Casa Más
Adaptable
Equitable
Future-Ready
Sustainable
Resilient
Affordable
PROBLEM: Housing Shortage

LOS ANGELES COUNTY NEEDS

550,000 MORE AFFORDABLE RENTAL HOMES
Solution: ADUs
More Más
Animated graphic from Top View showing the site plan with the interior, roof patio, and solar canopy.
Sustainable Construction
Building Enclosure

Floor: R39
- Plywood Sheeting: 3/4""}
- Floor Joint: 2 x 12
- Loose Fill Cellulose: R-40

Roof: R39
- Gypsum Board: 1/2"
- Structural Insulated Panel: 1/2" OSB outside, 5" EPS foam inside
- Continuous Rim Joint: 2 x 12
- Furring Strip: 3/4" x 1 1/2"
- Wood Batten Damping: 1" x 1"
- Pressure Treated Sill Plate: 3 x 6
- Anchor Bolt
- Cinderblock Sill Wall with No. 5 Reinforcement, 4 OC
- Footing with 3 Continuous Reinforcement

Walls: R20
- Gypsum Board: 1/2"
- Structural Insulated Panel: 1/2" OSB outside, 5" EPS foam inside
- Gypsum Board Ceiling: 1/2"
Passive Performance

Longest Day: June 20, 2020
Energy Use Intensity

Seasonal Energy Demand

![Seasonal Energy Demand Graph](chart.png)
Energy Use Intensity

Our Energy Use Intensity (EUI) decreases as we install more Solar Panels.

Energy Generation

- Architecture
- Engineering
- Energy
- Comfort
- Operations
- Resilience
- Market Potential & Feasibility
- Innovation
Solar Expansion

Max PV Grid Management Strategy

- Grid-tied PV allows for export or future storage
- Peak Rate Hours

Energy [MWh]
- Grid import
- PV to load
- Grid import

2015 [Hours]
- Max Solar (kWh)
- Gross Demand
- Peak Rate
Future-Proof

Virtual Power Plant

Solar

Smart Batteries

Dashboard

GridShare Cloud

Trading

Grid

Thermal Comfort
Lighting

Daylight Autonomy (300 lux)

Living Room:
Mean Daylight Autonomy
= 76.08 % of time occupied

Bedroom:
Mean Daylight Autonomy
= 79.09 % of time occupied
Operations
Appliances

Affordable

&

Sustainable
Core IT Infrastructure

Intro - Architecture - Engineering - Energy - Comfort - 
Operations - Resilience - Market Potential & Feasibility - 
Innovation

Diagram showing DSL or Cable connected to a Modem-Router-in-One, with Ethernet lines leading to devices.
User Interface

- Lights | ON
- Lock | ON
- Temperature | 69.0°F
- Greywater Collection
- Water Use | 26 gal
- Electricity Use | 19 kWh

- Basic Casa
- Más interface
- Pre-installed IoT devices
Extensibility and Customization

SSH via PuTTY to Access IoT Linux OS

Intel Edison Board
Operations

Equitable

Accessible

Easy to Use
Resilience

- Earthquake
- Drought
- Flood
- Fire
- Blackout
- Future
Earthquake

Overturning resisted by soil against footing

Lateral force resisted by bearing against soil on side faces

Horizontal sliding force resisted by friction of soil at bottom
Droughts

Usage With and Without Improvements

- Outdoor
- Indoor

Legend:
- Usage without improvements
- Usage with improvements
Flooding
Blackout

Daytime Energy Source

Nighttime Energy Source
Future-Proof Virtual Power Plant

- Architecture
- Engineering
- Energy
- Comfort
- Operations
- Resilience
- Market Potential & Feasibility
- Innovation

Dashboards

GridShare Cloud

Trading

Grid

Solar

Virtual Power Plant

Smart Batteries

$ $$
The Community

**Important city hubs**

**South Los Angeles area**

**Recreation and open space**

Los Angeles

- Jesse Owens Park: 10m
- LAX Airport: 45m
- USC (College): 1h
- Downtown: 1h 20m
- Dockweiler Beach: 1h 20m
The Community

Proximity to public transportation and cultural hubs

Convenient biking routes
Challenges

Ownership of Occupied Units

Average rent price: $2,500

Household Income

Median income: $46,000

Average rent price: $2,500

53% Under $50K
29% $50K - $100K
16% $100K - $200K
2% $200K+
The Más Approach

Lower Utility Costs

Stabilized Local Rents

Sustainable for the Community

Affordable Rent for the Occupant

Reduced Housing Precarity

Multi Faceted Approach

The Homeowner

Highly affordable

- Low construction cost
- Small loan payments
- ADU accelerator program

The Más Approach

Affordable and modular

Resilient and cost effective

Fire resistant and sustainable

### Construction Cost Savings

<table>
<thead>
<tr>
<th>Construction Type</th>
<th>Casa Más</th>
<th>Standard Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exterior Walls</td>
<td>8,495</td>
<td>11,495</td>
</tr>
<tr>
<td>Batten</td>
<td>8,117</td>
<td>11,117</td>
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<tr>
<td>Canopy</td>
<td>6,453</td>
<td>14,453</td>
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<tr>
<td><strong>Total Savings</strong></td>
<td><strong>14,000</strong></td>
<td></td>
</tr>
</tbody>
</table>
The Construction

- Reliable cost projections
- Smaller floor plan
- Simplified design
Innovations

- Prefabricated SIP panels reduce cost and waste
- Grey water recapture reduces water usage and improves resilience
- Prefabricated plumbing wall simplifies construction and maintenance, and reduces cost
- Solar Battery and EV Ready to provide blackout resistance and contribute to grid modernization
- Trees combat the urban heat island and clean the air
Innovations

Solar panels generate income to offset construction costs.

Canopy structure provides patio space, shades structure, and can be converted to a second story.

Sustainably sourced and fire resistant building materials.

Earthquake resistant foundations that also minimize site disturbance.

Xeriscape reduces water usage without sacrificing comfort or aesthetics.