



*Climate & Equity Task Force*

# Equity Housing Sustainability

PRESENTED BY ALPHA GROUP



# Points of Discussion

Introductions  
Vision & City Goals  
The Triad  
Definitions  
Market Examples  
Success Factors  
Next Steps

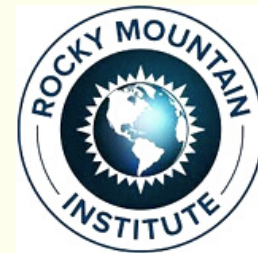


# ALPHA



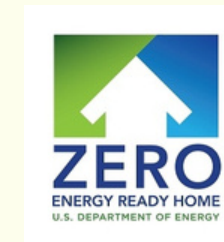
**Shilpa Sankaran**

Alpha Group  
ZNE/Prefab SME



## Zero Energy / Carbon Movement

Partners & Ecosystem





We shape our buildings,  
thereafter they shape us.

*Winston Churchill*



# Housing & Equity Challenges

- **Energy cost burden is disproportionate** for lower income neighborhoods (<50% of AMI are 27% more energy-cost burdened)
- **Housing stock is deteriorating**, unsafe, unhealthy with deferred maintenance, not climate resilient (e.g., basements and sewer system issues)
- **Traditional construction costs too high** for development in the city and difficult to finance
- **High demand for affordable housing**
- **Lack of jobs for people of color**
- Need to achieve **City climate goals** (2030 and 2040)





# The Triad of Benefits

Local off-site construction factory building ZE homes

## Economic Development

**Green Jobs**  
**Localized Labor Force**  
**Workforce Development**  
**Healthy Jobs**  
**Less Subject to Global**  
**Manufacturing Pressures**



**Equitable Housing**  
**Lower Development Costs**  
**Rapid Deployment**  
**Healthy Housing**  
**Lower Maintenance &**  
**Energy Costs**

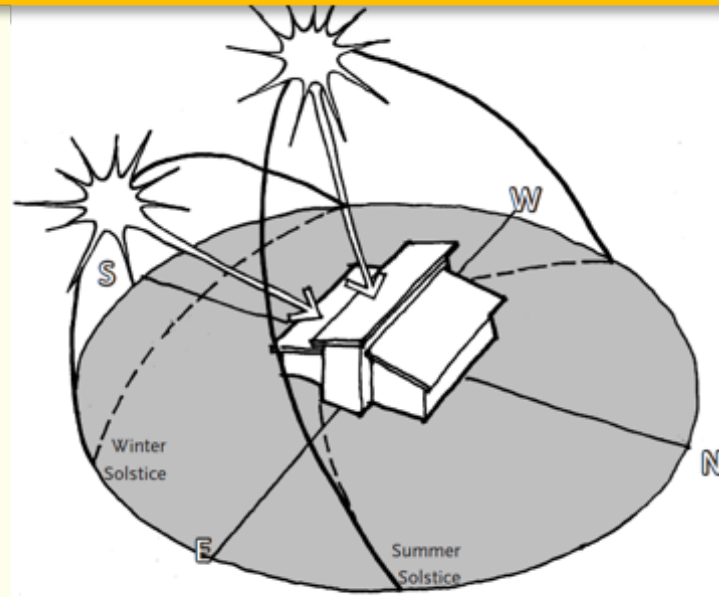
**Zero Carbon**  
**New Construction**  
**Community Scale Energy**  
**Retrofits**





# WHAT'S IN A NET ZERO ENERGY HOUSE?

Efficient form &  
orientation



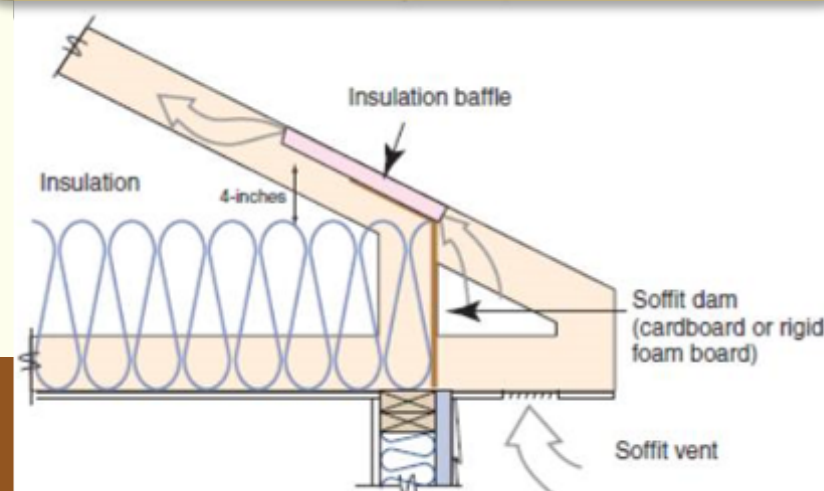
Small HVAC  
(sized to load)



Renewable  
energy



A really good  
thermal enclosure

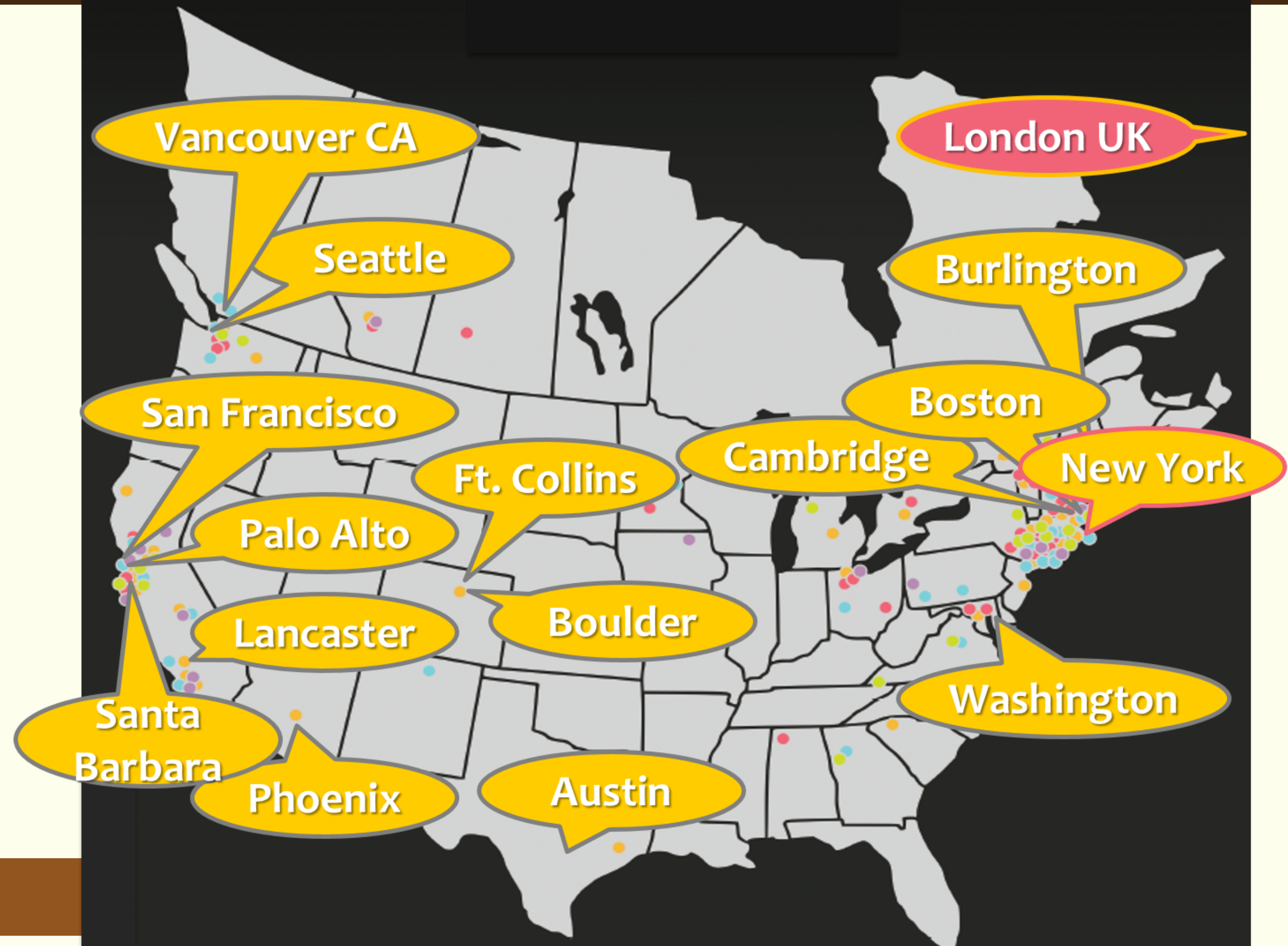


Best-in-class  
plug loads



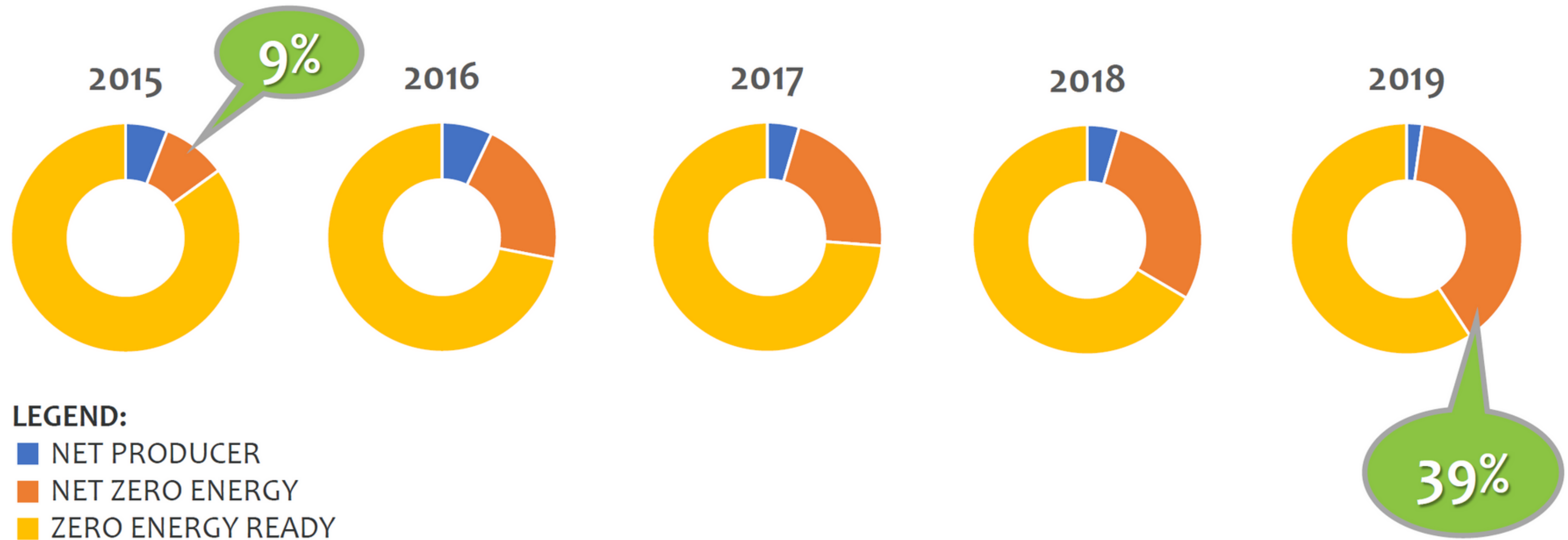
ZERO

# WHERE ARE POLICY HOT SPOTS?





# WHAT ARE TRENDS?



SOURCE: TEAM ZERO



# Offsite Construction Benefits



- **Quality control**
- **Weather-controlled environment**
- **Integrated design**
- **All trades under one roof**
- **Parallel production**
- **Healthy working conditions**
- **High indoor air quality & EE construction**
- **Faster deployment**
- **70-90% less waste**
- **5-15% cost savings**
- **Can be incrementally scaled over time**



# DEFINITIONS

*Goals: High Quality, Code Compliant, Efficient*



## Manufactured

HUD Code  
Personal Property Financing  
Built on a chassis  
Lowest quality/efficiency  
Least cost



## Panelized

Local/State Code  
Real Property  
90% Built Onsite  
Highest Cost  
Can be wood or LG Steel  
Most flexible design



## Modular

Local/State Code  
Real Property  
80% Factory-Built  
Cost Neutral / 100% Time Savings  
Wood or Steel (higher cost)  
Flexible design within constraints

# DEFINITIONS

*Variety of building system components to build or buy*



## Components

**SIPs** - Structurally Insulated Panels (roofs, walls, timber frame)

**Trusses** - Prefab framed roof trusses

**Open Panels** - Wall framing only (can be light gauge steel or wood)

**Closed Panels** - Either finished on one side or both (includes MEP/insulation, windows, etc)



# Zero Energy Off-site Examples



Zero Energy Modular  
Affordable  
ZETA Communities (CA)



Zero Energy Modular  
Affordable  
Vermod - Public/Private  
partnership (VT)



Zero Energy Modular  
Market Rate  
BrightBuilt Homes (NE)



Zero Energy Panel /  
Timber Frame  
Market Rate  
Unity Homes (MA)



# Market Examples



Zero Energy Modular  
Micro-units  
SmartSpace SOMA (San Francisco)  
ZETA Communities

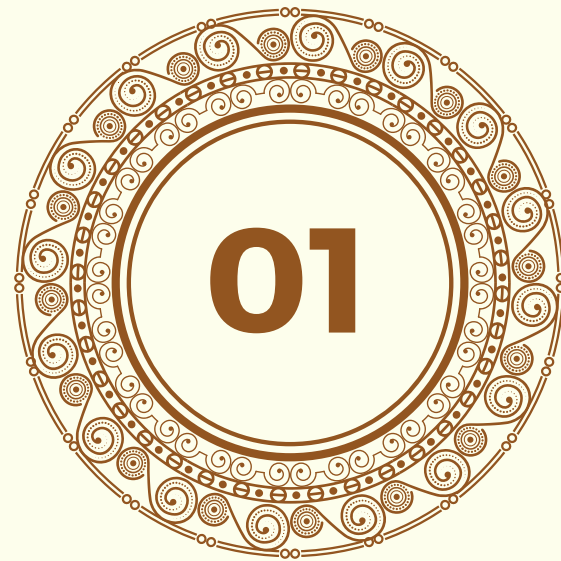


Zero Energy Panelized  
Affordable Housing Retrofits  
EnergieSprong  
Netherlands



# 3-LEGGED STOOL

*Not a Project: A Sustainable Business Model*



**Integrated A&E /  
Factory /  
General Contractor**



**Committed Pipeline**



**Leading City Vision,  
Policy, Codes**



# Factory

Support hyper-local jobs for neighborhoods that need it

30th Street Corridor location

Underutilized industrial facilities

Existing buildings match many factory design requirements

Potential funding availability

Revitalize district

Future vision - Attract adjacent related sustainable construction industry businesses



CENTURY CITY I

[generalcapitalgroup.com](http://generalcapitalgroup.com)



[generalcapitalgroup.com](http://generalcapitalgroup.com)



# Success Factors



- **Commitment to 5-year ramp**
- **Sufficient Financing - Factory and Project**
- **Financially Committed Partners**
- **City Commitment, Support, Resources**
- **Entrepreneurial Mindset**
- **Product Development Mindset**
- **Willingness to Adapt**
- **Collaboration with internal and external organizations and programs and national movement**



# Potential Factory Evolution



- **Build components off-site**
- **Lower cost factory (\$2-\$5M)**
- **Higher cost of construction**



- **Build fully finished modules**
- **Higher cost factory (\$5-\$10M)**
- **Lower cost of construction**





# Next Steps

## 12 Months

Complete Business Case  
Garner Stakeholder Support  
Recruit and Secure Partners  
Identify Pilot and Project Pipeline