Building in the 21st Century

Small + Sustainable
Poll: choose your own topics

- What are micro houses? An aesthetic taxonomy
- Drivers of the micro house trend
- Why micro > green building > green power
- Minim House case study

20 min Q&A
What are micro houses anyway?

- Foundation built?
- On wheels?
- 90% of NYC apartments?
- Less than 300 ft²? or 300 ft²/person?
- An aesthetic taxonomy…
Foundation/multi-units

New projects: Seattle; AdAPT NYC 55 units; DC Wharf project 170 units; San Fran, Chicago…
Foundation/detached

New generation of pre-fab sheds for office, living, accessory dwelling units (ADU’s)

Companies (ready to ship): Studio Shed, Modern Shed, Kithaus, Kanga…
Wheels/ ‘looks like a RV/trailer, not a house’
Class A/B/C motorhomes (motors); travel trailers, 5th wheels, popup campers
Wheels / over 400 sq.ft.
Manufactured/modular homes, ‘single’ or ‘doublewides’, up to 2300ft²+; HUD code applies.
Wheels- under 400 sq.ft

‘Park models’, typically 12’x36’ to remain under 400ft² and qualify as an RV.

Manufacturers: Forest River, Athens, Park Model, Breckenridge, WheelHaus*, etc.
Wheels or foundation: under 250 sq.ft ‘tiny’ homes

Mostly DIY’ers, mostly houseplans, no major manufacturers. Even most ‘cabin’ plans/manufacturers are much larger.
Site note: Why ‘tiny’ homes on wheels?

- **Site constraints:** Zoning issues; Avoid building codes; No need for 400ft2+
- **Portability:** easier to haul a normal width trailer down the road (or a 22' wide load); Fit in small spaces: alley lot, backyard etc.
- **Aesthetics:** park models and other manufactured housing often look like they were designed by people who make trailers (which they do). Proportion, scale and style all seem to have lost out to the dictates of structure and affordability- also an issue with many tiny houses.
- **Build quality:** Few (if any) park models or trailers with R-26 walls and R-40 ceilings, hardwood floors, LED lighting, high quality fit/finish, etc.
What’s driving the interest?

- Economics
- Demographics
- Greener living
- Simpler living
- Technology
Is there really a trend?

A micro market for micro structures:
- Home sales: In 2013, just 1% of home buyers purchased places of less than 1,000 ft² (National Association of Realtors)
- Average new home construction square footage continues to rise each year: 2598 ft² in 2013. (U.S. Census)
- New construction: 13 million new homes constructed since 2003, number of detached tiny homes? 1000? New micro apartment units? 5000 in Seattle/NY/SF/DC?
- But 3 million trailers + RVs sold since 2003…so many know how to live small.

Yet with economics, demographics, trends in green/simple living, and technology, potential for growing demand?

The role for refined design in increasing demand & supply: individual units, and communities
The eco imperative

❖ U.S. buildings (residential + commercial) contribute 9% of world’s CO2 emissions (equal to the combined total emissions of Japan, France, and the UK).

❖ According to IPCC, we need 80% reduction of overall carbon emissions by 2050. So residential use must go from 20.5 quads down to 4 by 2050, even as population expands over next 35 years.

U.S. EIA Annual Energy Outlook 2014, quadrillion Btus

- Residential Building Delivered Energy: 11.02
- Residential Building Related Losses: 9.54
- Commercial Building Delivered Energy: 8.65
- Commercial Building Related Losses: 9.24
- Industrial Delivered: 24.0
- Industrial Related Losses: 7.08
- Transportation Delivered (0 loss): 26.98

TOTAL 2014: 96.51

Residential: 21.3%
Commercial: 18.5%
Responses to lower building CO2 emissions

✧ Increase % of green power
  ✧ How: federal+ state incentives, utility regulation, etc.
  ✧ But…note priority of efficiency

✧ Green new construction + green retrofits
  ✧ How: energy+building codes, voluntary codes (LEED), appliance efficiency standards, etc.
  ✧ But… while energy use per residence decreased 9% from ’85-’04, ‘energy efficiency improvements have offset effect of more and larger homes’ in U.S. (EIA)

✧ Increase housing density
In U.S. from 292 ft² per person in 1950, to 954 ft² today. The average U.S. resident has as much individual space in their house as an entire 1950’s family would have shared.
How to get micro to go big?

- Zoning + building code changes (ADU’s, min ft2 requirements)
- Pricing energy correctly (carbon tax)

- Cultural shift from ‘big is better’:
  - Design: make small beautiful
  - Design: make small livable
  - Design: keep small affordable
  - Marketing: the joy of limits: greener, less work, cheaper, modest
  - Marketing: small is sexy
Case study: Minim House
Systems: Air Exchange (ERV), Heat, Cool, Water, Electricity, Construction (SIPs)
Questions?

“The voyage of discovery lies not in seeking new lands but in seeing with new eyes.”

–Proust

More information at microshowcase.com and minimhomes.com
Total Residential
Primary energy use is 21.8 quads
Microhouse communities?

“Detached version of micro apartments”.