

# INNOVATIVE MATERIALS + METHODS

*HOUSING  
INNOVATION  
WORKSHOP*

**NOV 02, 2018**  
9am - 1pm

*BSA Space*  
290 Congress St, Suite 200  
Boston, MA 02210

THE MAYOR'S OFFICE OF  
**NEW URBAN  
MECHANICS**



**BSA**



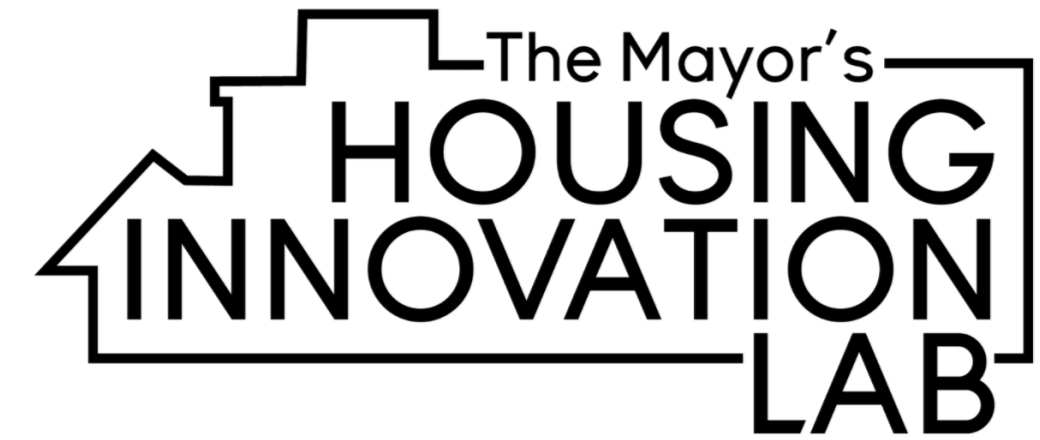
REAL  
ESTATE  
INNOVATION  
LAB

- Image: Patch22 High-Rise Timber Apartment Building, Franzten Architects: <http://patch22.nl/>



# WHO *WE* ARE

THE MAYOR'S OFFICE OF  
**NEW URBAN  
MECHANICS**

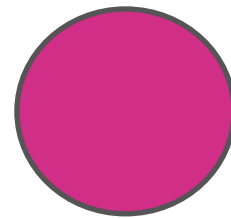


REAL  
ESTATE  
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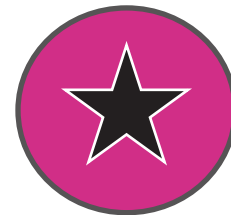


*\*We are grateful to our silent sponsor for supporting this event\**

# WHO *YOU* ARE



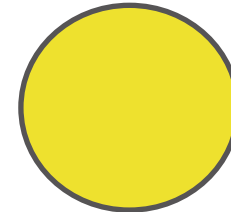
**DESIGNERS & ARCHITECTS**



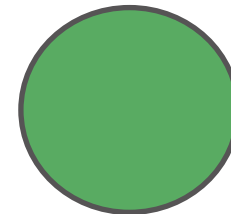
**BUILDERS & CONTRACTORS**



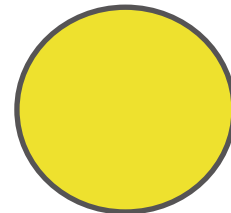
**REAL ESTATE DEVELOPERS**



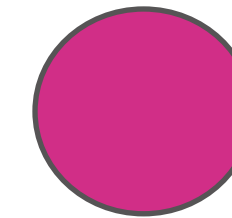
**LAND OWNERS & MANAGERS**



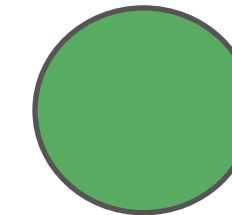
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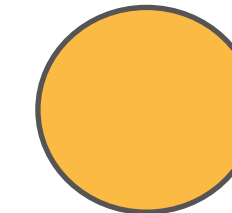
**FINANCIERS**



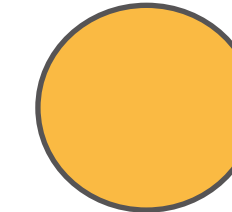
**CITY PLANNERS**



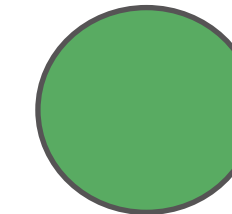
**COMMUNITY EXPERTS**



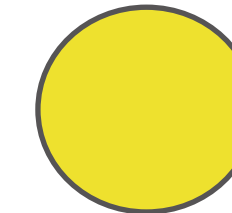
**TECH EVANGELISTS**



**EDUCATORS & RESEARCHERS**



**COMMUNICATIONS & MEDIA**



**BROKERS**

# OBJECTIVES

1

HAVE FUN!

2

BUILD SOMETHING NEW TOGETHER!

3

40 IDEAS, 800 EXPANSIONS, 16 PROTOTYPES, 8 PITCHES!

4

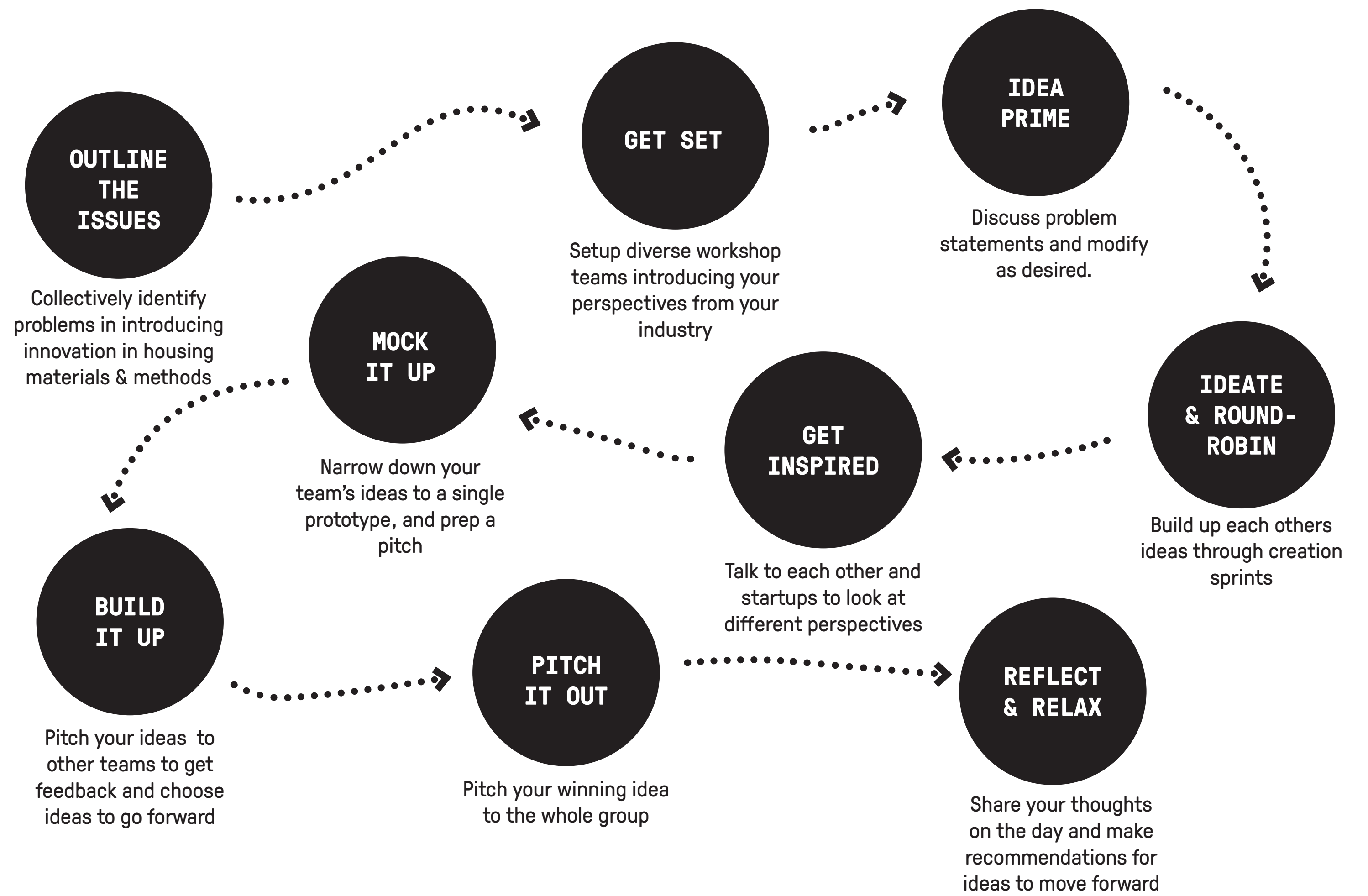
4 WAYS TO DEVELOP DIFFERENTLY!

5

FORM OUR COMMUNITY!



# WORKSHOP FLOW





# GUIDING PRINCIPLES

1

BE OPEN TO SPONTANEOUS CONNECTIONS

2

QUESTION THE OBVIOUS

3

MAKE THE DAY WHAT YOU NEED IT TO BE

4

ACKNOWLEDGE OTHERS AND BE HEARD

5

EXPERIENCE, AND NEW IDEAS HAVE THE SAME SEAT AT THE TABLE

#

GET SOCIAL! **#developdifferently** @BSAIA @HousingiLab @MITREILab



# EQUITY OF INNOVATION

*As we workshop solutions today we should keep the following questions at the forefront:*

- 1 WHO IS BENEFITTING?**
- 2 HOW IS WEALTH & VALUE DISTRIBUTED?**
- 3 HOW IS THIS IMPACTING GOOD, STABLE JOBS?**
- 4 HOW DOES THIS IMPACT NEIGHBORHOODS?**



# TEAM MISSIONS



## VISION:

Our goal:

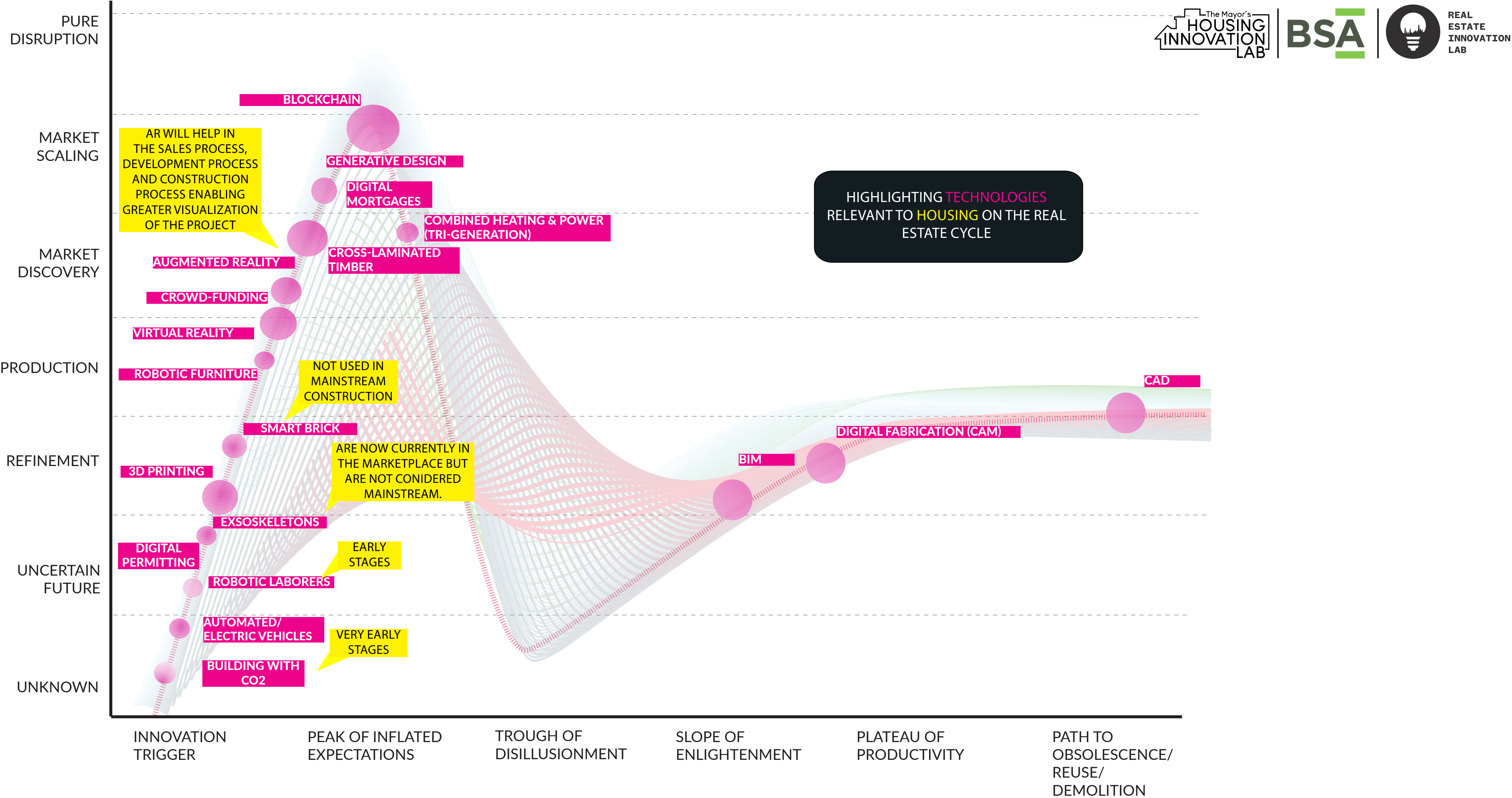
- increase the amount of housing to increase housing supply, AND
- decrease the total cost of development,

to serve the middle income housing demanders in the City of Boston and its surrounding areas, through innovations in:

- 1. Construction:**  
materials & techniques
- 2. Process:**  
regulations & procedures
- 3. Technologies:**  
products & services
- 4. Financing:**  
underwriting & sourcing



# Innovative Housing Technologies



# Innovative Housing Types

PURE  
DISRUPTION

MARKET  
SCALING

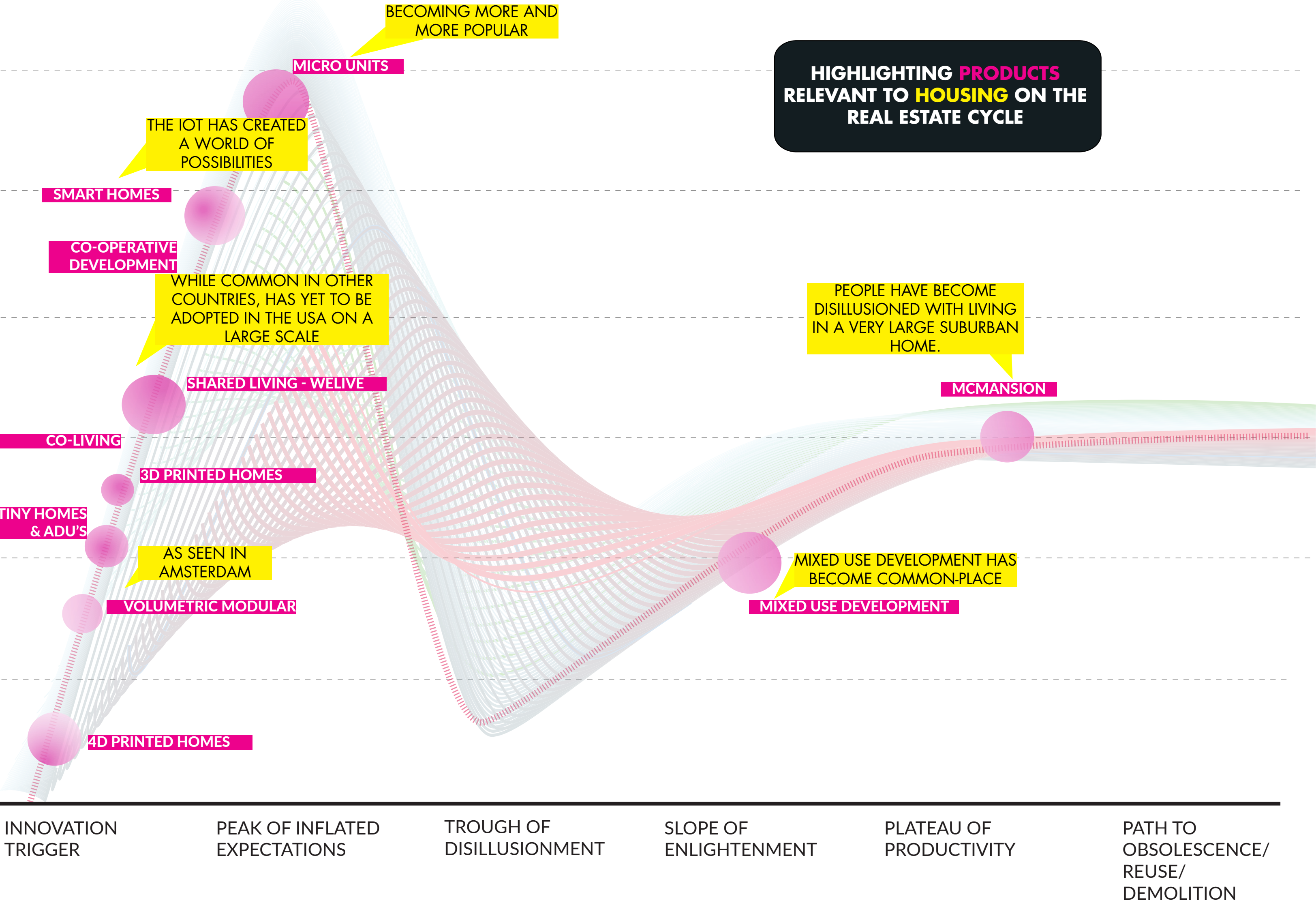
MARKET  
DISCOVERY

PRODUCTION

REFINEMENT

UNCERTAIN  
FUTURE

UNKNOWN





# 4 TOPICS:

## CONSTRUCTION

*new materials  
& techniques*

## PROCESS

*new regulations  
& procedures*

## TECHNOLOGY

*new products  
& services*

## FINANCING

*new underwriting  
& sources*

# CONSTRUCTION

*new materials & techniques*

## PROBLEM:

Currently, we have limited ability to reduce the cost of construction for residential buildings.

The choices available for materials, structure, and finishes are limited and tightly integrated with conventional construction techniques, labor skills, supply chains, firm sizes, locations, and regulations.

## CHALLENGE:

How could new materials and construction techniques have the potential to be incorporated into the housing construction industry? How could their diffusion be facilitated?

E.g:

- Prefabricated, Cross-Laminated Timber and alternate fire-safety evaluation
- 3D-Printed Concrete
- SIPs (Structural Insulated Panels)
- Passivhaus
- Modular Componentry
- Low-Carbon & Low Embodied-Energy materials



# CONSTRUCTION

*new materials &  
techniques*

## CROSS-LAMINATED TIMBER

*Featured:*

Mithun + Kattera,  
CLT Student Housing Prototype





# CONSTRUCTION

*new materials &  
techniques*

## VOLUMETRIC MODULAR

*Featured:*

Kasita,  
Stackable modular housing prototype





# CONSTRUCTION

*new materials &  
techniques*

## 3D-PRINTED HOUSING

*Featured:*

ICON,  
Collaboration with New Story low-cost housing  
prototype





# PROCESS

*new regulations  
& procedures*



## PROBLEM:

Currently we have antiquated zoning and built environment regulations that inhibit innovation or market-fit in new housing development.

## CHALLENGE:

How can the relationship between communities, regulators, and the housing industry be reformed so that development is more predictable, community-oriented, and sufficient for a growing population?

E.g.:

- Legislation to promote/enable ADUs (Accessory Dwelling Units, Tiny Homes)
- Lowering barriers to co-ownership
- More transparent & accessible permitting
- Zoning for specific innovative product types
- Removing parking minimums
- Rent Control policies
- Reduced minimum unit sizes



# PROCESS

*new regulations  
& procedures*

## ACCESSORY DWELLING UNITS (ADUs)

*Featured:*

People's Architecture Office,  
Plug-in House





# PROCESS

*new regulations  
& procedures*

## CO-LIVING

*Featured:*

Nesterly,  
Platform for intergenerational homesharing

The Mayor's  
HOUSING  
INNOVATION  
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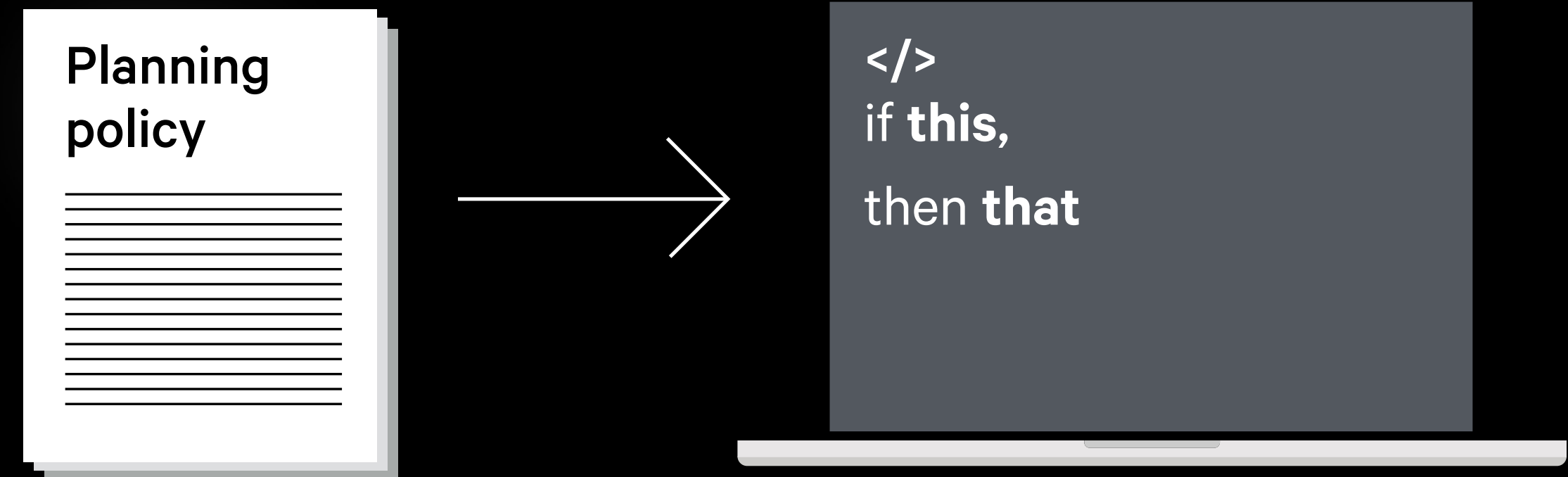
# PROCESS

*new regulations  
& procedures*

## DIGITAL PERMITTING

*Featured:*

Open Systems Lab,  
PlanX, digitized permitting guidance and  
compliance system



## What if we could write planning policy as ... code?

The problem is that the planning system was designed before computers or the internet. It was designed to run on paper, so everything has to be laboriously written, read and checked by humans. But what if planning policies and information could be read automatically: not just by humans, but also machines?



# TECHNOLOGY

## *new products & services*



### PROBLEM :

Currently, the diffusion of new technologies into the housing industry is slow and fragmentary.

The process for institutional capital to value and invest in housing innovations requires significant market precedent, or governmental assistance and risk-mitigation.

In addition, the impact of infrastructural innovation (like autonomous vehicles) on housing & planning is poorly considered or planned-for.

### CHALLENGE :

Which technologies show great promise for the housing industry, and how can their diffusion be facilitated? Which technologies will have significant impact on the housing market, and how can these be leveraged to produce beneficial outcomes?

E.g.:

- Autonomous (Electric) Vehicles
- Automated Parking Structures
- Household Solar (off-the-grid energy)
- Co-living (Mix Use)
- Shipping Container Homes
- 3D-printed homes
- Robotic Furniture



# TECHNOLOGY

*new products & services*

## AUTOMATED & ELECTRIC VEHICLES

Impact on housing choice, location, and parking



The Mayor's  
HOUSING  
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ESTATE  
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# TECHNOLOGY

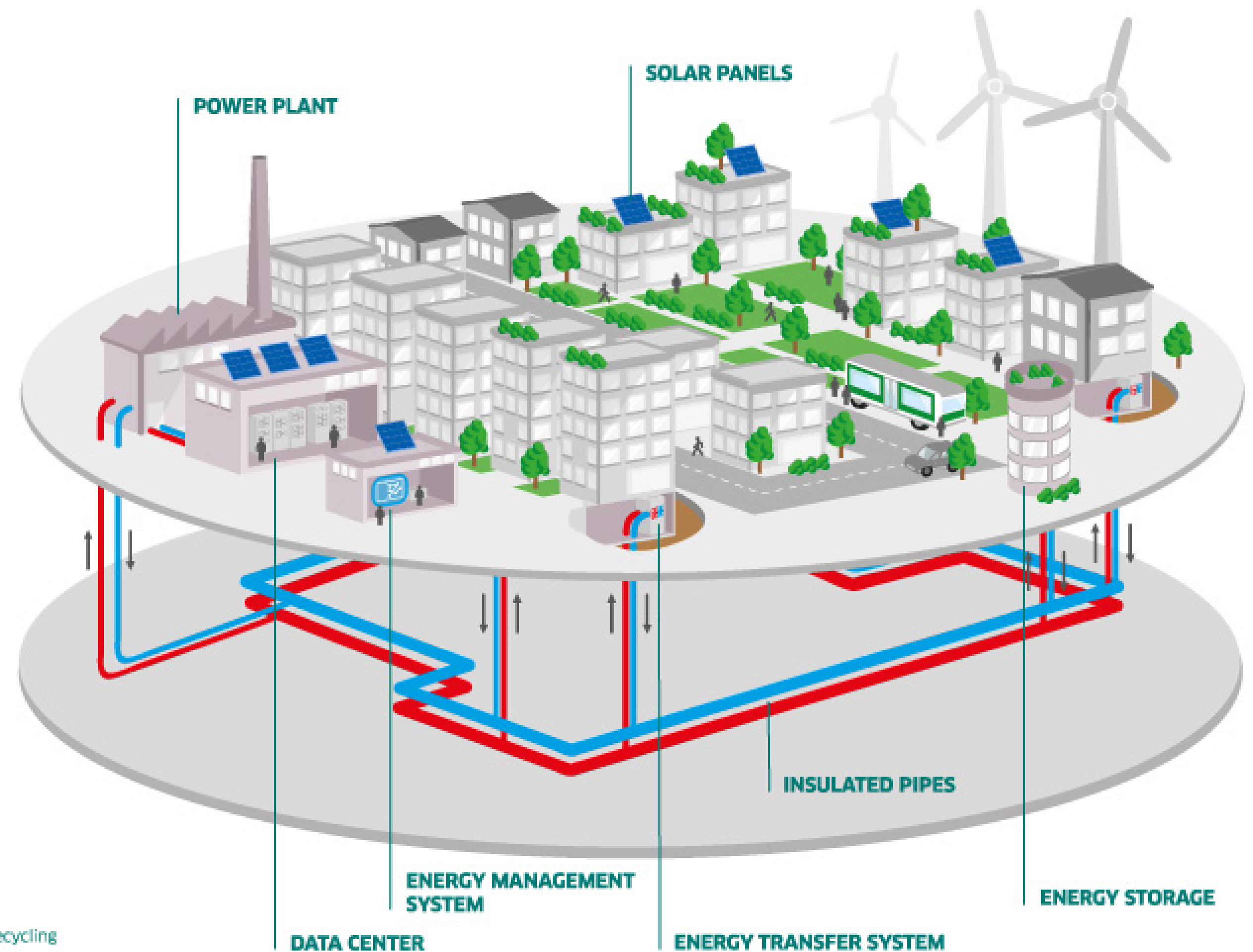
*new products & services*

## DISTRICT ENERGY

Featured:

ENGIE,  
District heating and cooling systems

-  Heat from computer servers
-  Geothermal energy
-  Natural gas
-  Biomass
-  Solar
-  Household waste recycling





# TECHNOLOGY

*new products & services*

## ROBOTIC FURNITURE

*Featured:*  
Ori,  
Transformable furniture for high-density urban living





# FINANCING

## *new underwriting & sources*

### PROBLEM:

Currently financial underwriting of housing development is blunt and has little incentive to value innovation.

The fragmentation and dissociation between investors/lenders and eventual occupants means amenity benefits that cannot be immediately captured into the asset price are left out of new development specifications or requirements.

### CHALLENGE:

How can a closer financial relationship between housing occupants and asset investors be fostered so that innovations are valued? Which ownership, tenancy, or organizational vehicles could spur the adoption and diffusion of innovations in construction, materials, and products?

E.g.:

- Tenant-led Co-operative ownership (Baugruppen)
- Amenity metrics in tax/price assessment
- Discounts in property taxes for innovation adoption.
- Lowering barriers to co-ownership
- Co- & crowd-funding development



# FINANCING

*new underwriting  
& sources*

## CO-OWNERSHIP & CO-OPERATIVE DEVELOPMENT

*Featured:*

Nightingale Housing 1.0,  
20 Apartments in Florence Street, Brunswick





# FINANCING

*new underwriting  
& sources*

## DIGITAL MORTGAGES

Featured:

Blend,  
Frictionless, compliant, and more accessible  
lending  
completed 3 requests

Taxes

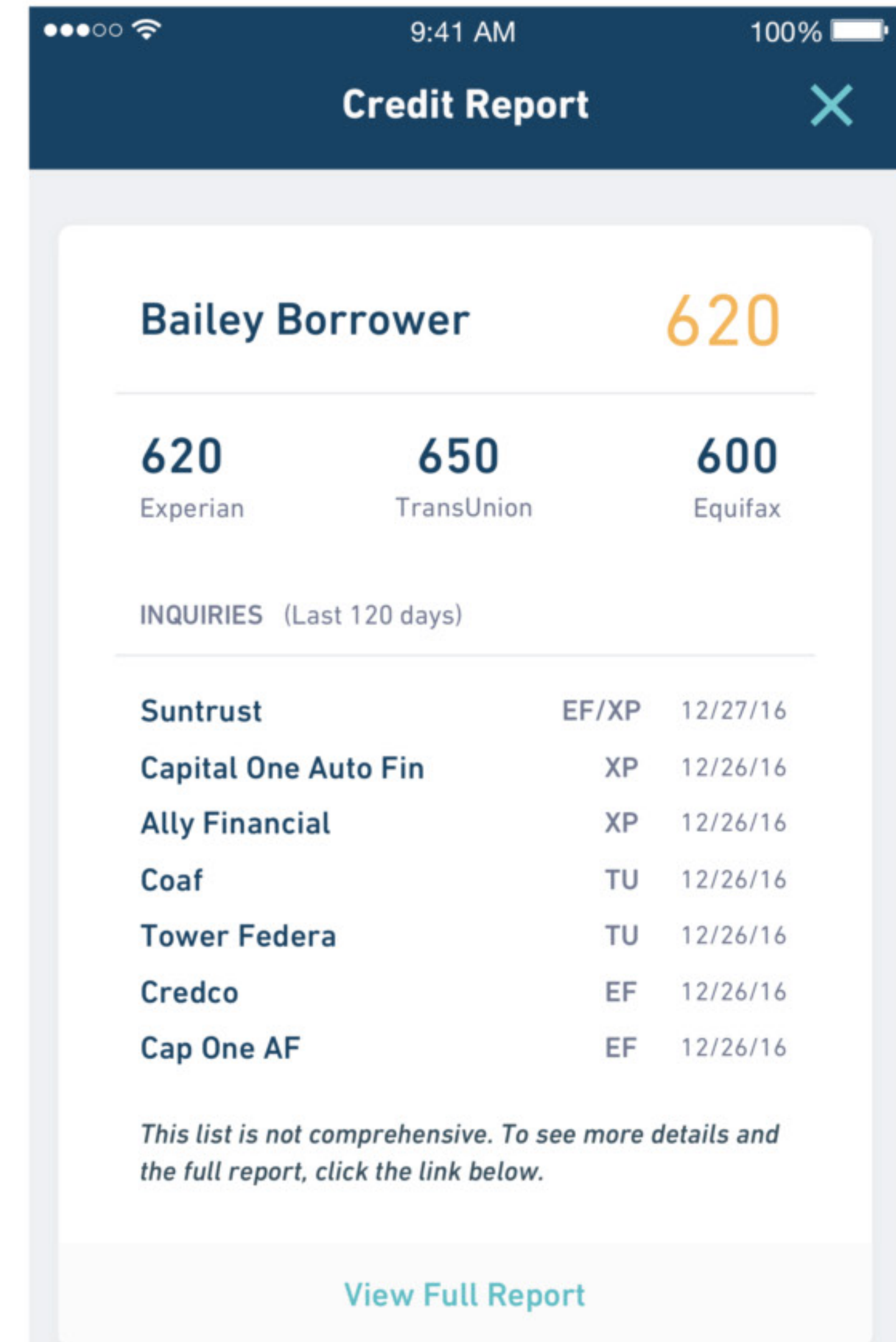
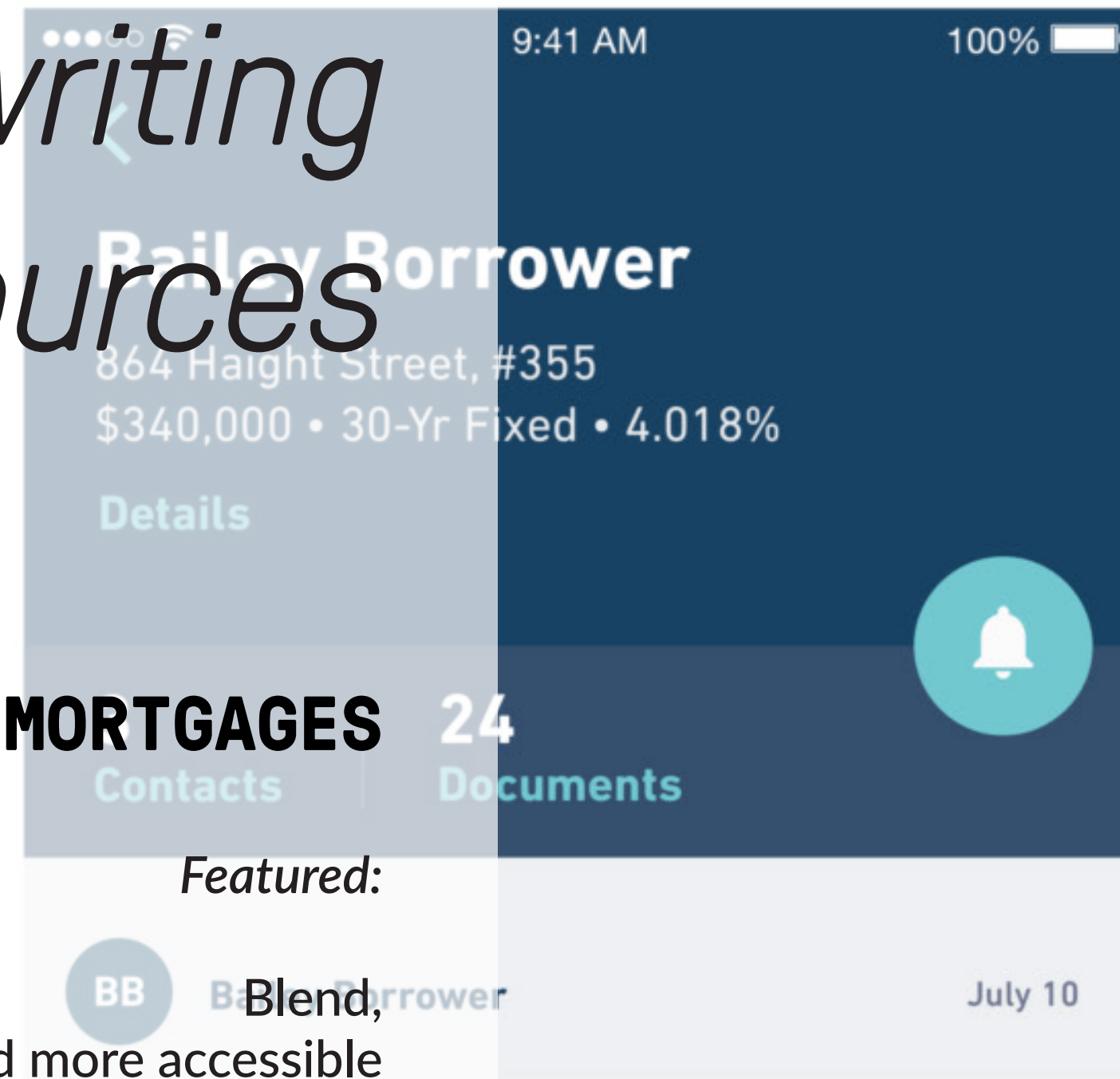
2016 Tax Return — Bailey B

2015 Tax Return — Bailey B

W2s

W-2 — Bailey B

Paystubs



REAL  
ESTATE  
INNOVATION  
LAB



# FINANCING

*new underwriting  
& sources*

## Earnings to Date ⓘ

Paid and unpaid distributions.

\$43.62

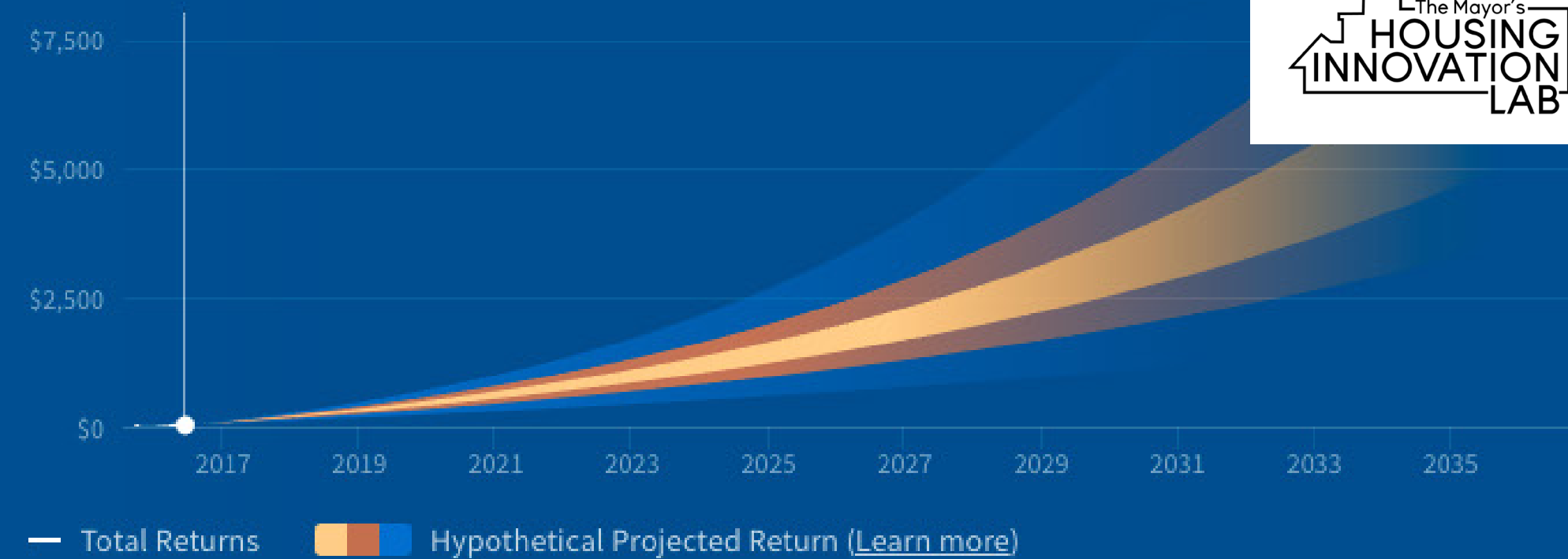
↑ \$15.5 since last login



Next distribution  
Mid-July 2017

## Total Returns ⓘ

Cumulative paid and unpaid earnings + change in Net Asset Value (NAV) per share.



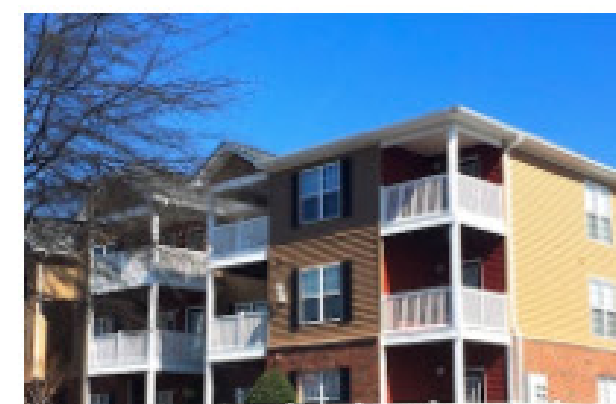
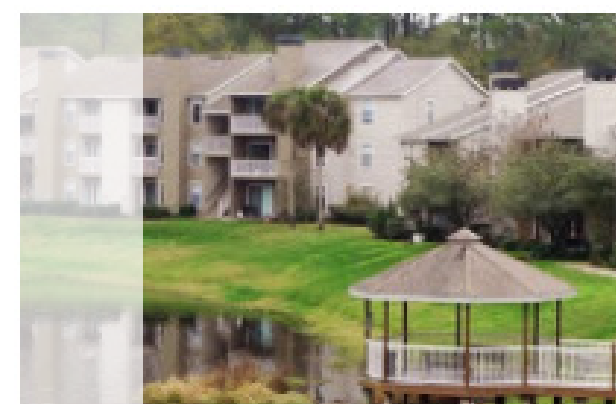
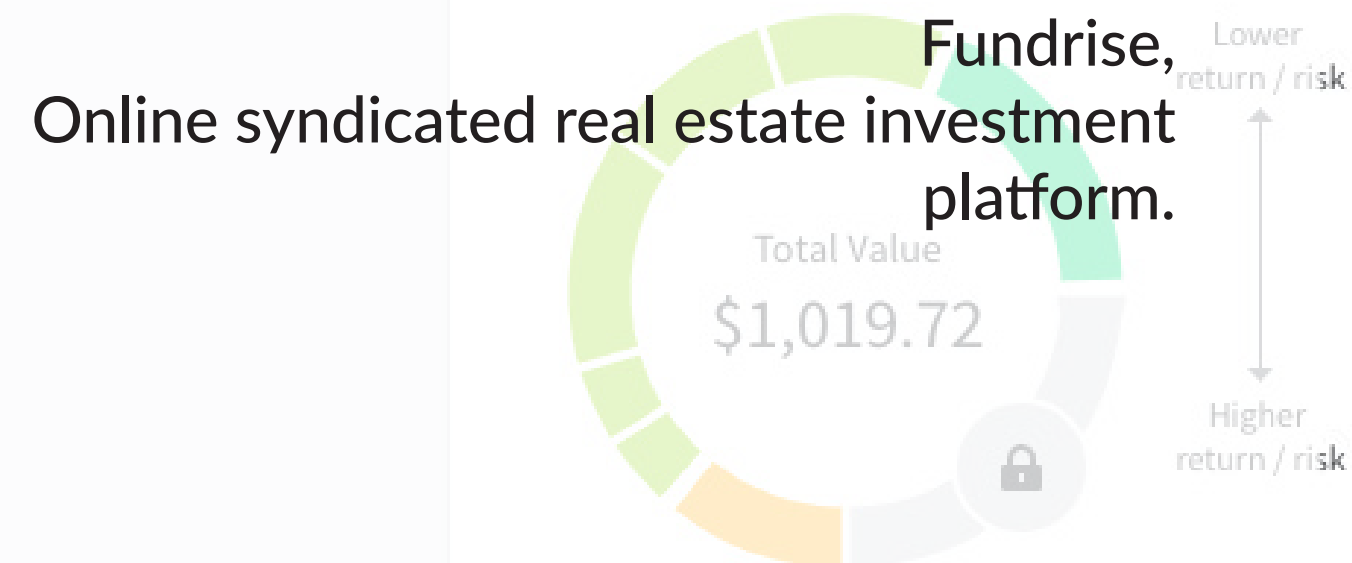
You have not designated any beneficiaries. [Designate a beneficiary](#)

## CROWD-FUNDING

Your Portfolio

Featured:

Asset Map Investment



## Recent Activity



New Asset: \$2.1M Acquisition  
Loan in Los Angeles, CA 31 May



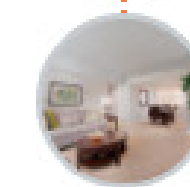
New Asset: \$8.5M JV Equity  
Investment 23 May



Asset Addition: \$2.5M  
Investment in Tempe, AZ 10 May



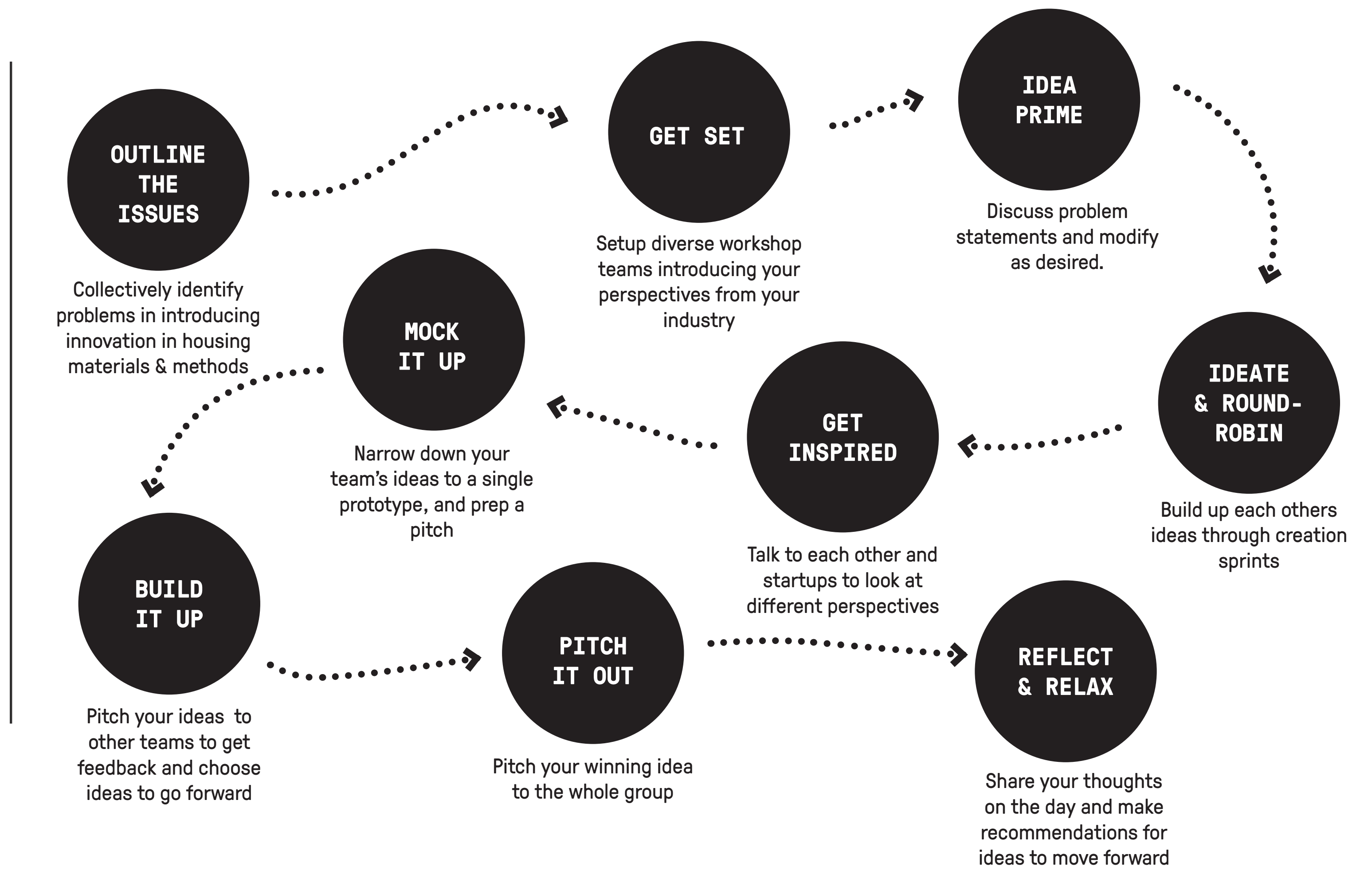
Asset Addition: \$1.72M  
Investment in Los Angeles, CA 4 May



New Asset: \$6.5M JV Equity  
Investment Added 20 Apr

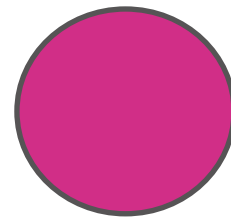


# WORKSHOP FLOW

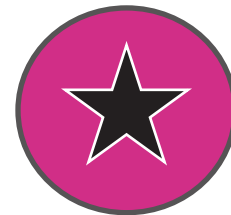




# MAKE A TEAM



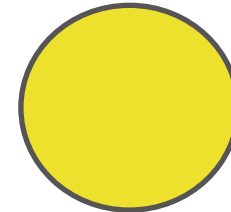
**DESIGNERS & ARCHITECTS**



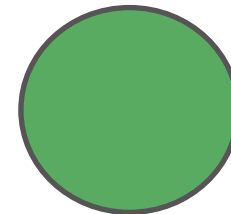
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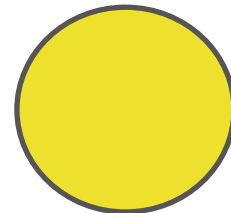
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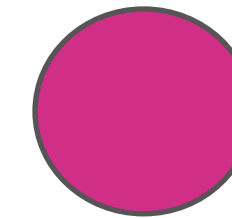
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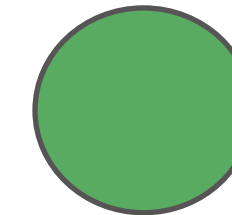
**LAWYERS**



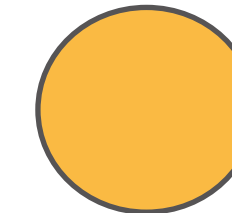
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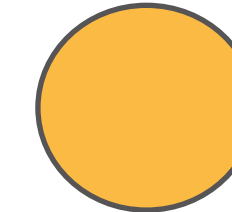
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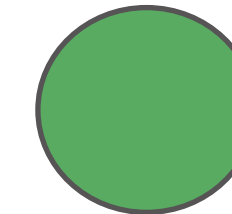
**COMMUNITY EXPERTS**



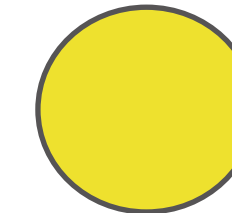
**TECH EVANGELISTS**



**EDUCATORS & RESEARCHERS**



**COMMUNICATIONS & MEDIA**



**BROKERS**

