Building the future one block at a time.

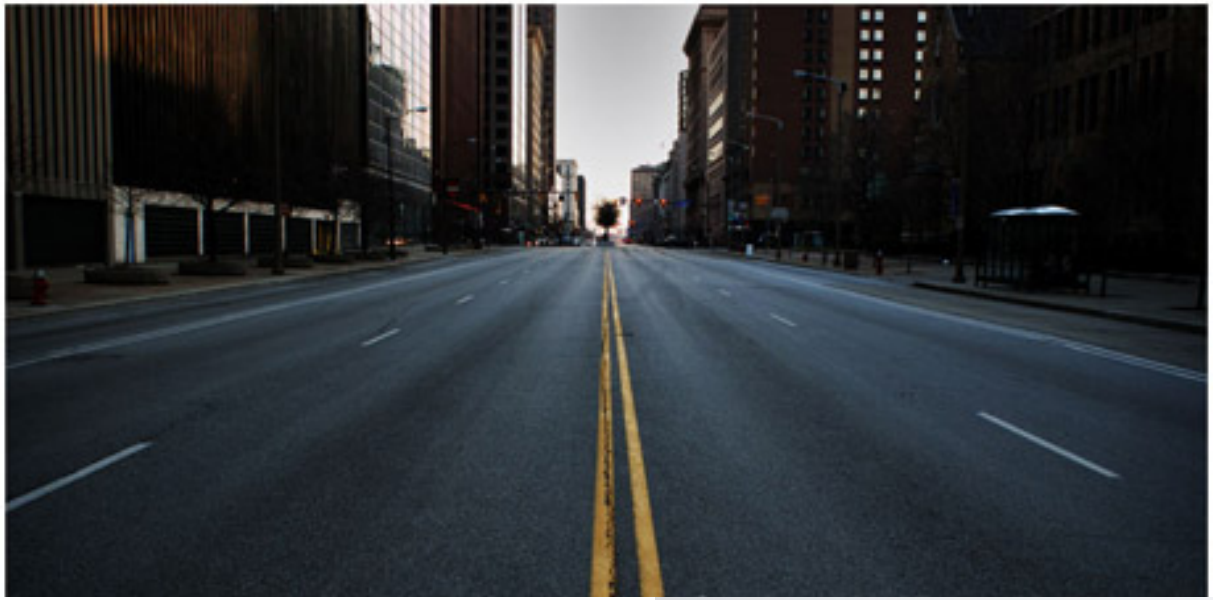
Living City Block

"Funding, Planning, and Policy Development
for Aggregated Energy Programs"
September 28, 2012

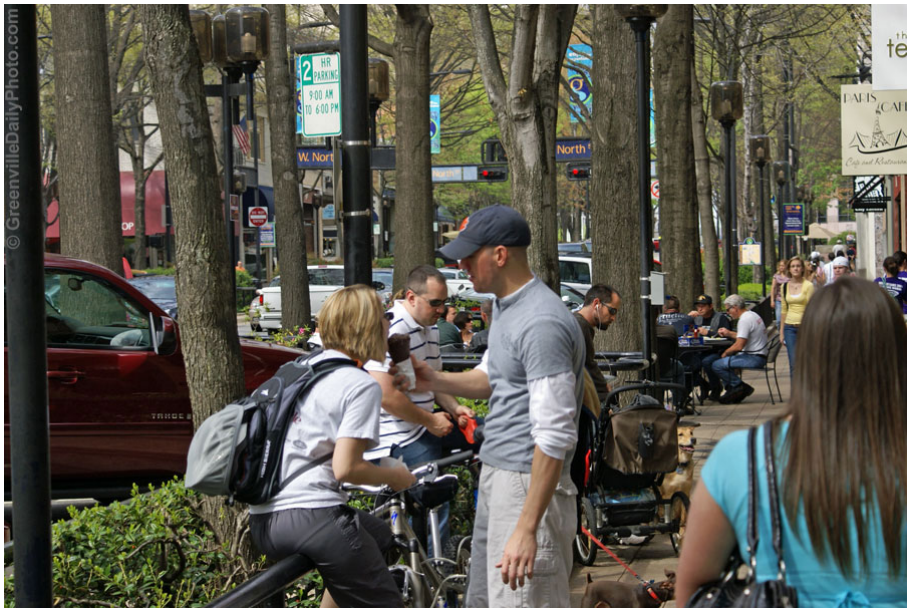
www.LivingCityBlock.org

United Nations Department of Economic and Social Affairs: http://esa.un.org/unpd/wup/CD-ROM_2009/WUP2009-F03-Urban_Population.xls

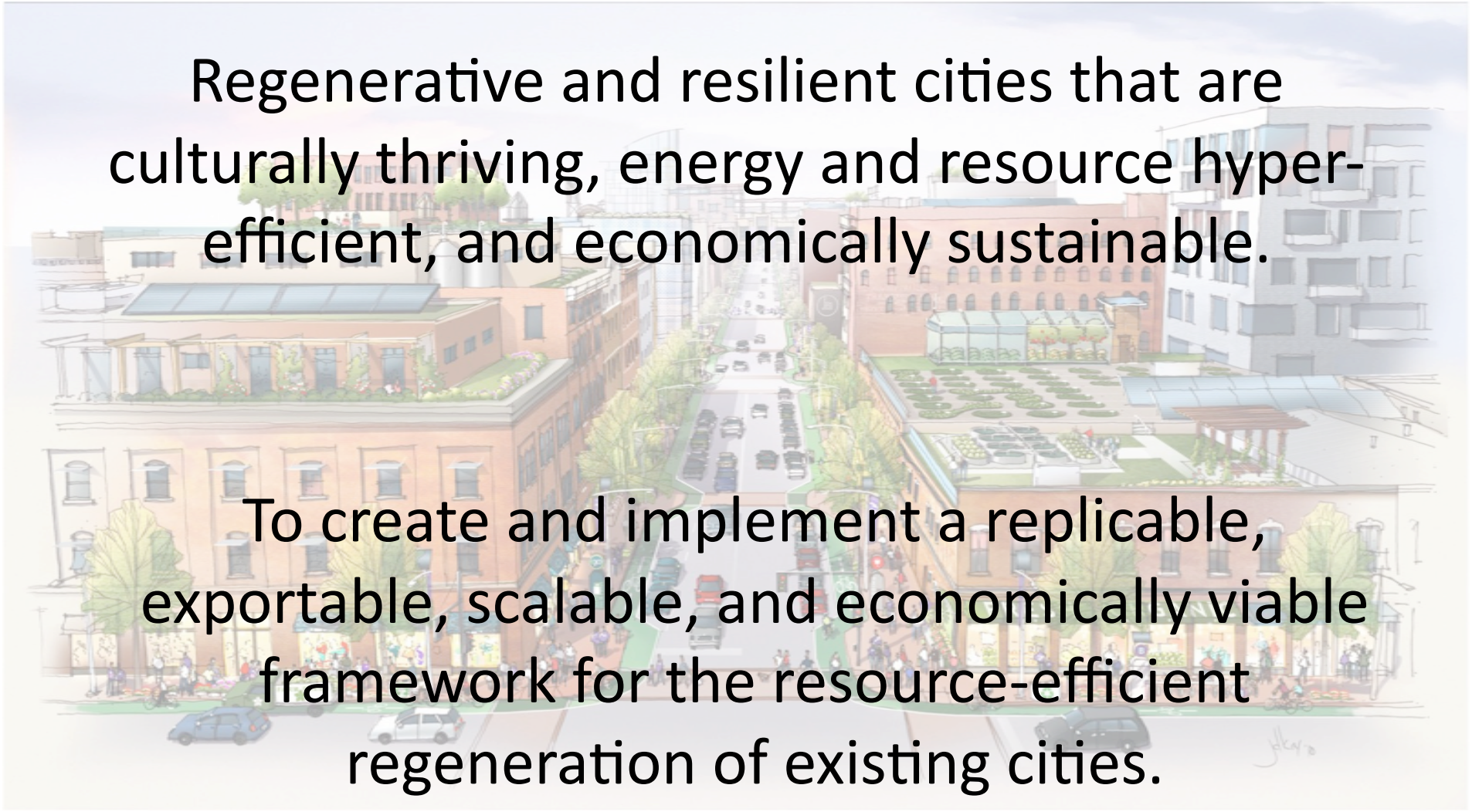
WHAT KIND OF CITIES WILL THEY LIVE IN?



WHAT KIND OF CITIES WILL THEY LIVE IN?



VISION AND MISSION



Regenerative and resilient cities that are culturally thriving, energy and resource hyper-efficient, and economically sustainable.

To create and implement a replicable, exportable, scalable, and economically viable framework for the resource-efficient regeneration of existing cities.

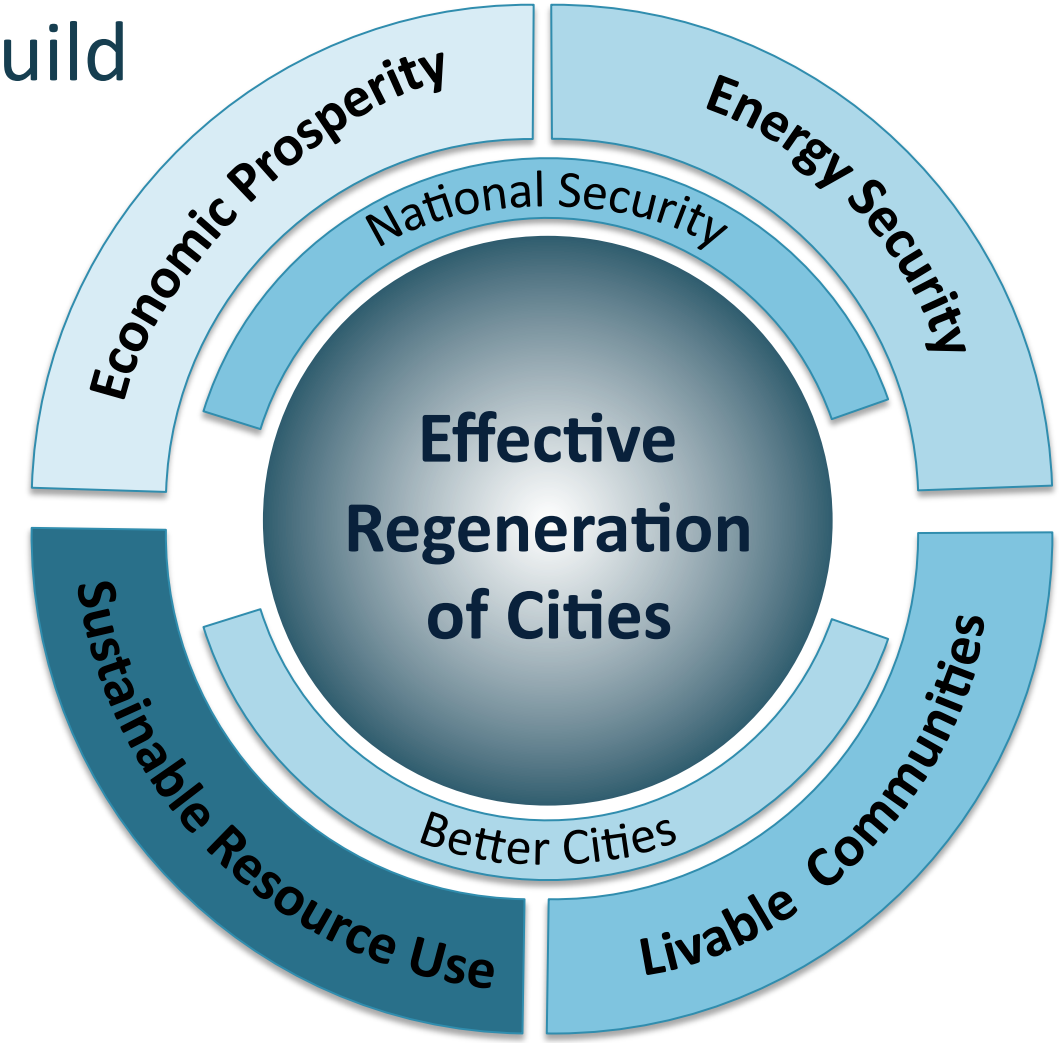
WHAT WE DO

We work as an *implementation partner* to transform existing urban communities into:

hyper-resource efficient, economically sustainable, socially and culturally thriving urban neighborhoods.

OPPORTUNITY

By addressing the challenges as a system, we can build



by moving forward with the same work at once.

HOW WE ARE GOING TO DO IT

An Integrated Approach with Multiple Benefits.

- **Prove the business/ finance case**
- **Prove the economic development case**
- **Prove the livable communities case**

COMMUNITY BUILDING & BEHAVIOR CHANGE

We Make a 6-10 Year Commitment to Each Community

NEW CONSTRUCTION and LARGE BUILDINGS

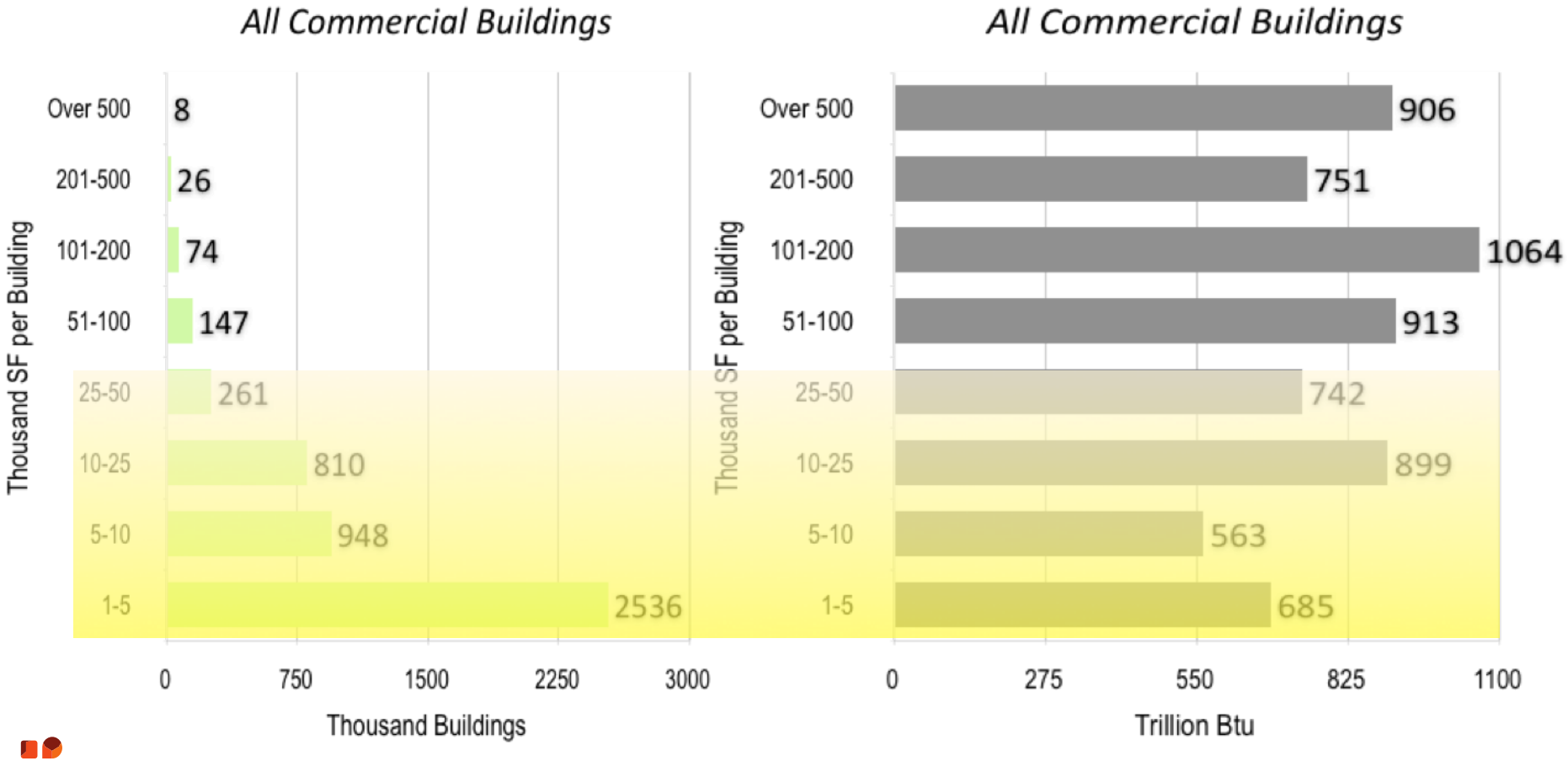
This level of work is being achieved in ground-up construction and large buildings.

Our challenge is to achieve the same thing, or better, in existing small to medium-sized buildings.

95% of U.S. commercial building owners own small to mid-sized commercial buildings

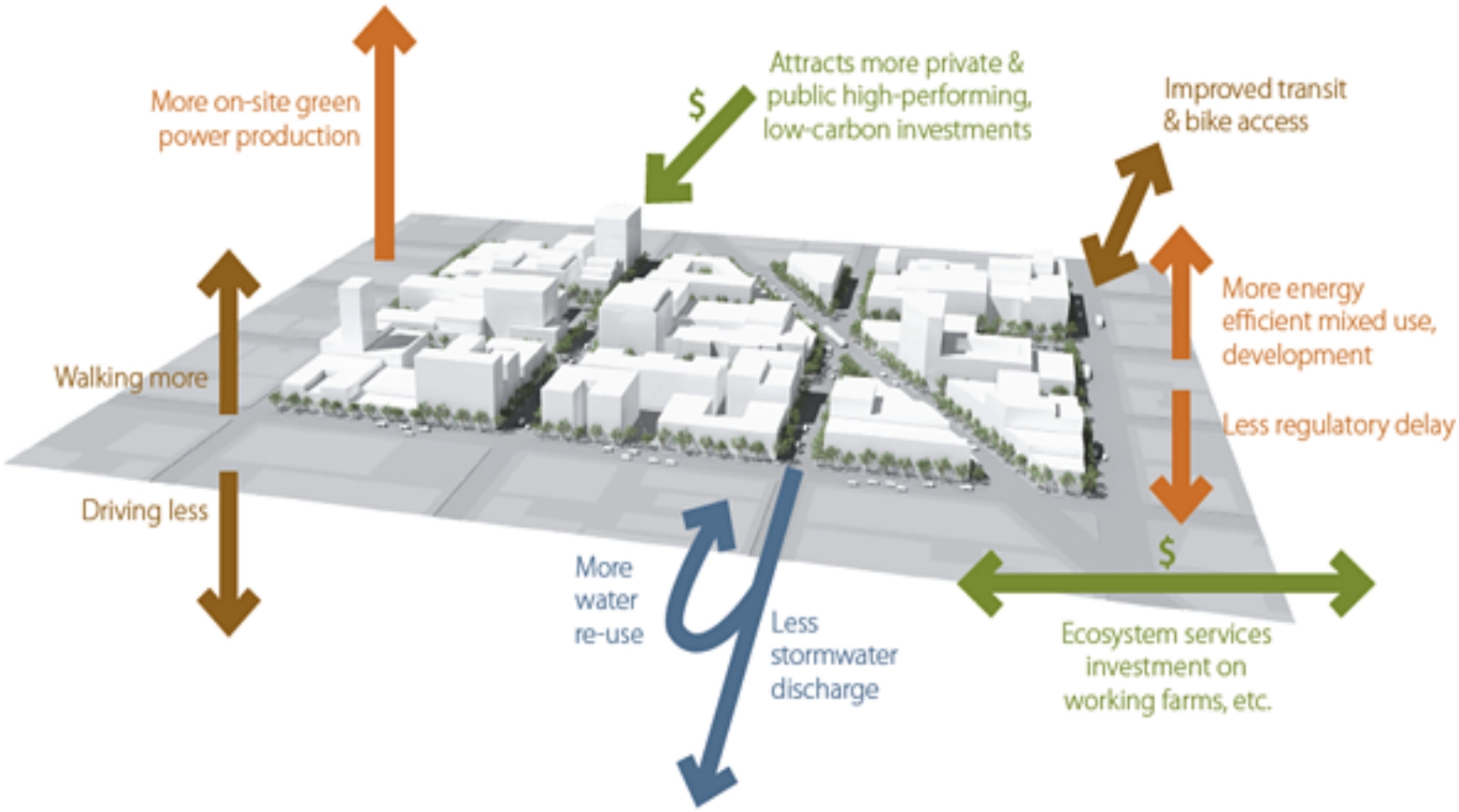
⇒ **45%** of all commercial sq footage

⇒ Consuming **44%** of annual commercial building energy use



Living City Block approaches the incredibly complex challenge of transforming cities by breaking it down into "bite-sized," (we like to say "block-sized") components.

Model Property of Mithun, 2008



We identify target blocks, which we call *Living City Blocks,* areas that can have a disproportionate impact on their local surroundings.

www.LivingCityBlock.org

Mithun, 2008

THE PROCESS

Phase 1 - Neighborhood Selection

Scouting locations, securing local partners, identification of local funding

Phase 2 – Secure Partnerships

Lock in location as well as utility and academic partners, community workshop, and draft master plans

Phase 3 – Project Kickoff

Baselining, energy modeling, financial modeling, analysis of EEMs and District Systems

Phase 4 – Project Implementation

Installation of EEMs and District System, Green Concierge, M&V, Living Communities work

Phase 5 – Track and Validate Economic Value Increases

Monitor behavioral changes and measure and validate results

Building the future one block at a time.

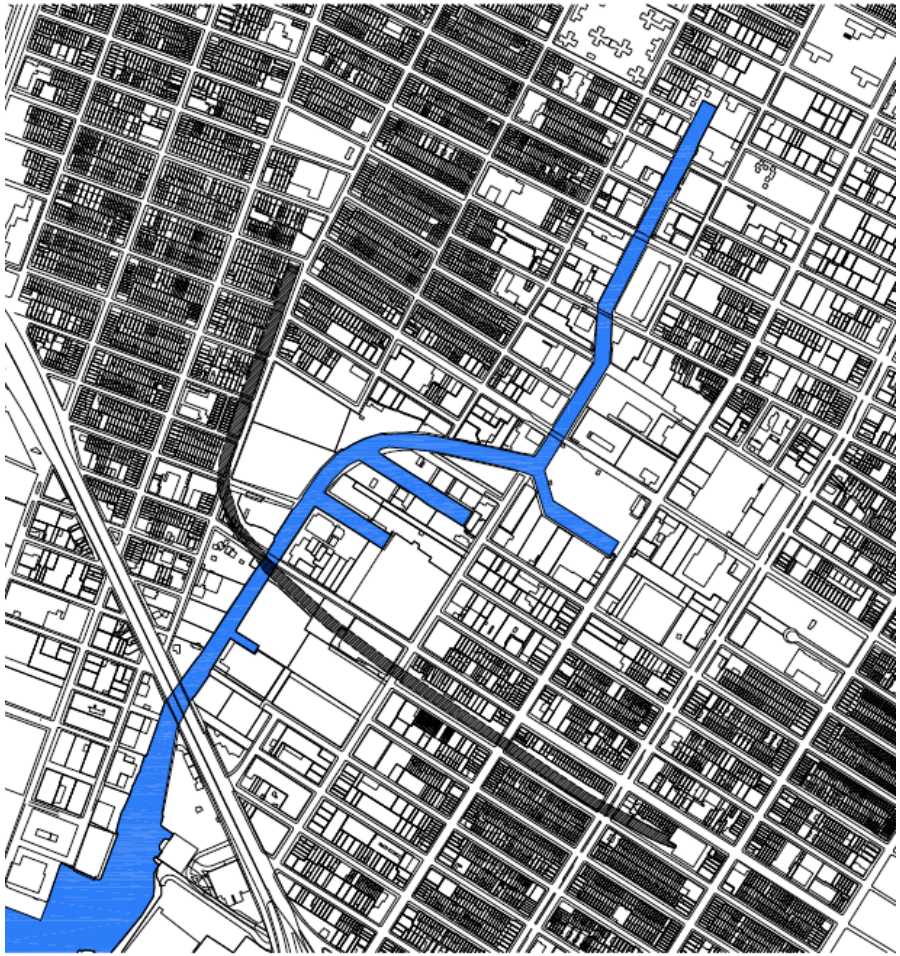
Living City Brooklyn

GOWANUS

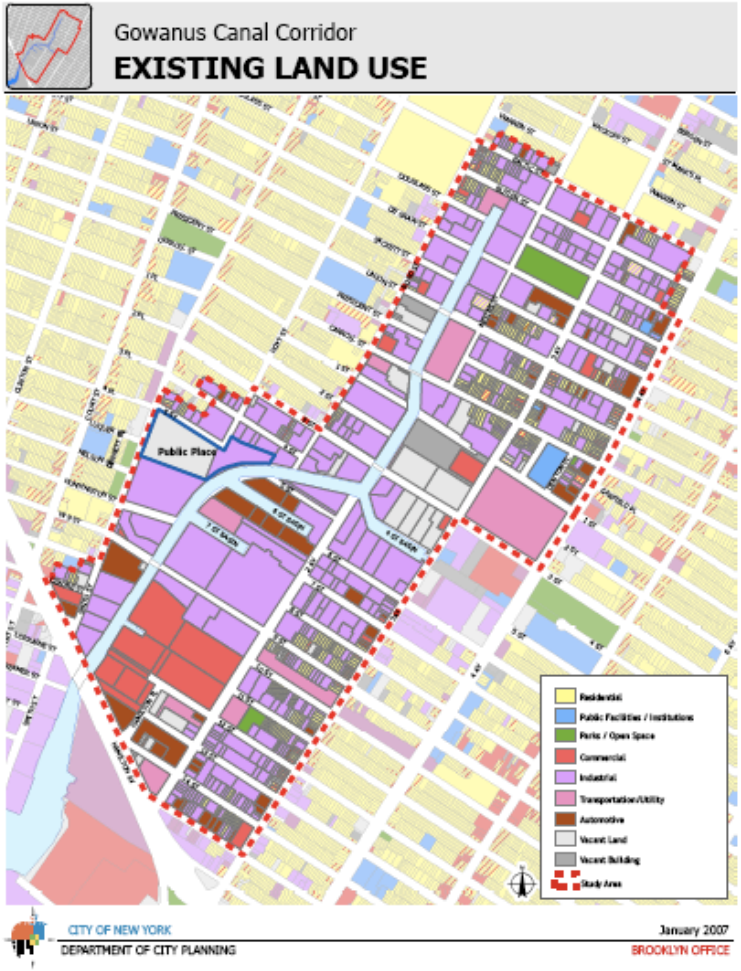
Building the future one block at a time.

Living City Brooklyn

GOWANUS



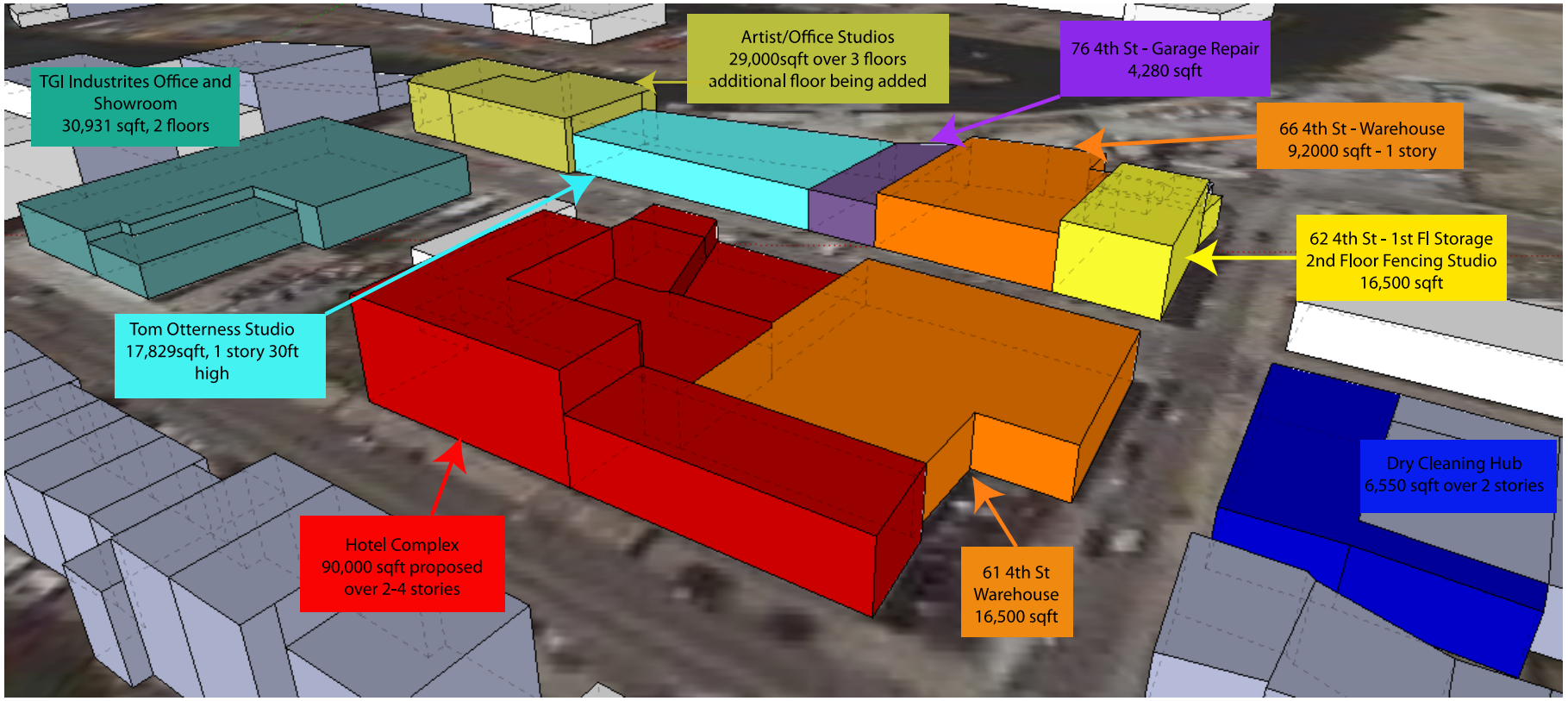
GOWANUS BROOKLYN NY
SCALE: 1:200



www.LivingCityBlock.org

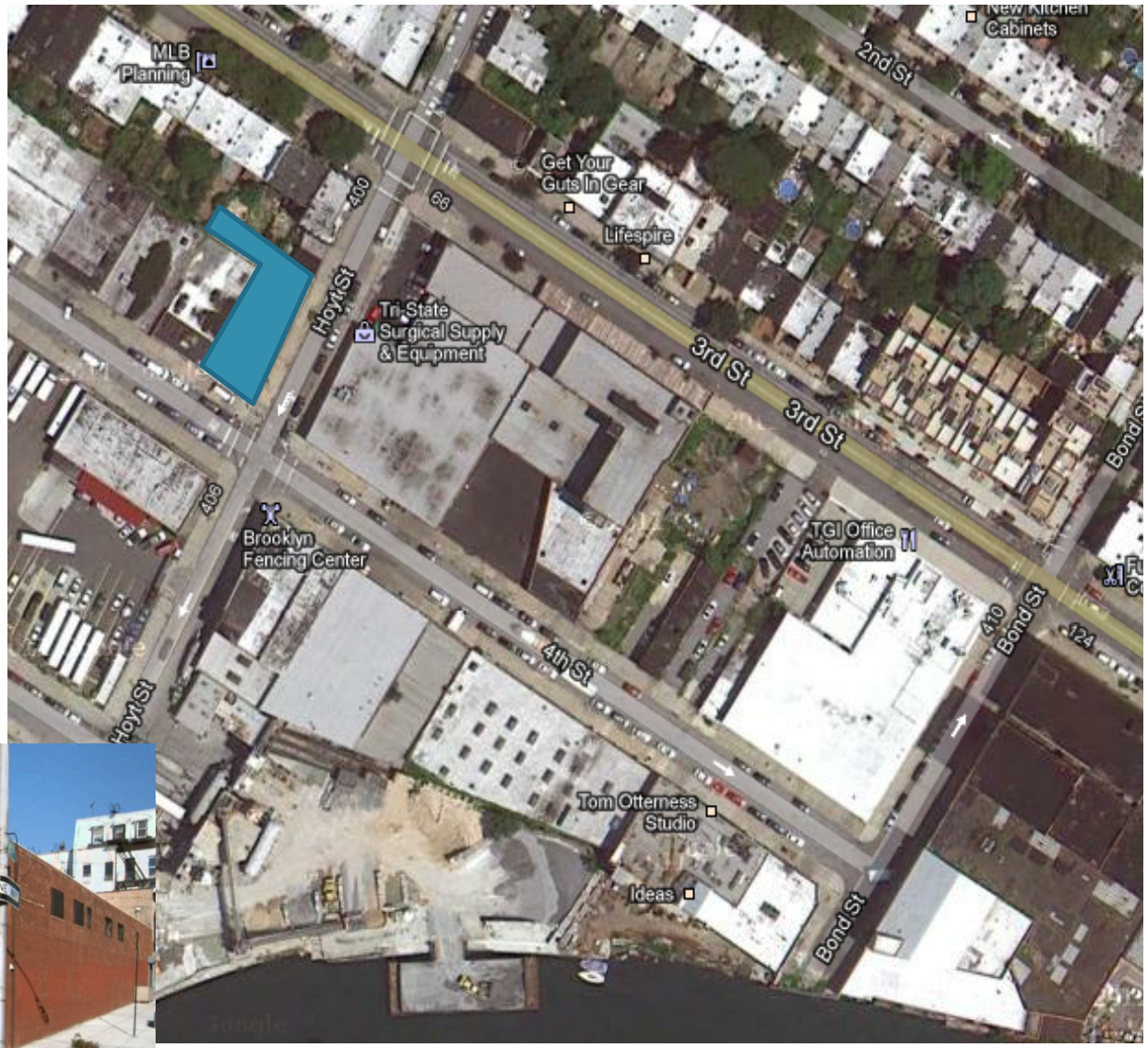
PHASE 1: C&I DISTRICT

PHASE 1 – Commercial/Industrial District



KONG CLEANERS

- 6,550 sq. ft.
- Dry cleaning hub for stores throughout S. Brooklyn
- 24 hour operations
- Baseload: 53kW
- Peak load: 70-85kW
- ERP: Upgrade steam press, optimize distribution system, upgrade lighting and add lighting controls

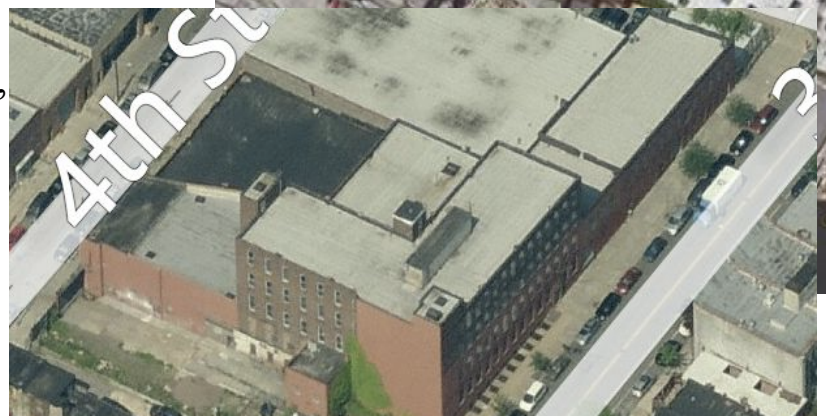


TRI-STATE SURGICAL SUPPLY

- 16,500 sq. ft.
- Warehouse for surgical supplies, small office space
- Base load: 6kW
- Peak load: 8-15kW
- ERP: Upgrade lighting

HOTEL COMPLEX

- Approx. 90,000 sq. ft. planned
- Planned Boutique Hotel (100 rooms), Office space/artist work + gallery space, light manufacturing, commercial kitchen
- Baseload: 72kW
- Peak load: 88-128kW
- ERP: insulate envelope, upgrade windows, install advanced HVAC plant, utilize on-site cogeneration heat, and power, Install high efficiency lighting system



TGI INDUSTRIES

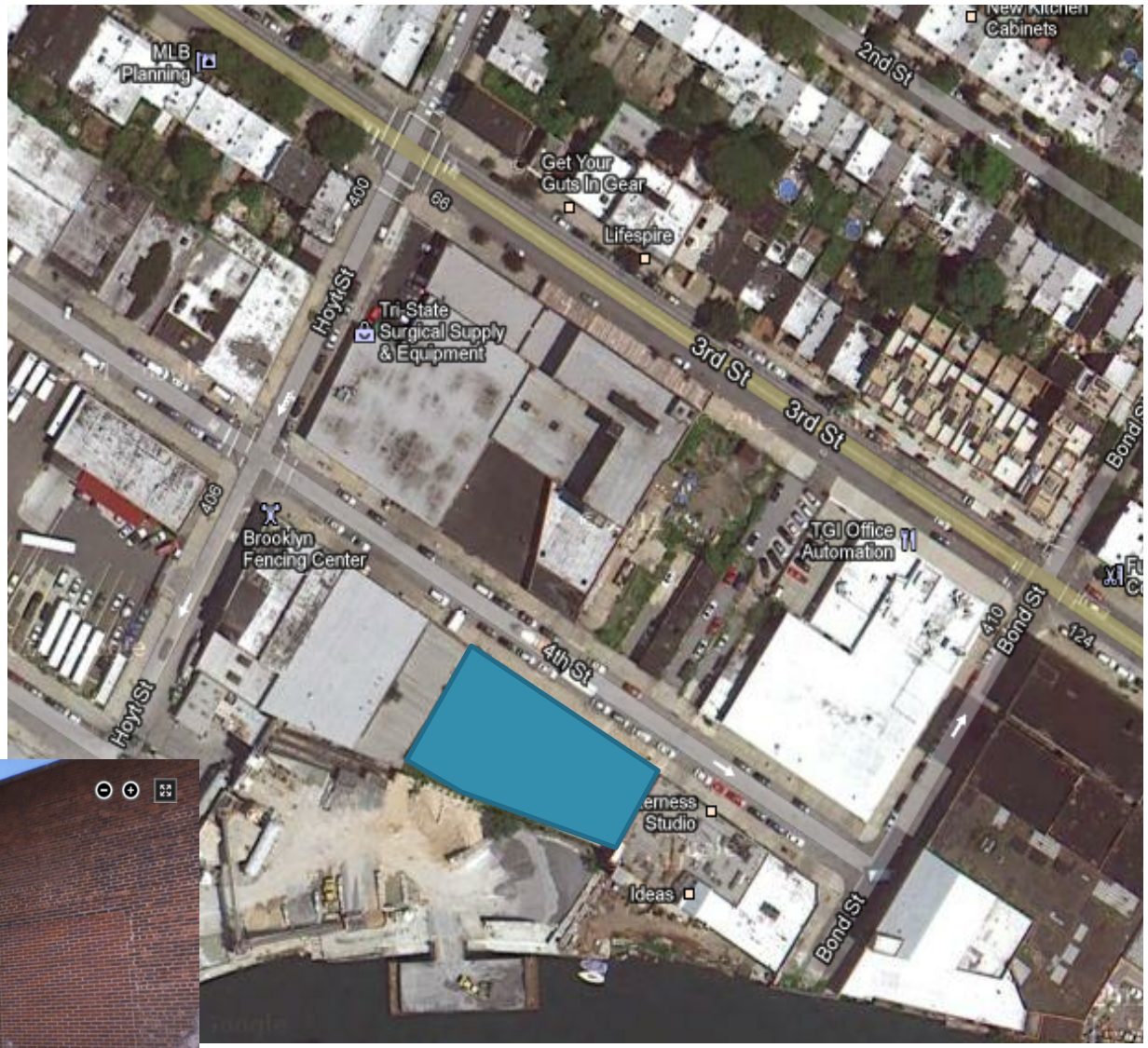
- 30,931 sq. ft.
- Corporate headquarters, equipment showroom/ warehouse
- Warehouse – 16 hrs per day, Office approx. 12 hrs per day
- Baseload: 72kW
- Peak load: 87-129kW
- ERP: Install lighting controls, reduce HVAC system size, optimize distribution system

4TH AND BOND

- Individual artist and office space for approx. 24 tenants
- Expect partial occupancy for 24 hrs per day
- Baseload: 40kW
- Peak load: 38-123kW
- ERP: Upgrade lighting system, install lighting controls, upgrade HVAC system, insulate + seal building envelope

TOM OTTERNESS STUDIO

- 17,977 sq. ft.
- Sculptors workshop, office, kitchen, loading dock
- 12-16 hour daily operation
- Baseload: 35kW
- Peak load: 39-66kW
- ERP: replace skylights, repair and optimize distribution system, upgrade HVAC system and controls, upgrade lighting



ROBERT B. SAMUELS, INC.

- 4,280 sq. ft.
- Auto Service Shop
- Baseload: 4kW
- Peak load: 4-15kW
- ERP: Upgrade lighting system, install lighting controls.

LIG IMPORTS

- 9,200 sq. ft.
- Dry Storage
- Baseload: 13kW
- Peak load: 14-50kW
- ERP: Upgrade lighting system, install lighting controls.

BROOKLYN FENCING CENTER

- 16,500 sq. ft.
- Fencing school, warehouse space
- Mostly after school and weekend operation
- Baseload: 12kW
- Peak load: 9-29kW
- ERP: Install HVAC controls, upgrade lighting system, install lighting controls.

PHASE 1: C&I DISTRICT

Total Baseload: approx 300 kW

Peak Range: 350 – 634kW

POTENTIAL ENERGY PROGRAM:

- Energy Efficiency: Reduction and Optimization Plan
- Peak Shaving
- Demand Response
- Cogeneration – Baseload Power and Thermal Consumption
- Solar PV – Peak Load Production
- Power Storage
- Ancillary Grid Services

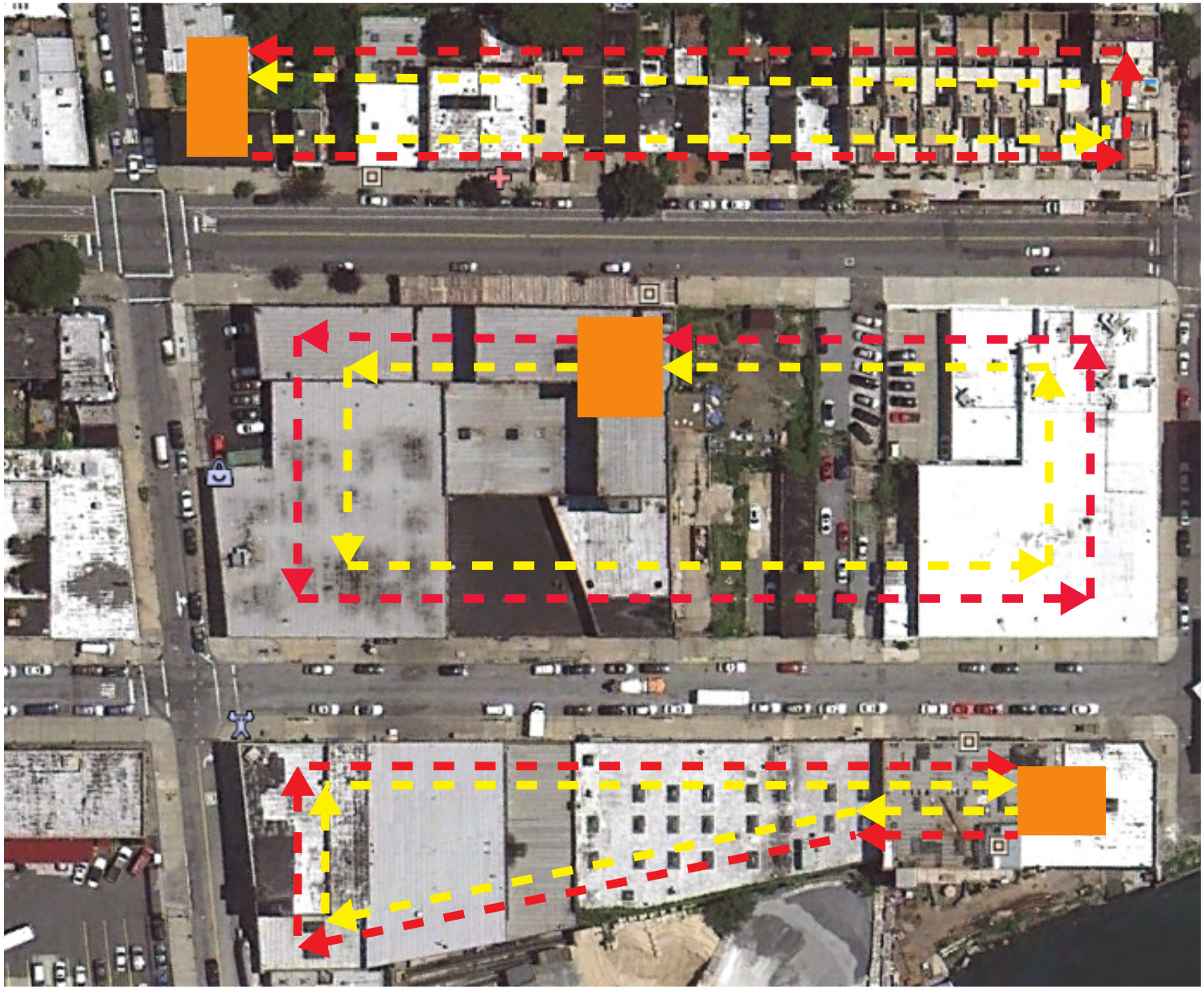
DISTRIBUTED GENERATION ARRANGEMENTS

Means to establishing Single Customer status

Shared Infrastructure on a Physical Loop

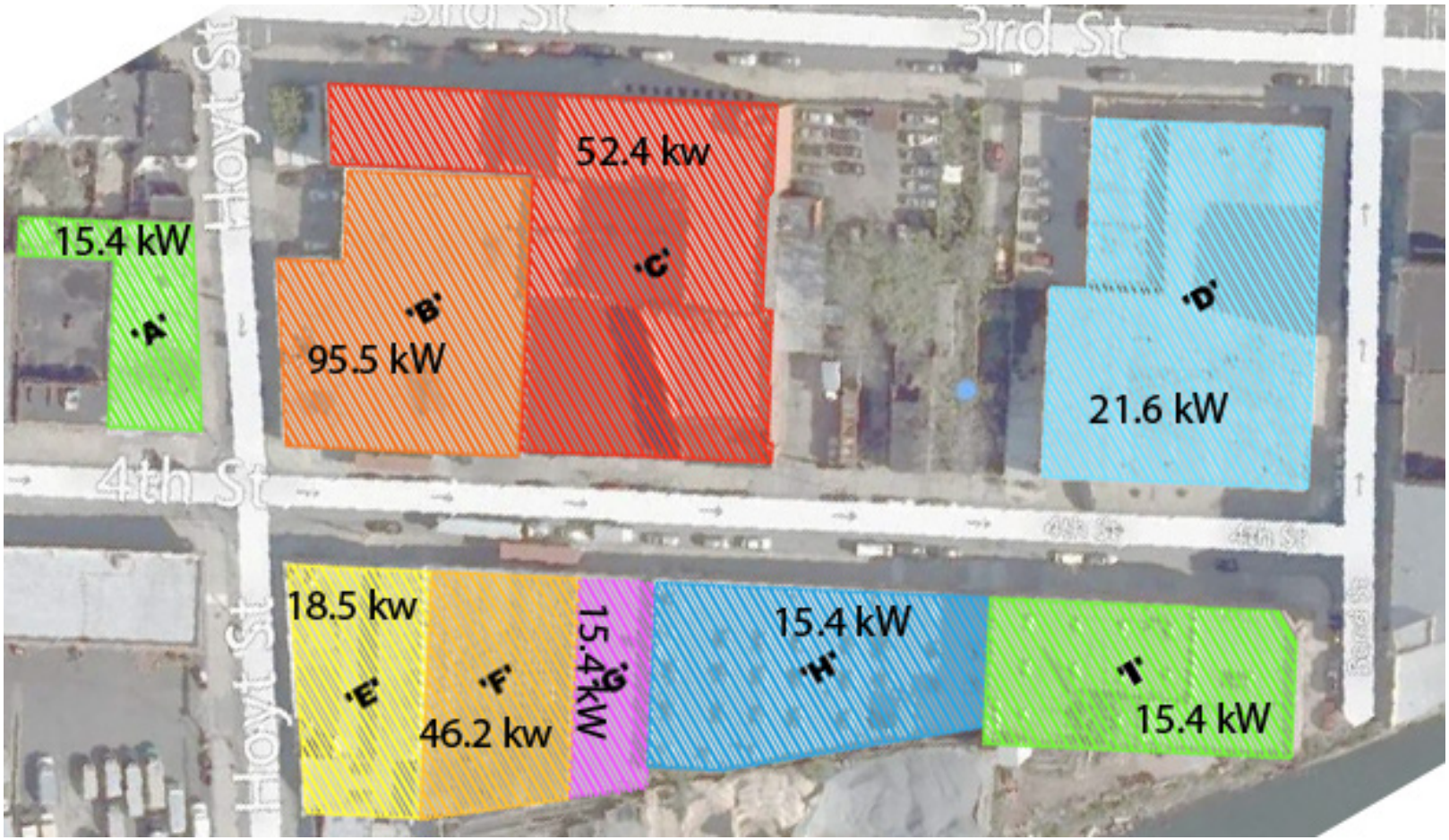
DISTRIBUTED GENERATION ARRANGEMENTS

Means to establishing Single Customer status



SOLAR POTENTIAL

Option #1



Approx 300kW Potential

FUEL CELL ROUGH ANALYSIS

- 300 kW System (small!)
- $12,000/kW Installed = $3,600,000 Total
- Approx $1,800,000 in Incentives/Grants
- Save Approx $280,000 per year in heating and power expenses

- Simple Payback: 5.3 Years

Assumptions:

- Previous Incentives remain available (performance and installation)
- System operates 24/7 – 95% availability
- 56% total heat utilization

NET METERING ALLOWANCES

Electric Generating Equipment	Total Rated Capacity	Maximum Amount
Residential micro-CHP	1 to 10 kW	$350
Residential fuel cells	up to 10 kW	$350
Residential micro-hydro	up to 25 kW	$350
Solar	up to 25 kW	$350
Wind	up to 25 kW	$750
Farm waste	up to 1,000 kW	$5,000
Farm wind	above 25 kW up to 500 kW	$5,000
Nonresidential solar or wind	above 25 kW up to 2,000 kW	Company's actual cost
Non-residential fuel cells	up to 1,500 kW	Company's actual cost
Non-residential micro-hydro	up to 2,000 kW	Company's actual cost

HURDLES

PROJECT DEVELOPMENT

- **ORGANIZATION – getting multiple building owners into an arrangement that can be legally defined**
- **LACK OF PRECEDENT – lack of multi-stakeholder aggregation projects**
- **LOAD SIZE – incorporating enough buildings to warrant the energy program**

SOLUTIONS

(OR WHAT WOULD REALLY HELP)

- **SPECIALIZATION – we are conveners and caterers, ensuring that all the experts are at the table and the owners are well represented**
- **COMMUNITY BUILDING – associating owners with something bigger than their own building**
- ***PRECEDENTS – more multi-stakeholder examples***
- **ANCHOR BUILDINGS – always have at least one heavy consistent user to bolster load.**

HURDLES

DATA

- **ELECTRIC DATA – smaller buildings do not have detailed interval data collected. Lack of historical data**
- **HIDDEN TREASURE – underground infrastructure maps housed in various depts., utilities, authorities, etc. must all be considered**

SOLUTIONS

(*OR WHAT WOULD REALLY HELP*)

- **GET TO KNOW YOUR LOAD – actively meter, interview operators, to inform modeling**
- ***IN-DEPTH DATABASES – advanced metering collected for all building sizes, in one place, for owners and developers to access***
- ***CONSOLIDATED DATABASES* – a one stop shop for sustainability data and maps**

HURDLES

UTILITY/REGULATORY

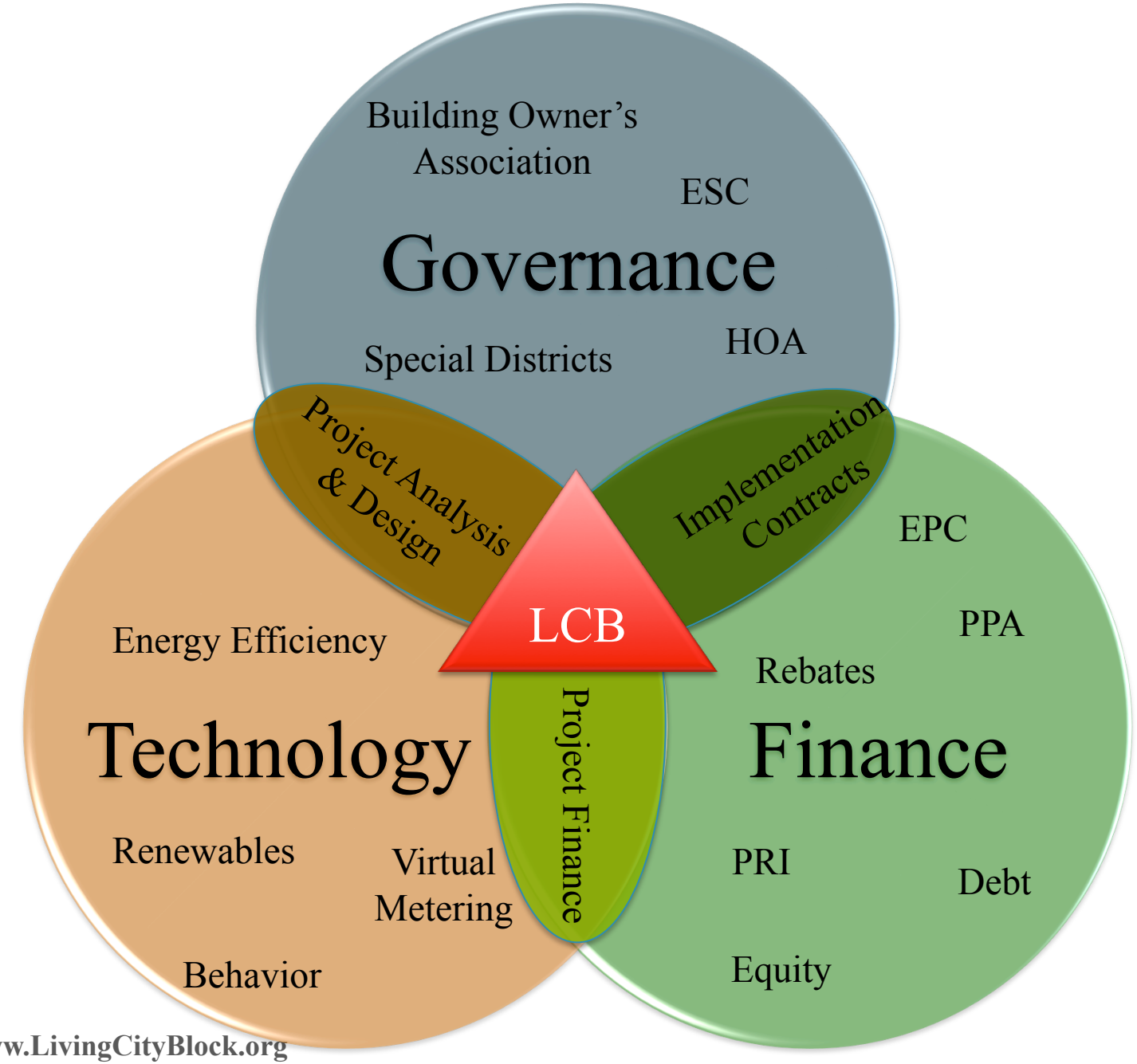
- **PROPERTY LINES – few precedents of privately produced energy distributed across property lines**
- **OVER PRODUCTION – limits to net-metering and low buy back rates.**
- **C&I – RESI RESTRICTIONS – limited to either or implementations.**

SOLUTIONS

(*OR WHAT WOULD REALLY HELP*)

- ***MULTI-PROPERTY PRECEDENTS – it's been done, now for more.***
- ***OPEN EXPORT – acknowledge actual per/kWh value to grid; reduce/remove net-metering limitations; improve buy-back rates***
- **STAGED DEVELOPMENT – identify best loops of C&I and Resi buildings for separate installations.**
- ***INDISCRIMINATE DISTRIBUTION RULES* – allow power producers and neighboring end-users take advantage of their mixed-use areas**

LIVING CITY BLOCK AGGREGATION MODEL



FINANCE & GOVERNANCE MODELING

"The additional capital needed for today's hyper efficient buildings can be achieved by monetizing future energy savings."

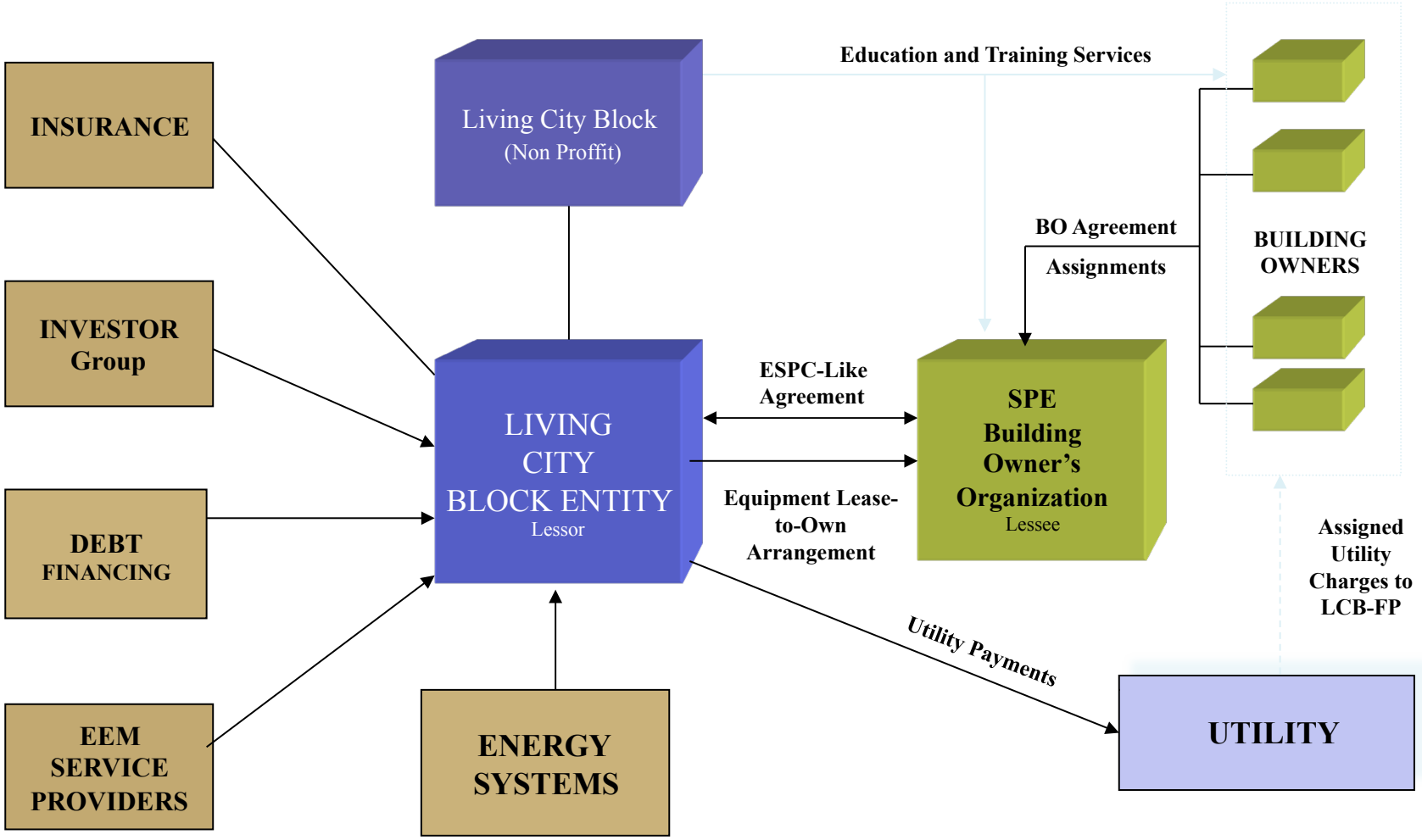
FINANCE & GOVERNANCE MODELING

NEW & HYBRID FINANCE TOOLS

- Negawatt or Energy Efficiency PPA
- RESCO – Resource and Energy Service Co.
- Project Finance model
- PRI - Program Related Investments
- CDM Model
- Disparate Owners Come Together in Block Wide Consortiums

Living City Block

Urban Sustainable Community Governance Model



FINANCE & GOVERNANCE MODELING

FINANCE MODELING LCB PROJECTS

Equity	20%	Private (15-20% IRR), Social Equity (8-12% IRR)
Tax Credits	10%	Historic, LIHTC, NMTC, etc.
Rebates	10-15%	179D, Local Utility, Federal/State, etc.
Public	10-15%	CRA, Bonds, QECBs, ARRA, EECBG, CDFI
Sub/Mezz Debt	20%	Various Sources
Senior Debt	25-30%	Capitalized cash flow from EE savings
PROJECT FINANCING	100%	

The gleam of an heroic act
Such strange illumination
The Possible's slow fuse is lit
By the Imagination.

— Emily
Dickinson

We turn the possible
Into the practical

There is nothing more difficult to take in hand, more perilous to conduct, or more uncertain in its success, than to take the lead in the introduction of a new order of things.

— Nicolo Machiavelli
The Prince

REPLICABLE
SCALABLE
EXPORTABLE

RESILIENT
VIBRANT
EFFICIENT

FRAMEWORK

CITIES

Building the future one block at a time.

Living City Block

INTEGRATION
COLLABORATION

COMMUNITY

www.LivingCityBlock.org