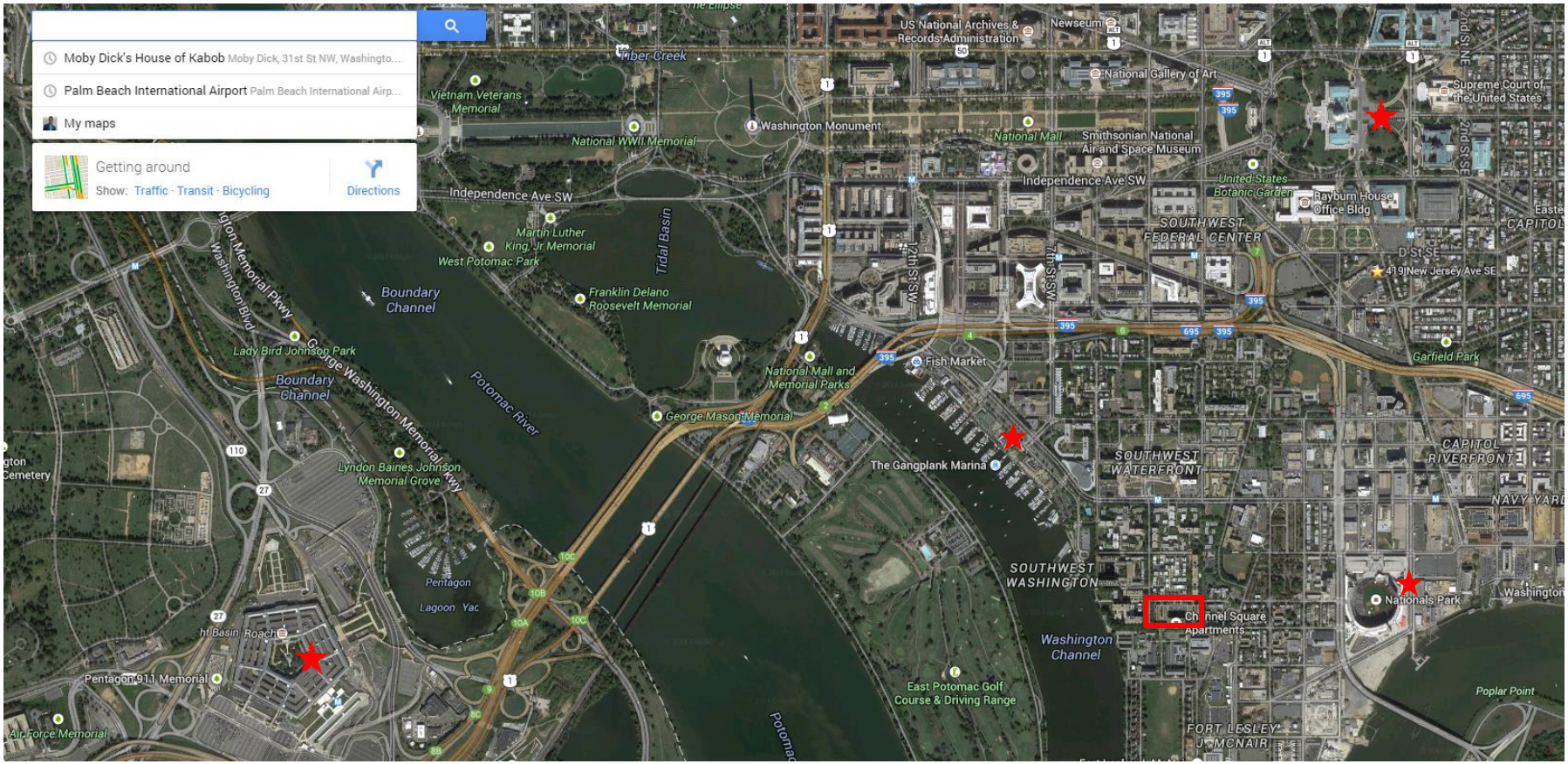
EXTENSIVE SOLAR OWNER

6 properties already have solar (Almost 1 Megawatt of power)



CHANNEL SQUARE
BATTERY STORAGE PROJECT

WHERE IS CHANNEL SQUARE?

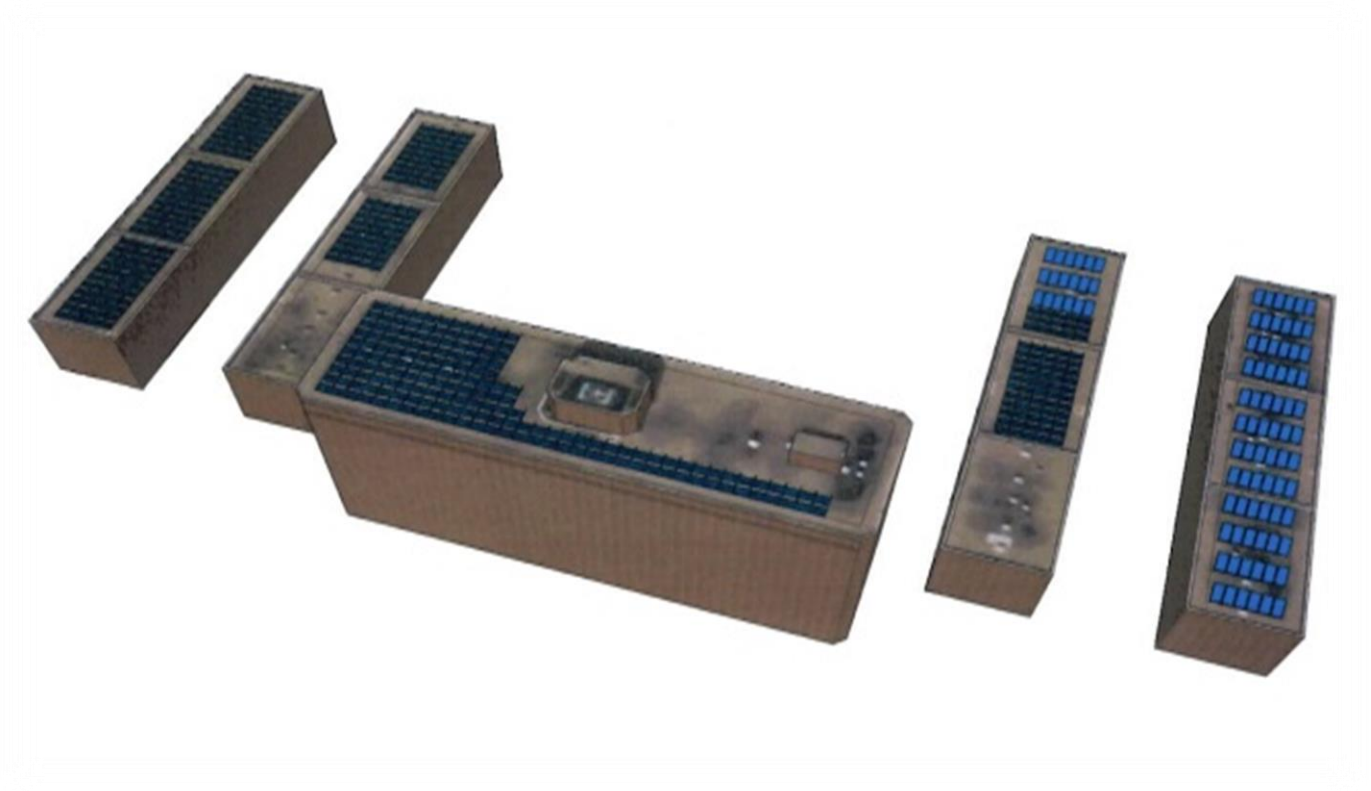


ENERGY & WATER UPGRADES

- Low-flow shower heads and faucet aerators
- New efficient hot water boilers with new VFD pumps
- High-efficiency interior/exterior lighting upgrades
- Washington Gas Energy Services supplies 100% wind renewable power

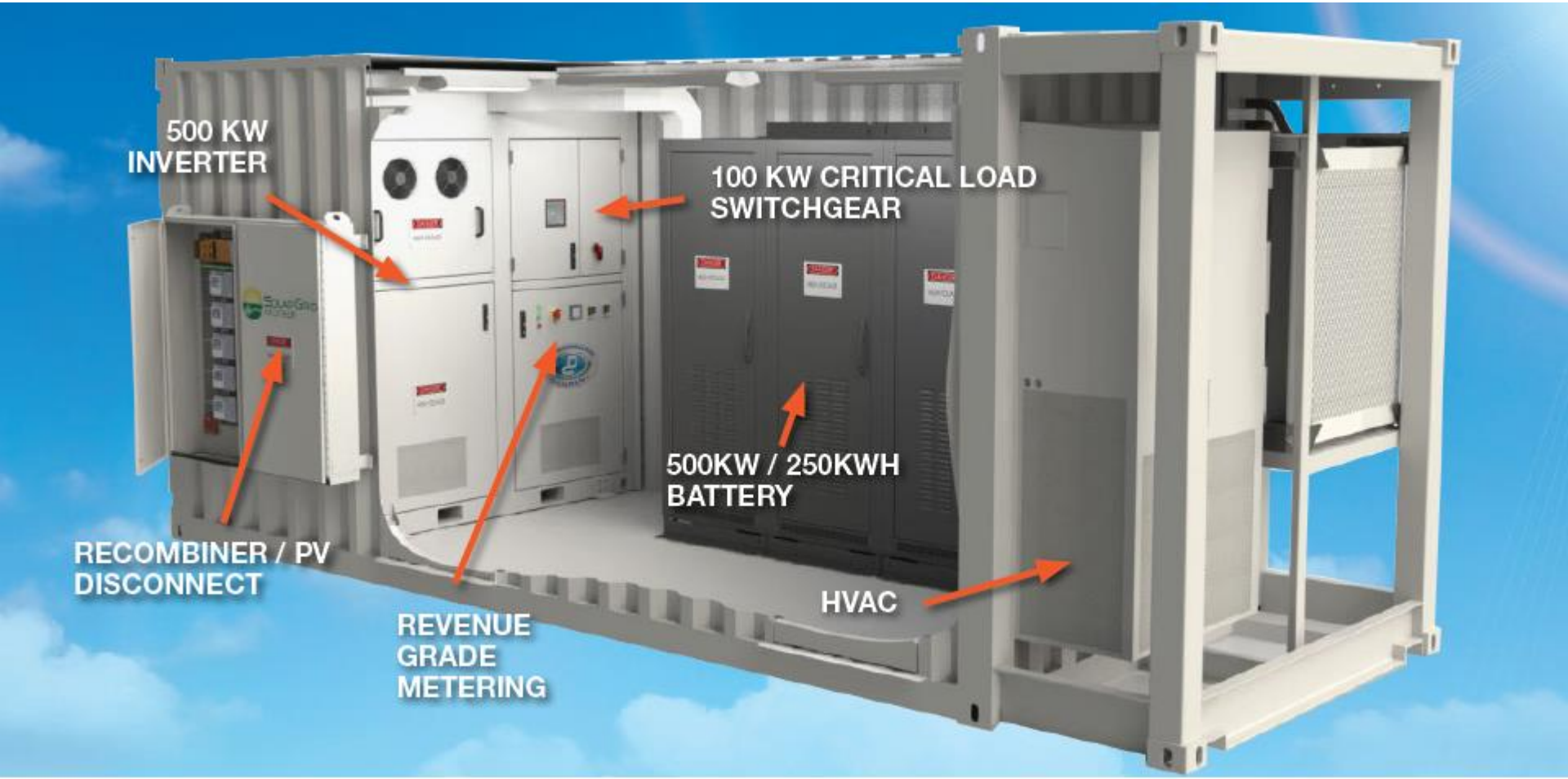
PROPOSED SOLAR INSTALLATION

- 300,000 Kilowatt hours of Solar Photovoltaic
- 7,200 Therms of Solar Thermal



BATTERY STORAGE

PowerFactor 500 (250KWH of Storage)

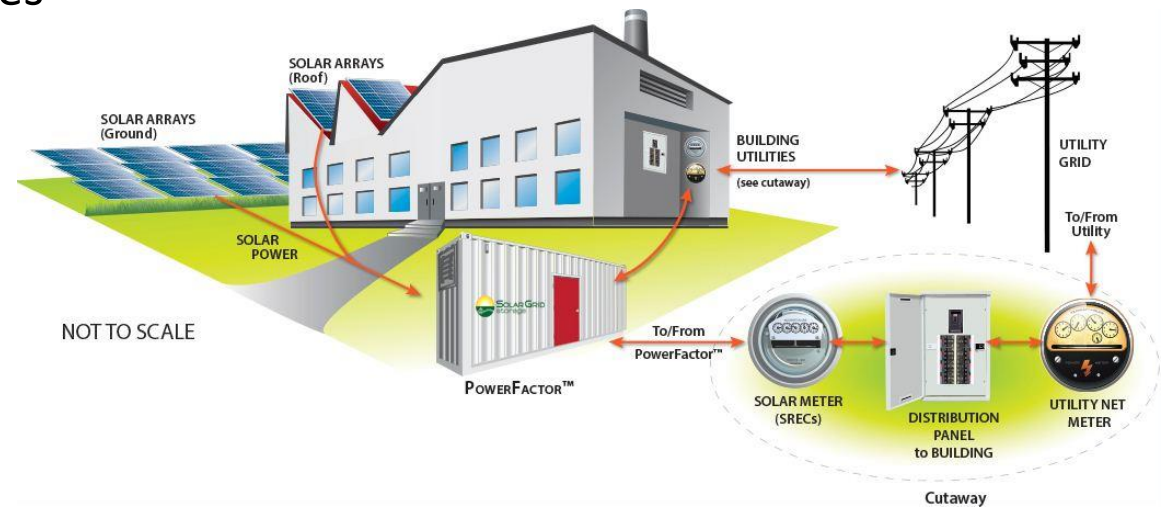


WHY BATTERY STORAGE?

- Resiliency during grid outages (Power critical loads)
- PV System Cost Reduction
- Extended Solar Inverter Warranty
- Guaranteed performance
- Peak shaving
- Reduced demand charges

CHALLENGES?

- Connecting battery to solar, building, and utility grid
- Integrating battery design with solar design
- Finding space to locate the battery
- Tying into existing generator
- Providing access to battery maintenance team
- Because of all these factors, execution will require extensive coordination between interested parties
- Financing and installing solar is hard enough



THANK YOU

If you would like to discuss further, I can be reached at…

Jared Lang

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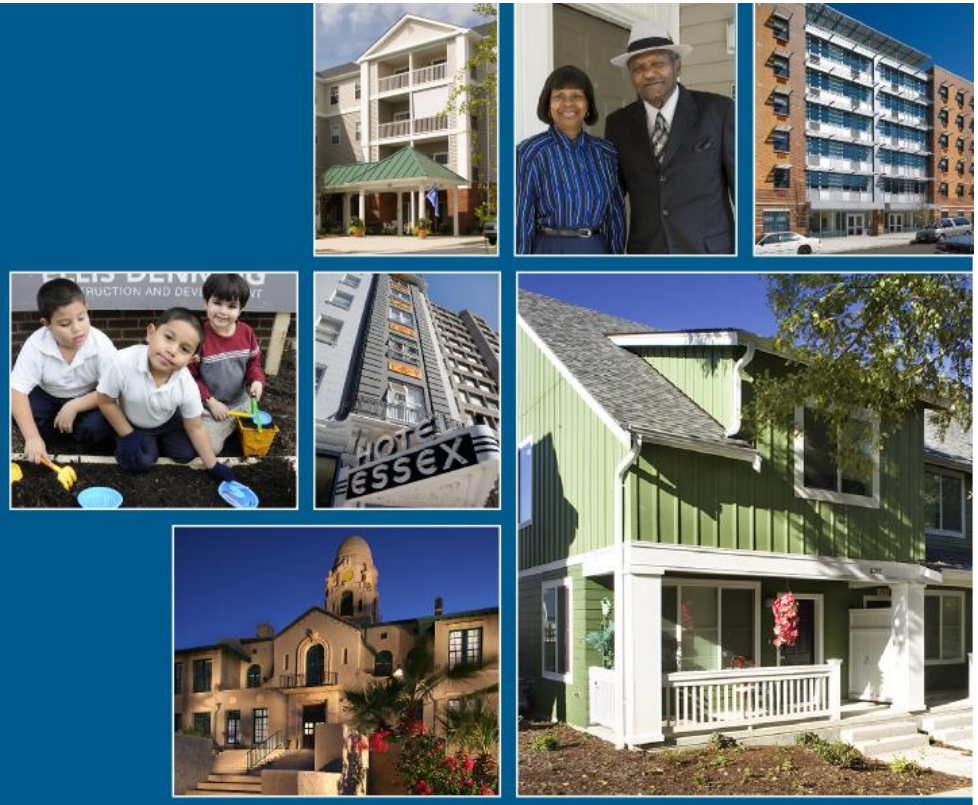
Green Communities Neighborhood Scale

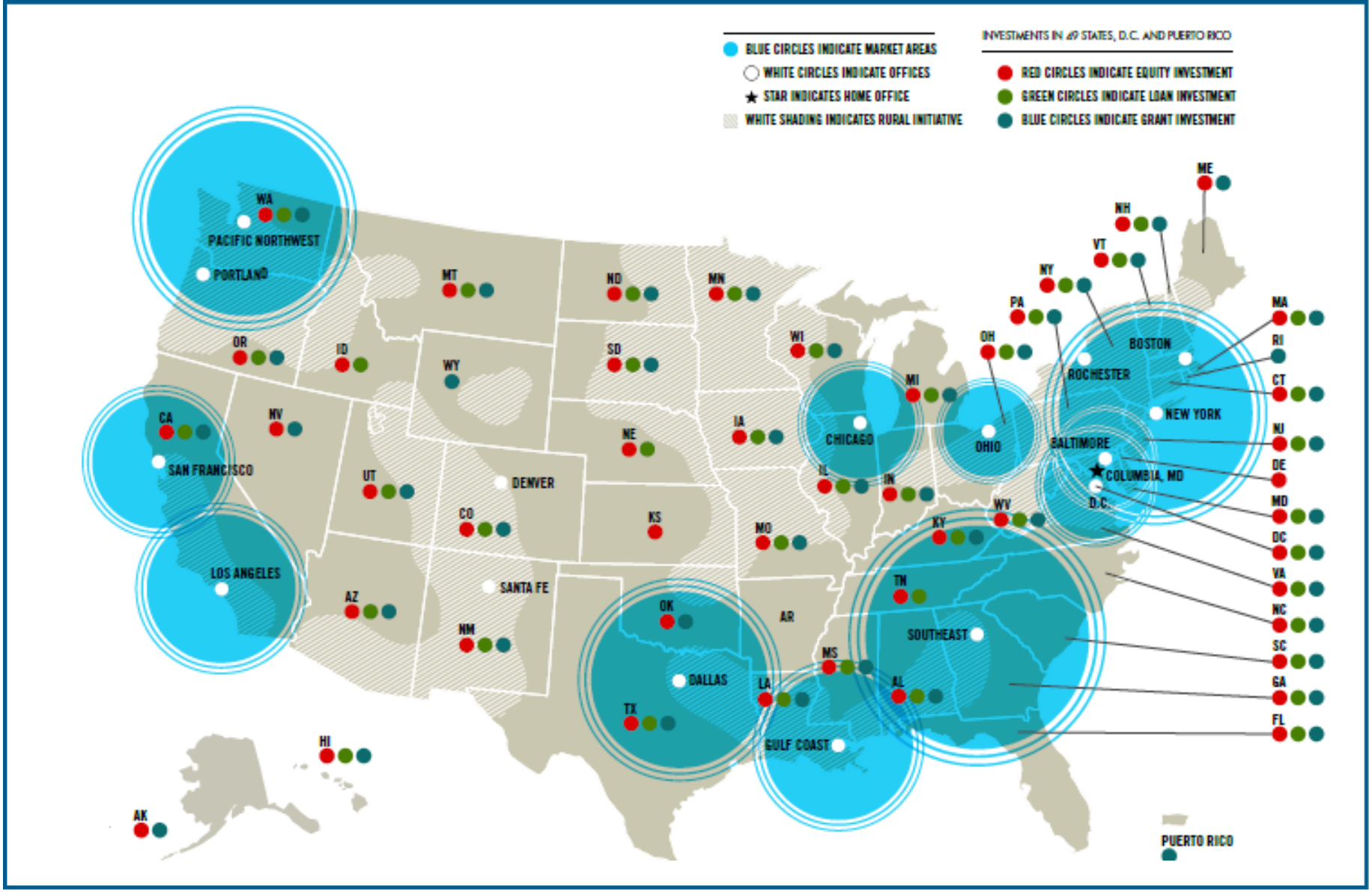


Date: Wednesday, January 30, 2015

Enterprise®

James W. Rouse
Our founder + inspiration

Enterprise creates and preserves affordable homes across the country



Green Communities provides framework for green affordable housing

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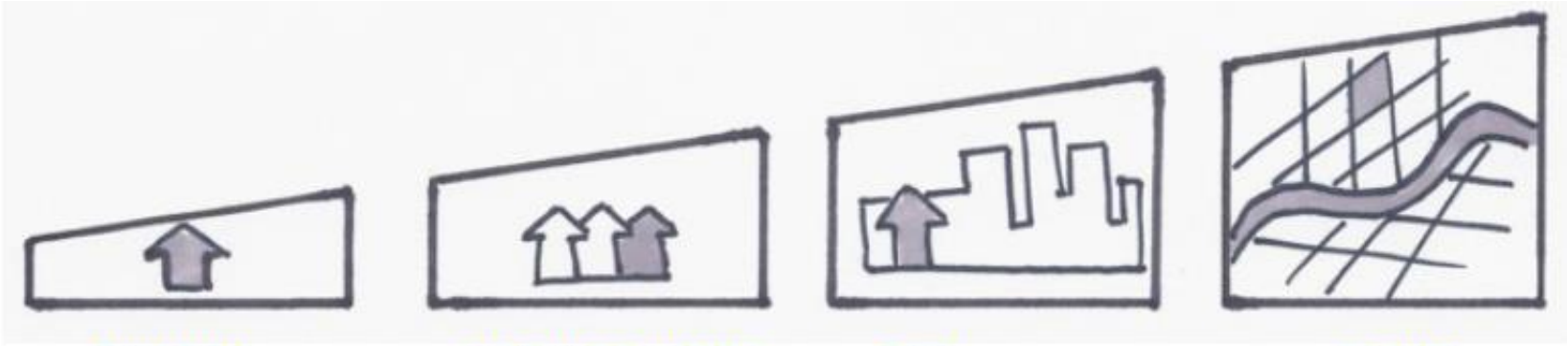
Solution: Neighborhood Scale?

- **New initiative**: Build upon our work to shape the future of sustainability and community development.
- **Neighborhood-scale projects:** Work with local partners at the neighborhood scale to better tackle persistent problems.



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Outcomes : Better Neighborhoods

- More affordable housing units through lower development costs
- Increase housing security through lower utility expenses
- Communities that are sustainable, healthy and resilient
- Affordable housing close to transit and economic opportunities

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Site 1: Sun Valley, (Denver, CO)

- Denver Housing Authority,
- Master Planning Industrial/Innovation District,
- New construction + redevelopment,
- 250 acres mixed use

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Site 2: Lathrop House, (Chicago, IL)

- Public Housing Revitalization ,
- New construction + rehab,
- 30 acres residential + commercial,
- 1,116 mixed-income units

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Site 3: Little Tokyo, (Los Angeles, CA)

- 750 mixed income apartment units,
- 27,500 sf of retail,
- 102,500 sf of office,
- 50,000 sf of cultural space

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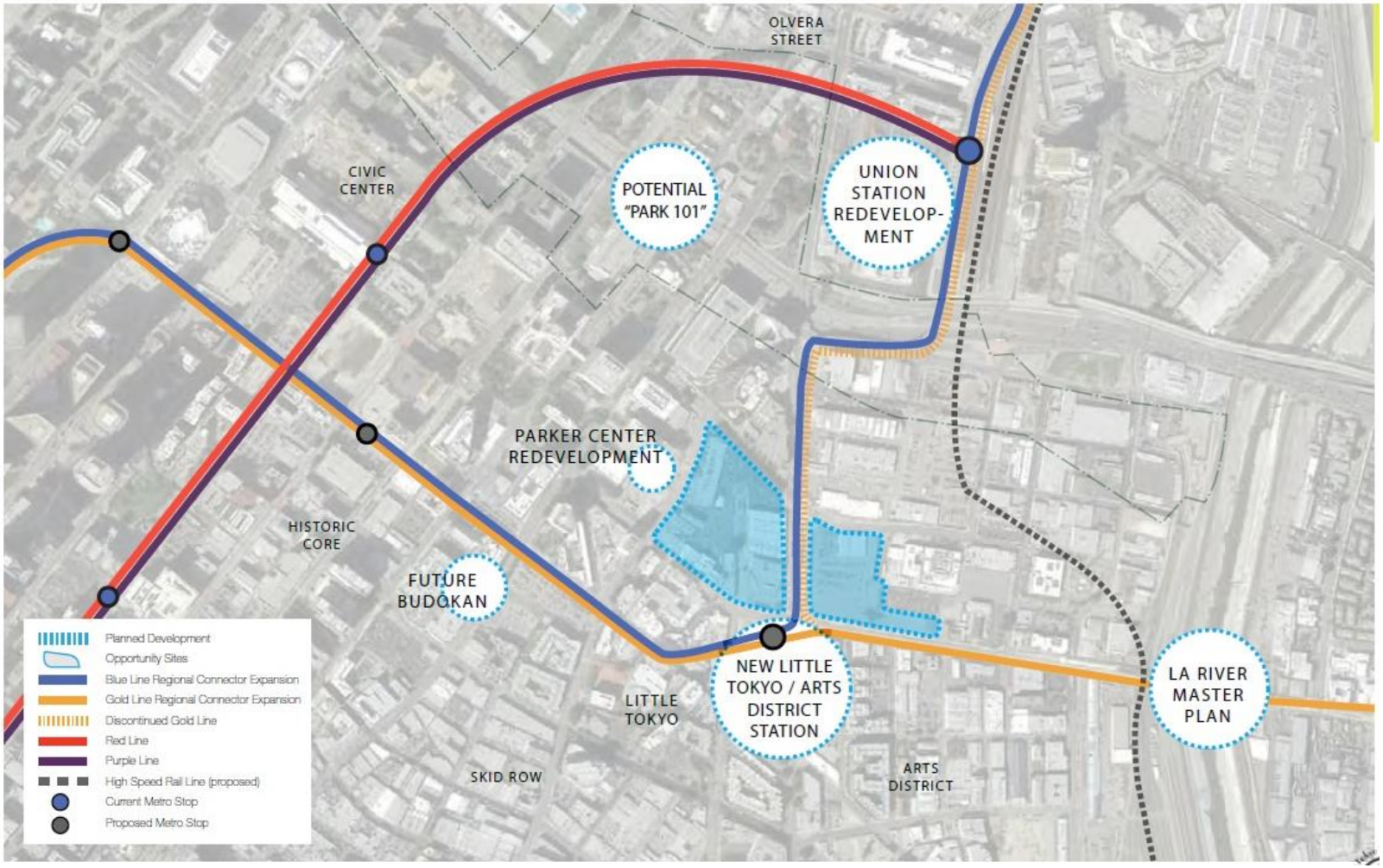
Example: Little Tokyo, (Los Angeles, CA)



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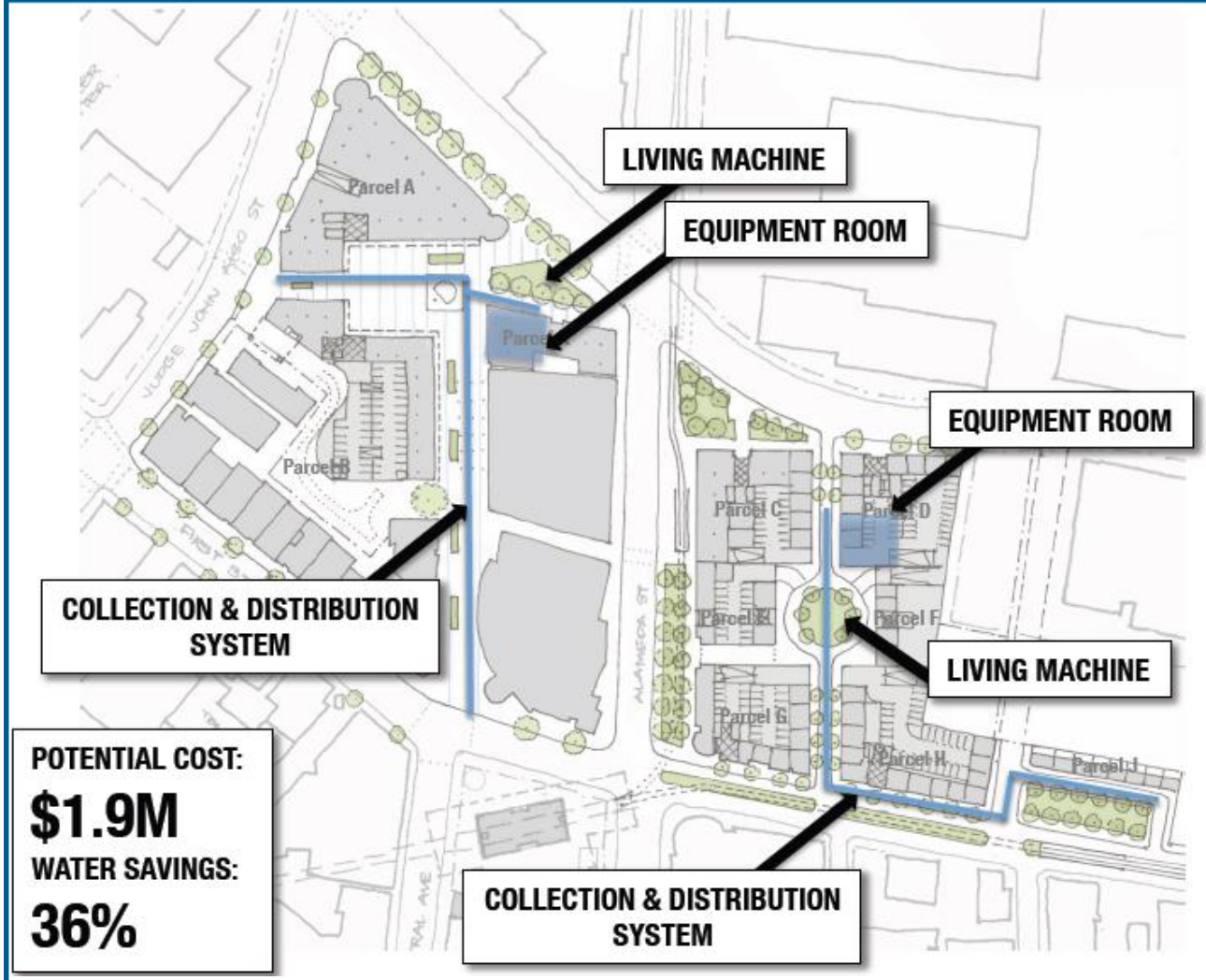
District Waste Water Management



POTENTIAL COST:
$1.9M
WATER SAVINGS:
36%

SYSTEM OVERVIEW

- 35-40% potable water use reduction through the treatment and reuse of domestic wastewater for toilet flushing, district energy cooling water make-up and irrigation (street and park)
- Wastewater treatment provided by a living machine which uses natural treatment processes to clean water.
- System to serve all new buildings
- Existing buildings such as MOCA and the Japanese American Museum have potential to be connected to system.

SYSTEM COMPONENTS

- Two (2) living machine systems. One serving Block 7 and one serving Mangrove (living machine size likely 4,000-6,000 SF)
- Equipment rooms and storage tanks required to be located adjacent to living machines (integrated into basement of buildings)
- Gravity collection system to convey wastewater to living machine
- Pressure system to provide non-potable water supply
- Each building has potable and non-potable water connection

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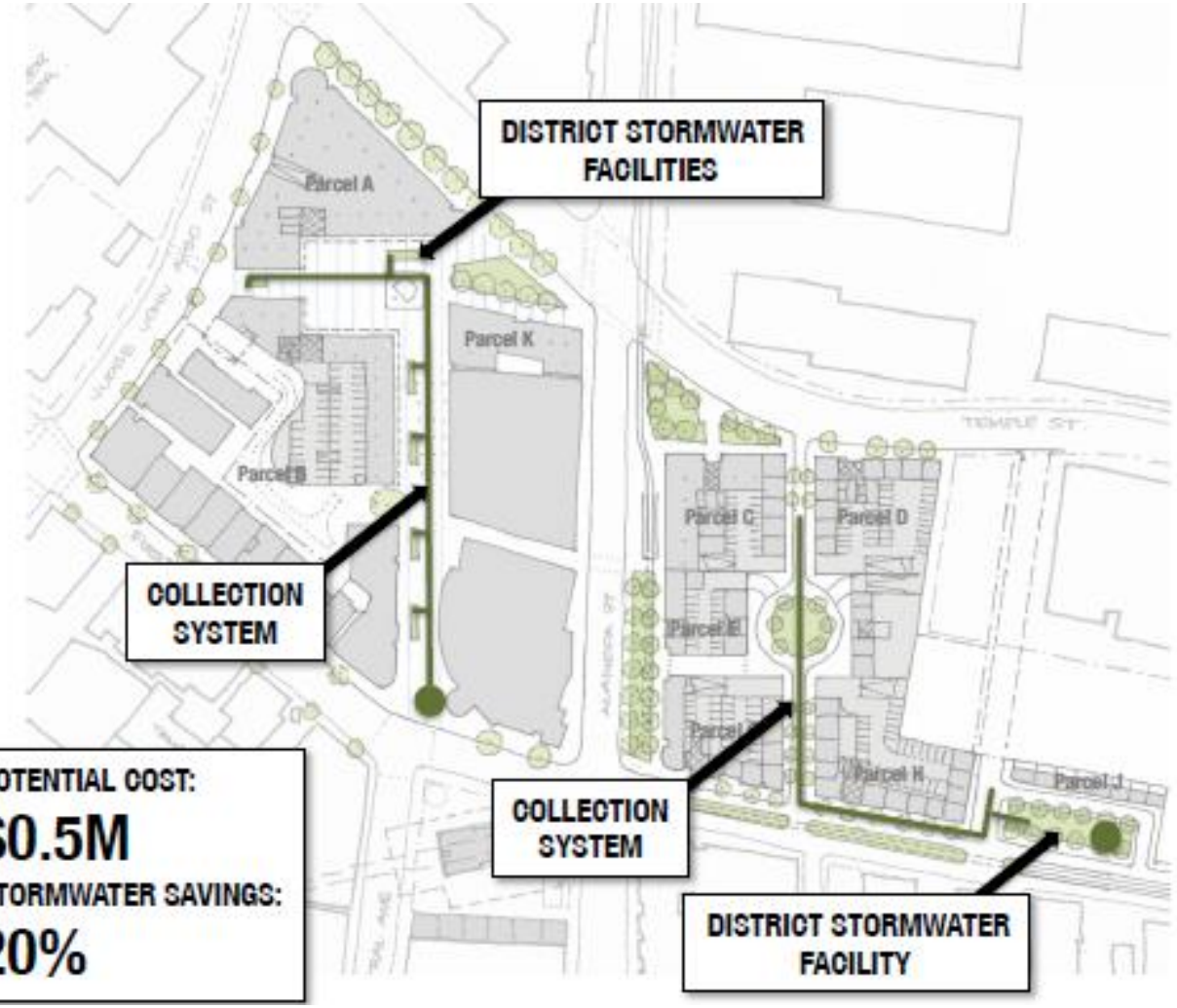
District Storm Water Management



POTENTIAL COST:
$0.5M
STORMWATER SAVINGS:
20%

SYSTEM OVERVIEW

- Potential to reduce stormwater management capital costs by 15-20%
- Stormwater from new development to be managed with district stormwater facilities (ie, shared stormwater facilities)
- Green infrastructure (ie, natural systems) preferred management approach
- System to serve all new buildings
- Existing buildings such as MOCA and the Japanese American Museum have potential to be connected to system.

SYSTEM COMPONENTS

- Gravity collection system
- District stormwater facilities such as stormwater planters and stormwater ponds
- Disposal via drywells (assuming suitable soil conditions)

DEVELOPMENT STRATEGY

- System developed by private partner (in partnership with LTSC) based on long-term stormwater management agreement between stormwater management provider and building customers (ie, stormwater credit)

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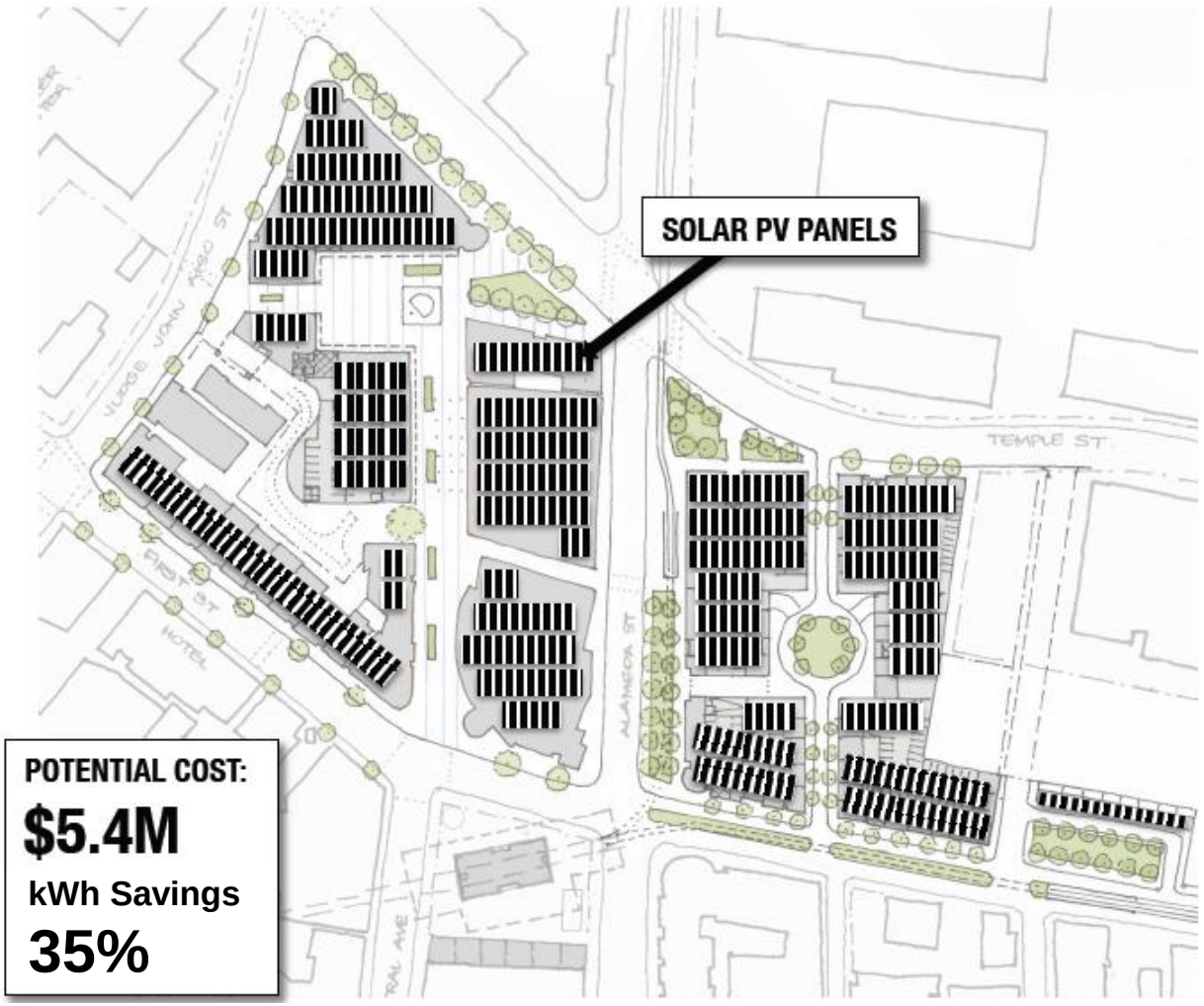
Community Solar



POTENTIAL COST:

$5.4M

kWh Savings

35%

SYSTEM OVERVIEW

- 2MW of solar PV potential

SYSTEM COMPONENTS

- Solar PV panels on all new building roofs
- Solar PV panels on large existing building roof (ie, MOCA and Japanese American Museum)
- Potential for electric vehicle (EV) charging stations

DEVELOPMENT STRATEGY

- System developed by private partner (in partnership with LTSC) based on power purchase agreement (PPA) solar provider and building customers

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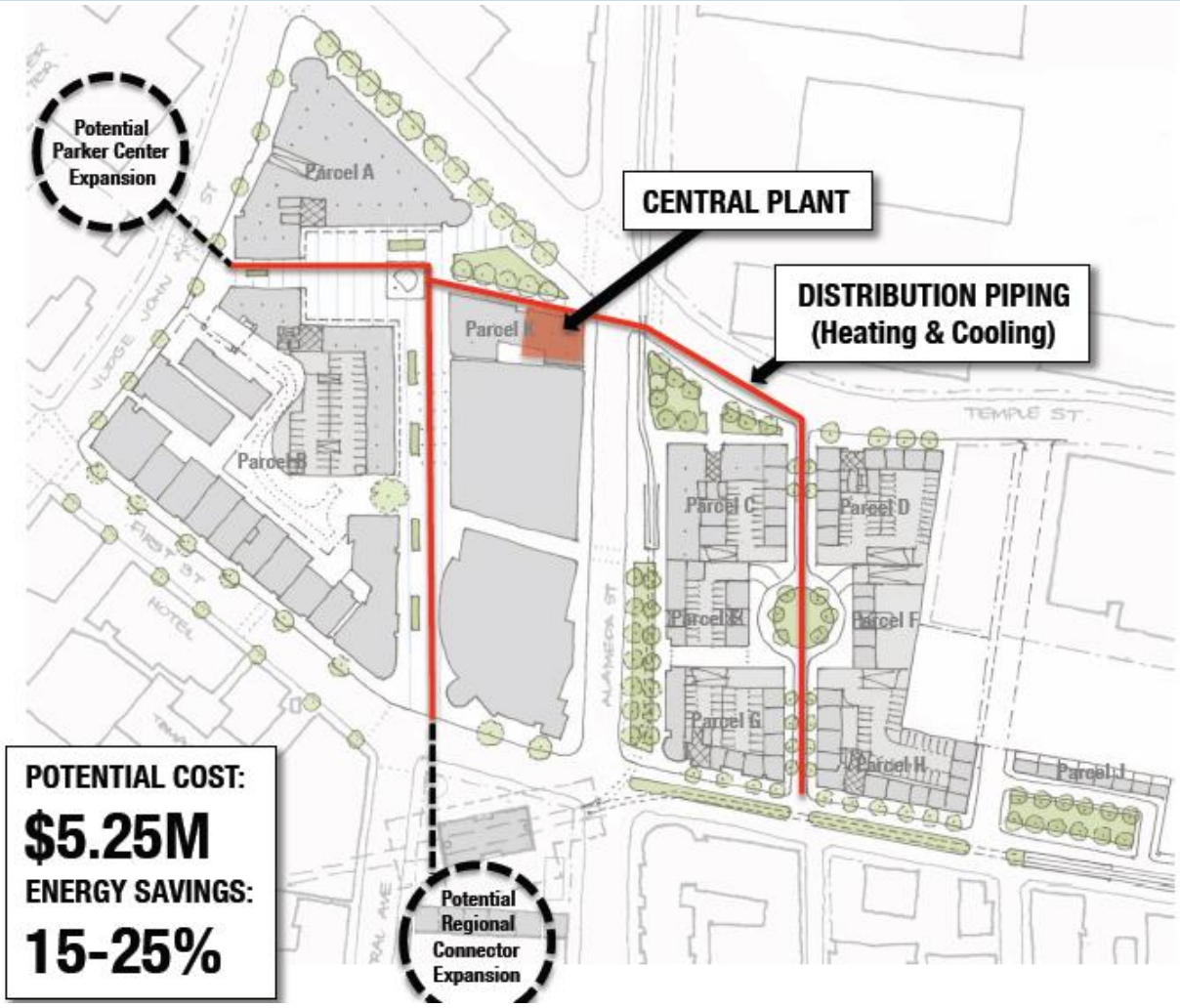
District Energy



POTENTIAL COST:
$5.25M
ENERGY SAVINGS:
15-25%

SYSTEM OVERVIEW

- 15-20% more efficient than building-scale systems and 10-20% more cost effective
- One central plant provides heating and cooling services to all new buildings within Little Tokyo
- No heating and cooling equipment at building-scale
- Existing buildings such as MOCA and the Japanese American Museum have potential to be connected to system.
- System should be sized to serve future Parker Center and Regional Connector Block expansion.

SYSTEM COMPONENTS

- Central Plant (natural gas fired boilers for heating and electrical chillers for cooling) integrated into building on Parcel K (20,000-30,000 SF)
- Four pipe distribution system (2 heating and 2 cooling)
- Energy transfer stations at each building

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Resiliency

- 8.5 million people lost power during Hurricane Sandy
  - Without HVAC, hot water, and electricity for up 2 weeks
  - Residents told to cut water use because treatment plants lost power
- HW buildings with CHP systems remained operating

The Brevoort three nights into the Hurricane Sandy blackout with lights shining powered by four Tecogen InVerde CHP units.

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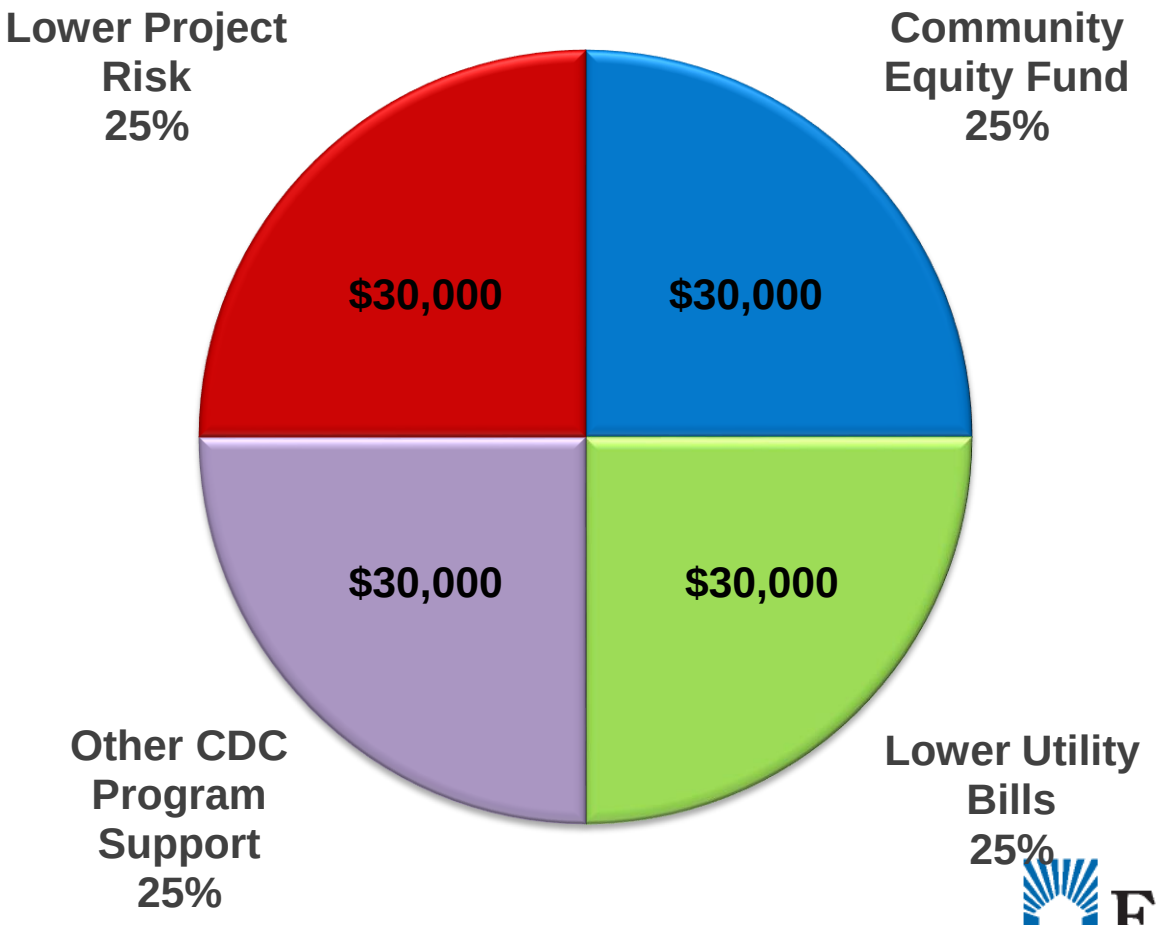
Options for Allocating Surplus:



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Benefits to a Neighborhood Scale Approach

Local Residents

- Reduced utility expenses
- Increased economic opportunities
- Amenity rich development
- Increased safety
- Better transit links
- Resilient systems
- Healthier homes
- Higher quality of living
- Sense of pride

Property Owners

- Lower development & operating costs
- Bulk utility rates
- Reduce exposure to fluctuating utility rates
- Decreased vacancies
- Improved public perception of brand

Other Benefits

- Utilities avoid peak-hour strain
- Cities benefit from economic activity
- Improved storm water management
- Recharged aquifers
- Reduce rate of natural resource depletion

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Resilient Power Project Upcoming Events & Links

- RPP e-Distribution List Sign-Up to get notices of future webinars and the *Resilient Power Project Newsletter*: http://bit.ly/RPPNews-Sign-Up
- More information about the project, its reports, and other information can be found at www.resilient-power.org.

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