



Innovative Strategies for Affordable, Energy-Efficient Housing in Rural Communities

Jon Racek
jonracek@iu.edu

Who am I

Eskenazi School of Art, Architecture and Design, IU Bloomington

Senior Lecturer, Comprehensive Design

Program Director of Comprehensive Design

Founder of ServeDesign

Worked with Center for Rural Engagement on a housing prototype in Paoli

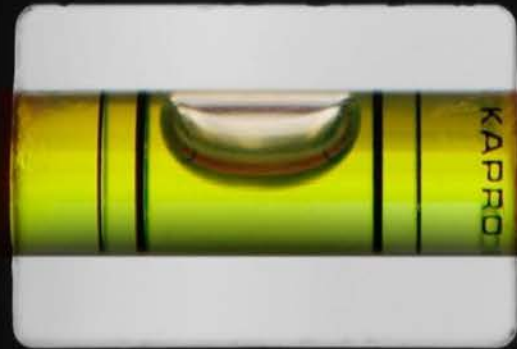
Researched building methodology as a solution for rural housing

Trained and practiced as an architect

Not an expert

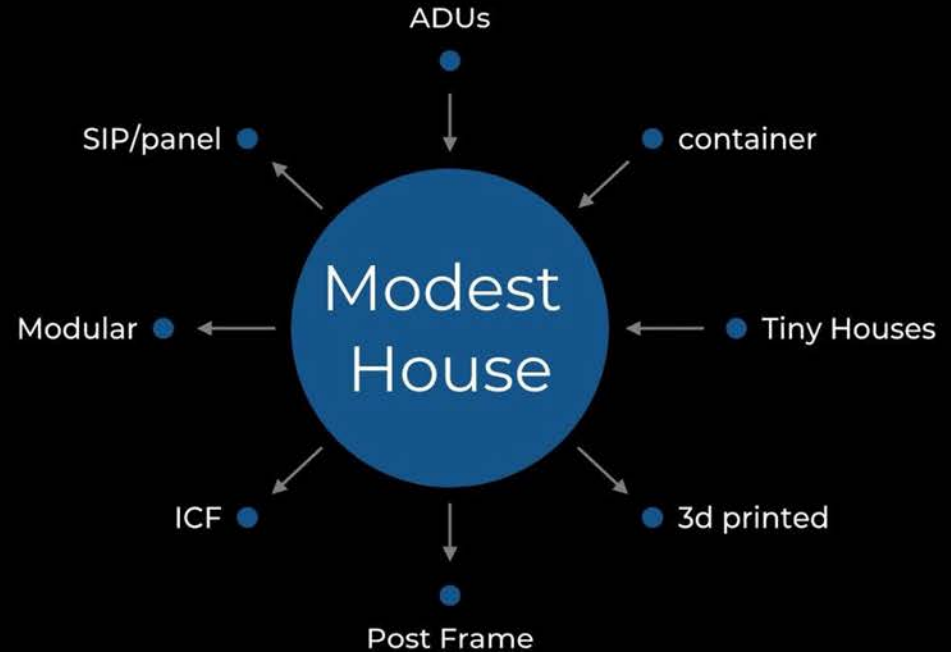


Balance: Affordability
and energy efficiency





Affordable, Energy Efficient Housing



Challenge of Rural Housing

There are several challenges that contribute to the lack of rural housing construction, including:



Lack of funding

Rural areas often lack the financial resources and investment needed to build new housing developments or it can be more financially beneficial to build elsewhere.



High development costs

Building in rural areas can be more expensive due to the remote location and lack of infrastructure.



Limited workforce

The lack of a skilled workforce in rural areas can make it difficult to complete housing projects.



Lower demand

There may be limited demand for housing in rural areas, which can make it difficult to justify the investment in new construction.

Innovations

Large Scale: Developers

Small scale: Builders



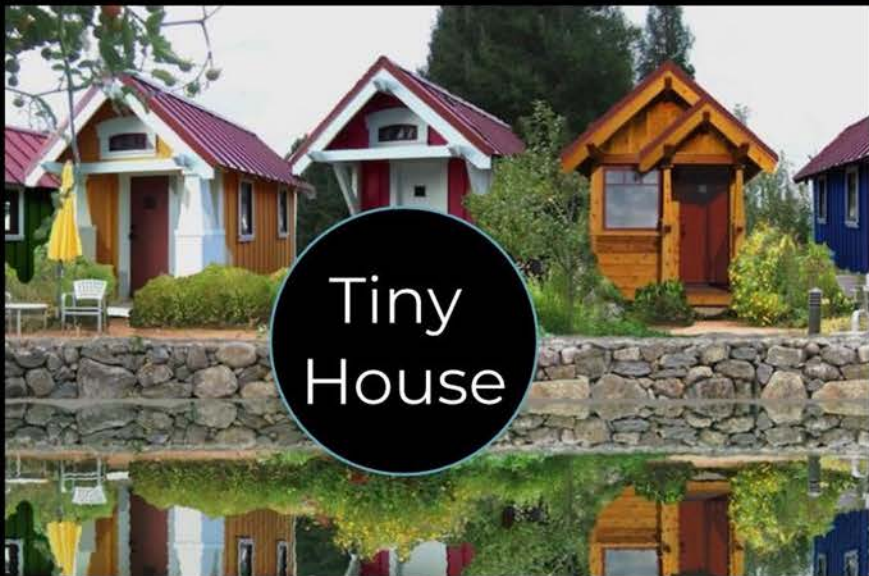
Innovations

Large Scale: Developers

Small scale: Builders











Eden Village

Community for Formerly Homeless Population

Springfield MO





Mobile Homes > Tiny Homes



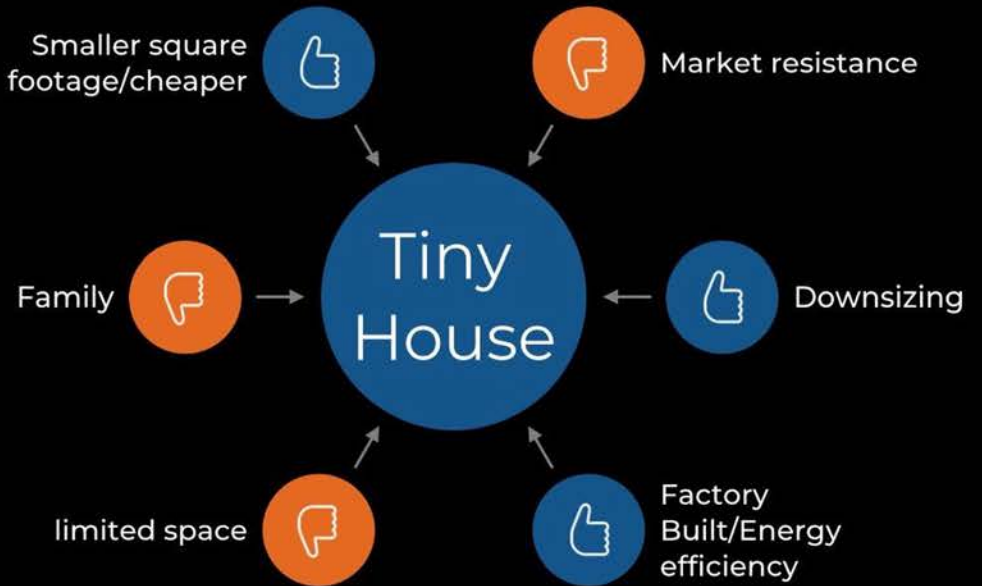
Alt to Mobile Home



Something new



Pros/Cons





CoHousing

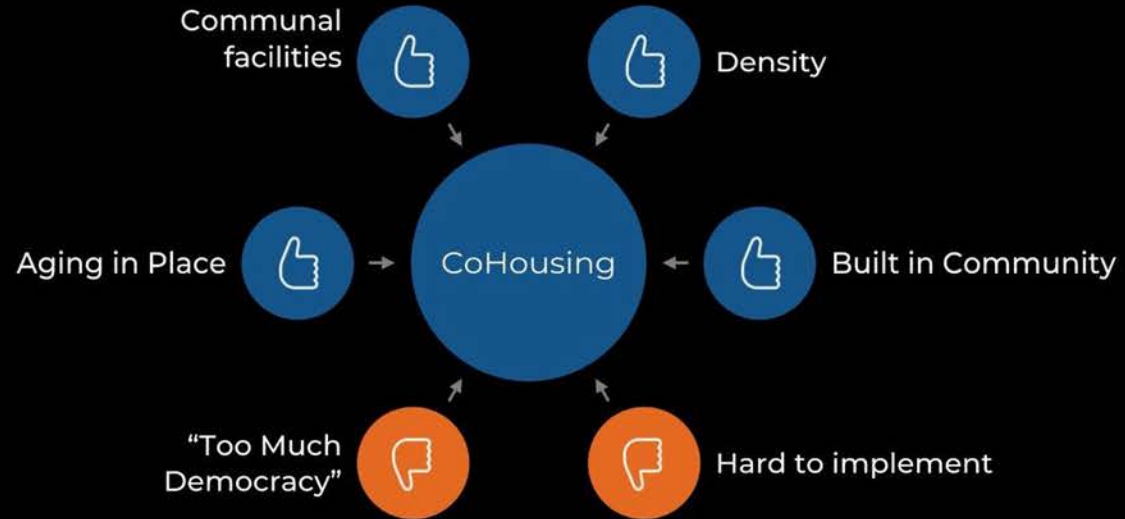
Cohousing is an intentional, collaborative neighborhood that combines private homes with shared indoor and outdoor spaces designed to support an active and interdependent community life.







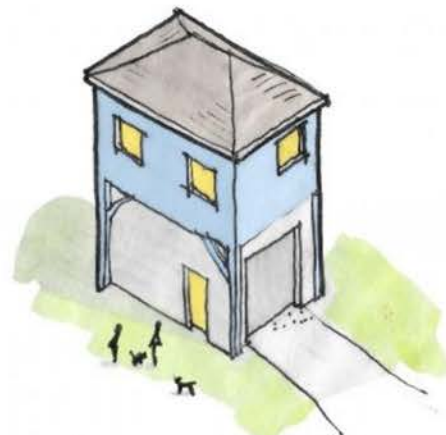
Pros/Cons







STAND-ALONE DETACHED



ADU OVER A GARAGE



ATTACHED ADU



BASEMENT ADU

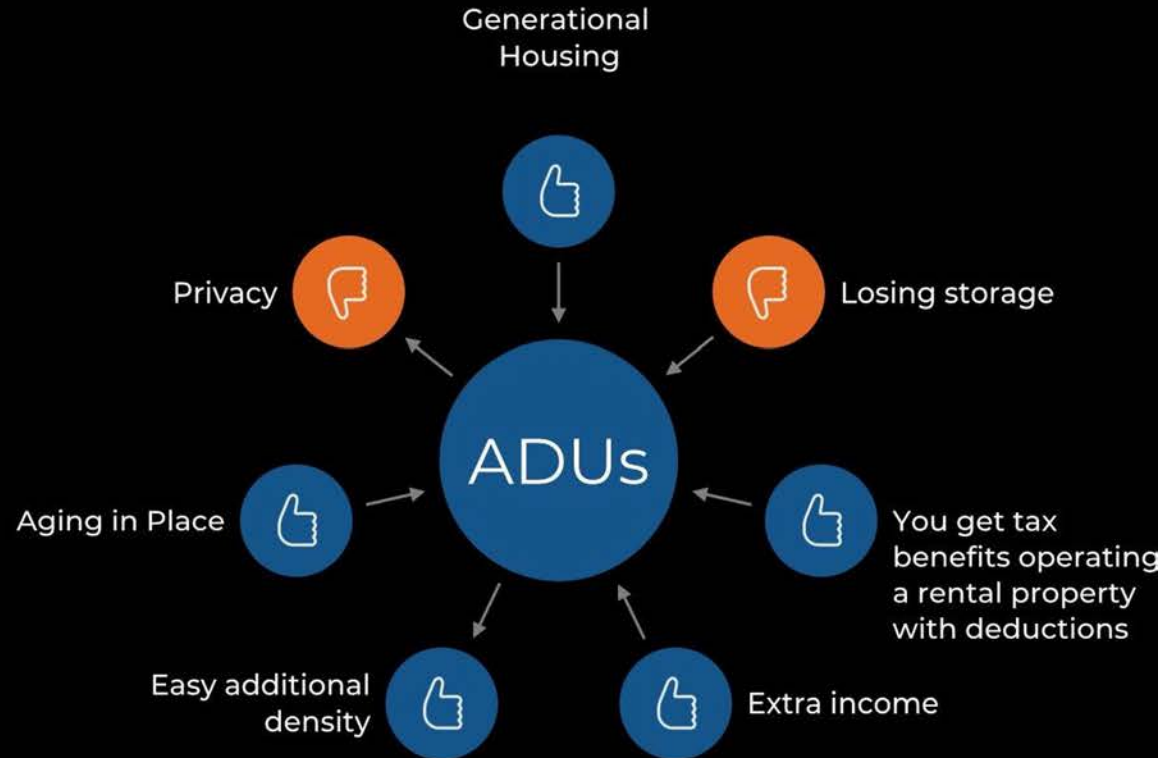
ADUs:

Accessory Dwelling Units

Granny Flat, Garage Unit

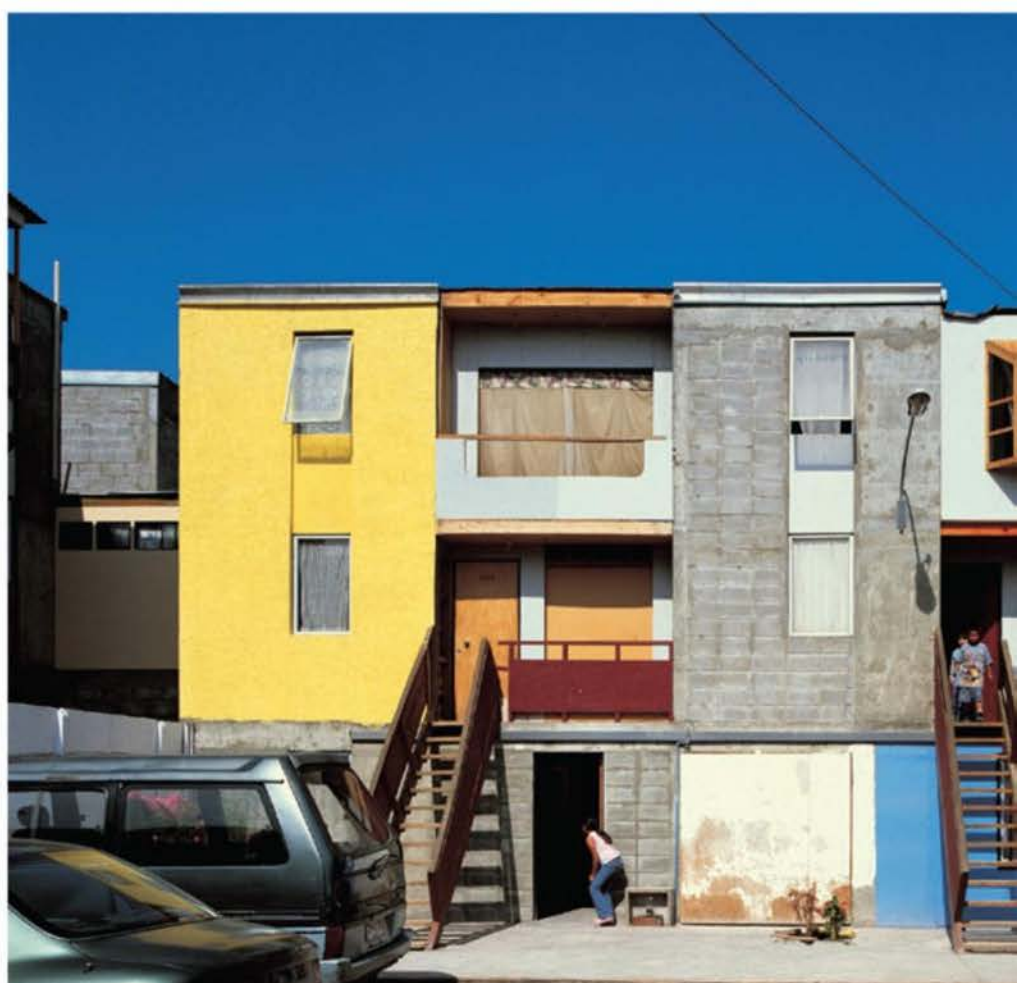


Pros/Cons



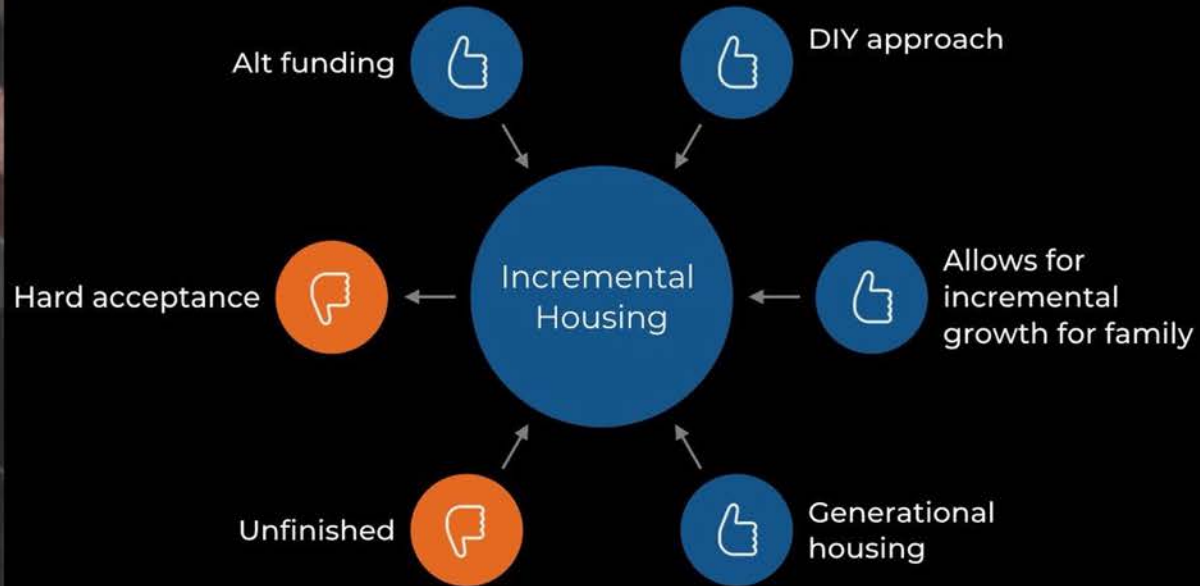








Pros/Cons

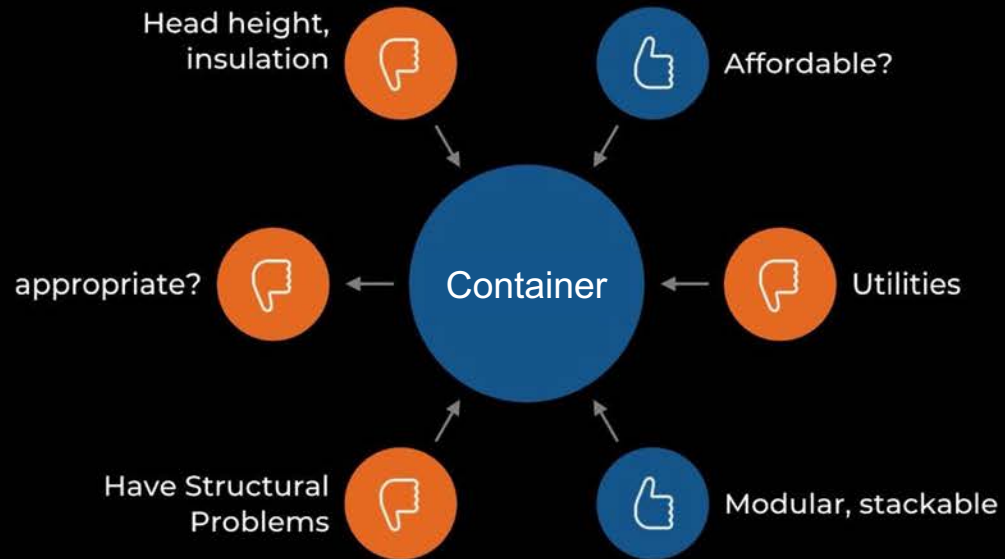








Pros/Cons

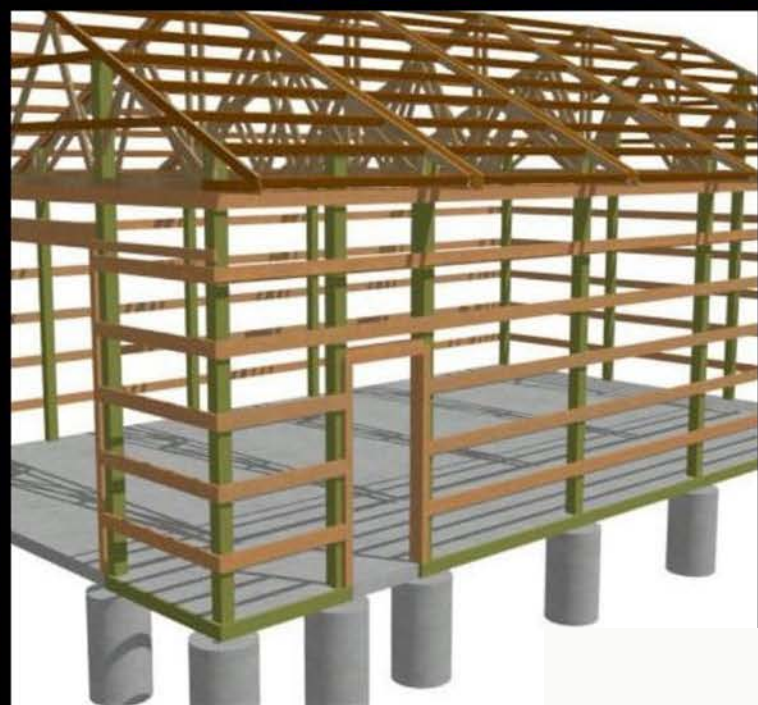


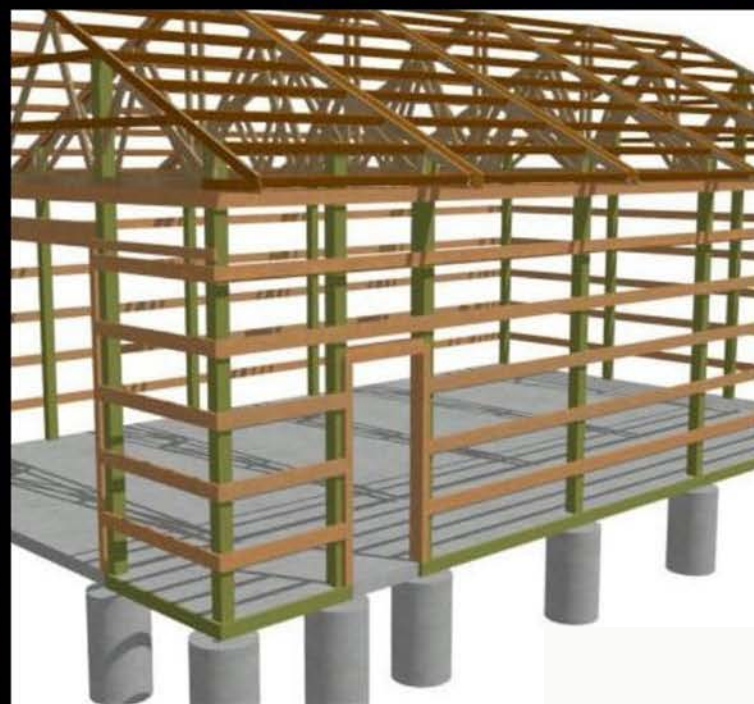
Innovations

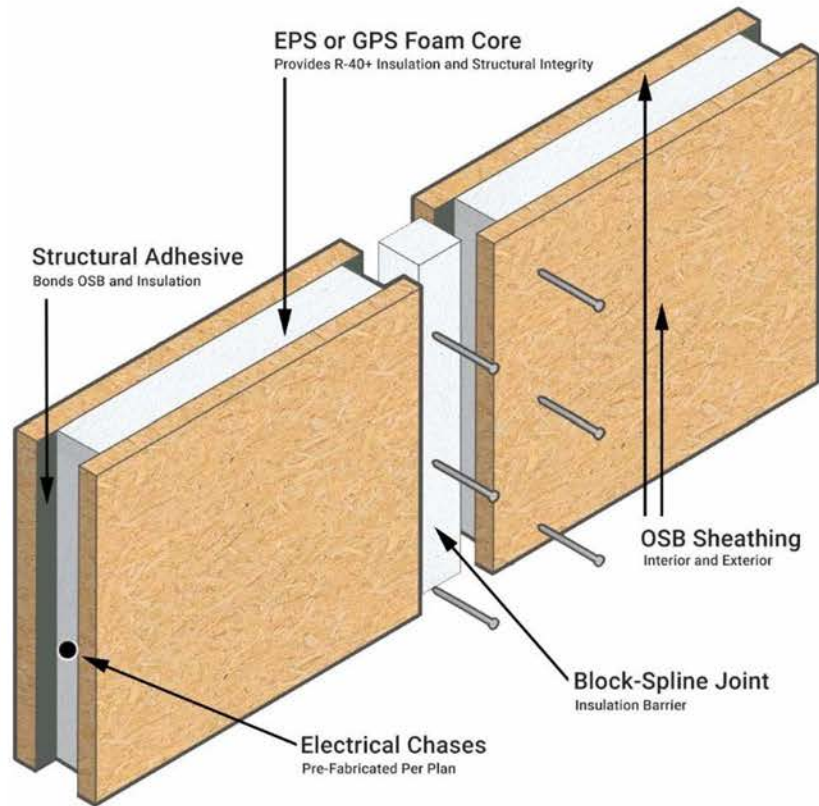
Large Scale: Developers

Small scale: Builders









Structural insulated panels (SIPs) consist of an insulating foam core sandwiched between two structural facings, typically oriented strand board (OSB).

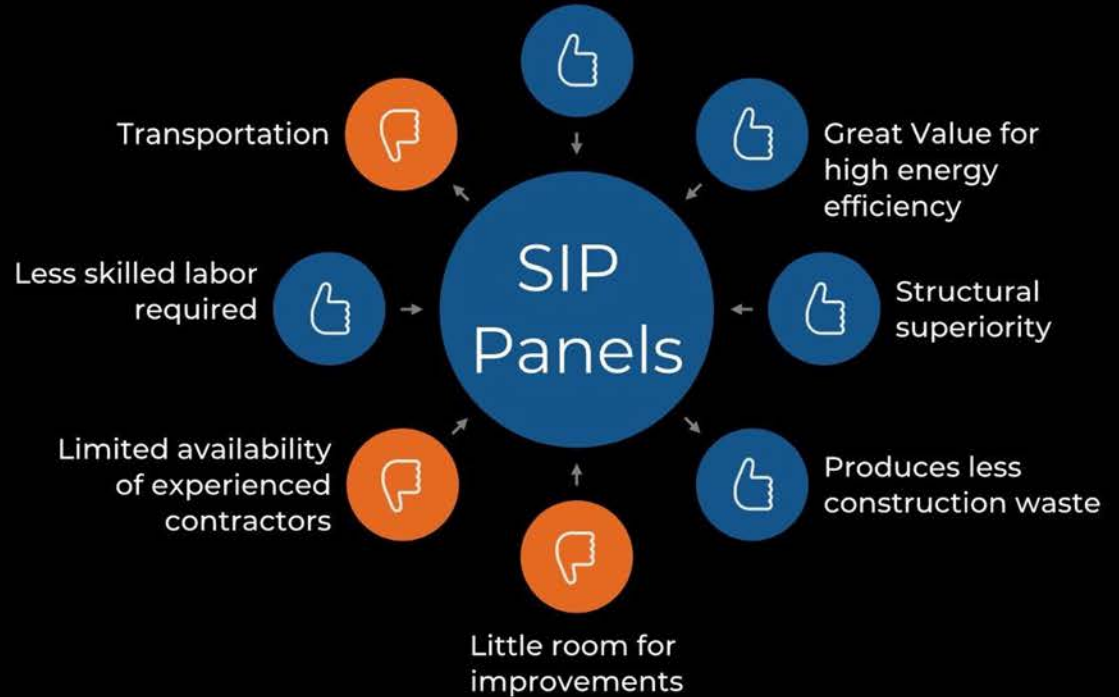


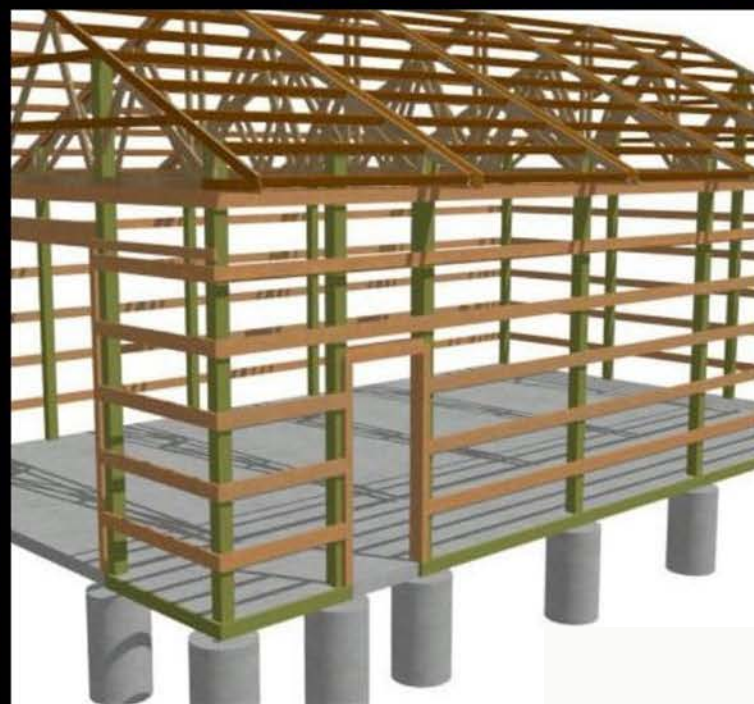


Pros/Cons

Energy efficiency

R Value = 4 per inch





Panelized
Construction



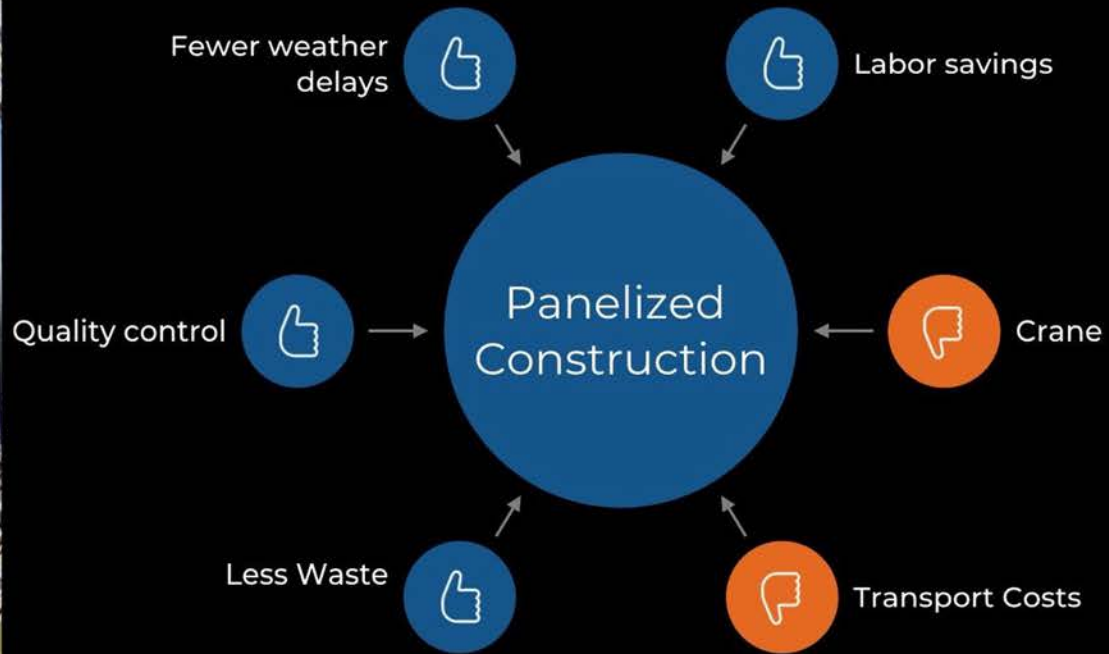
Panelized Construction

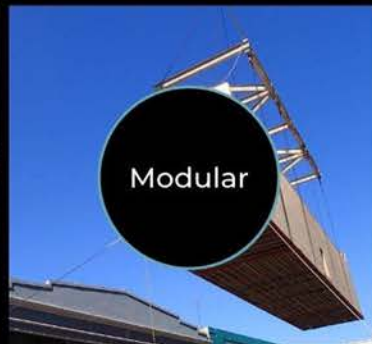
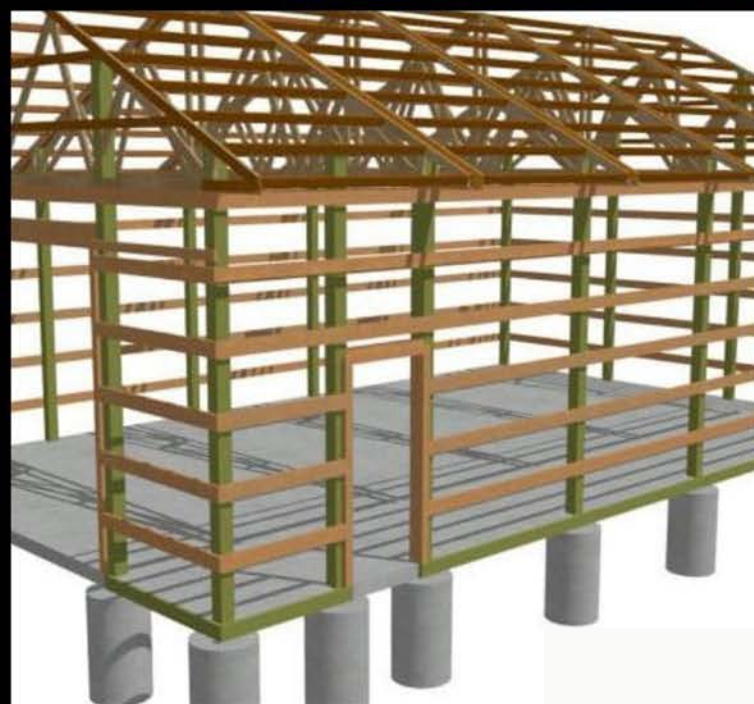
A panelized building system incorporates construction techniques that use advanced technology, quality materials and a controlled work environment to build energy-efficient homes in less time.





Pros/Cons





Modular



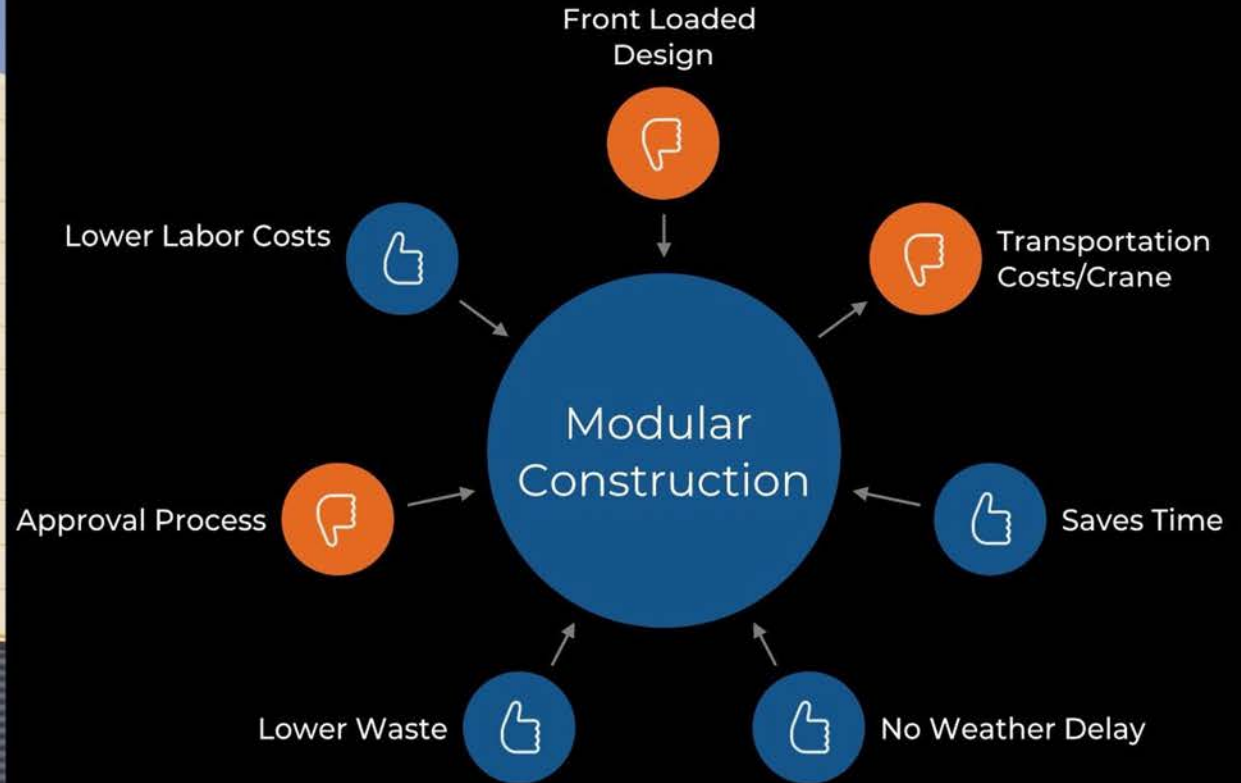
Modular Construction

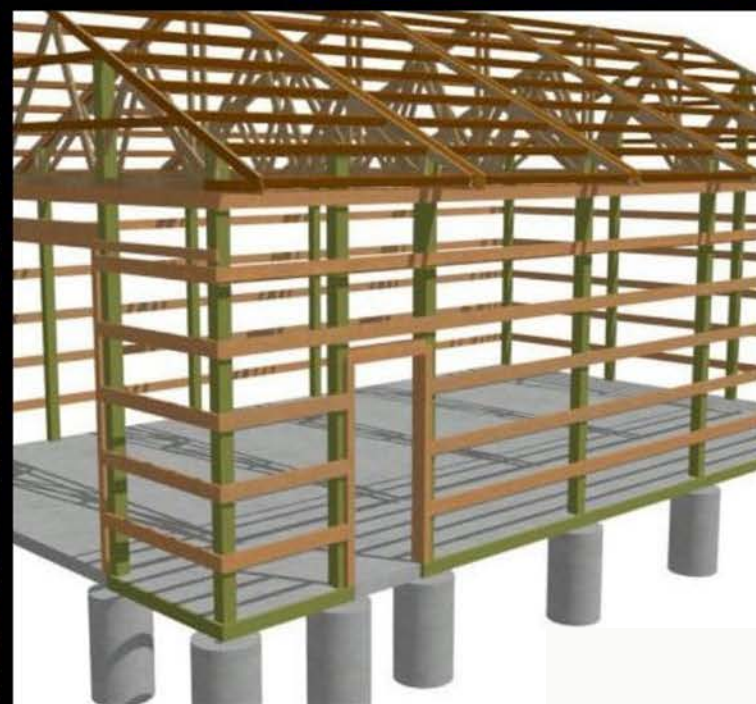
Modular construction offers a way to build offsite with quality materials and design. Assembled onsite, these structures can be energy efficient and cost-effective for rural communities.



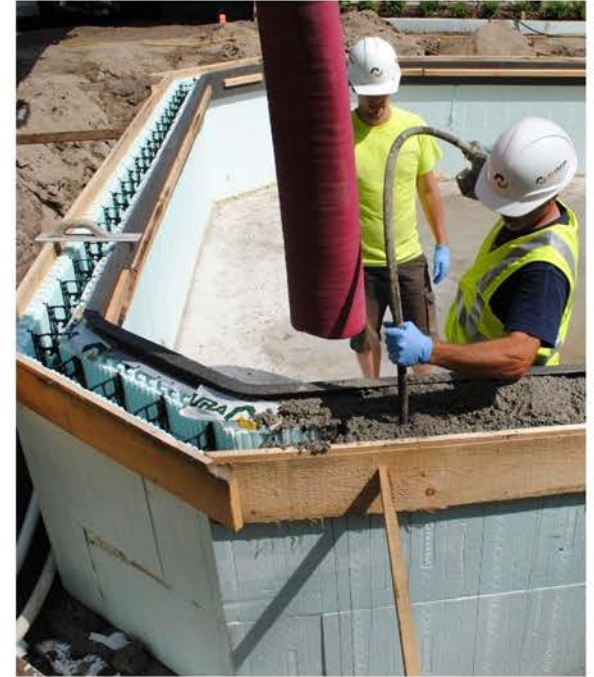
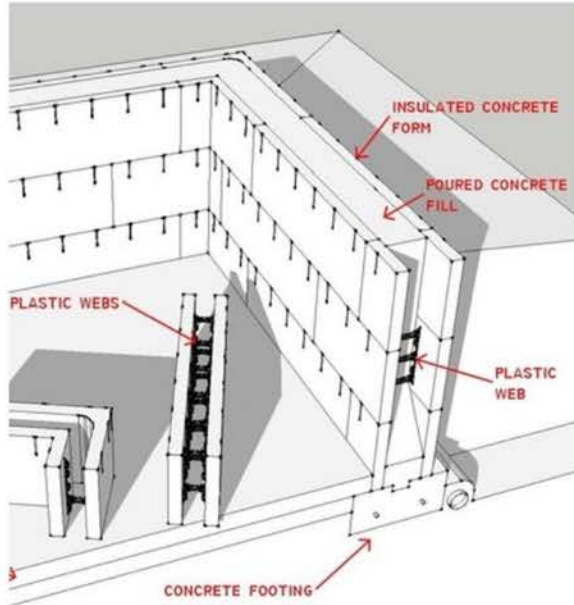


Pros/Cons



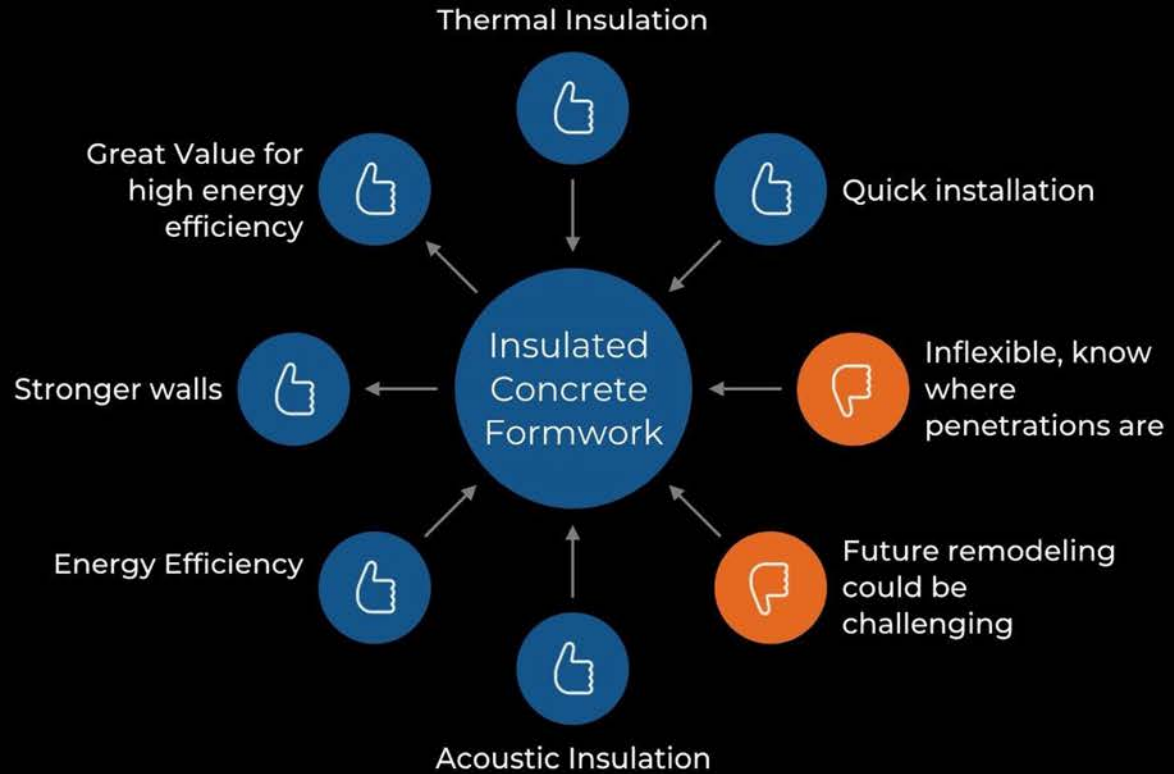


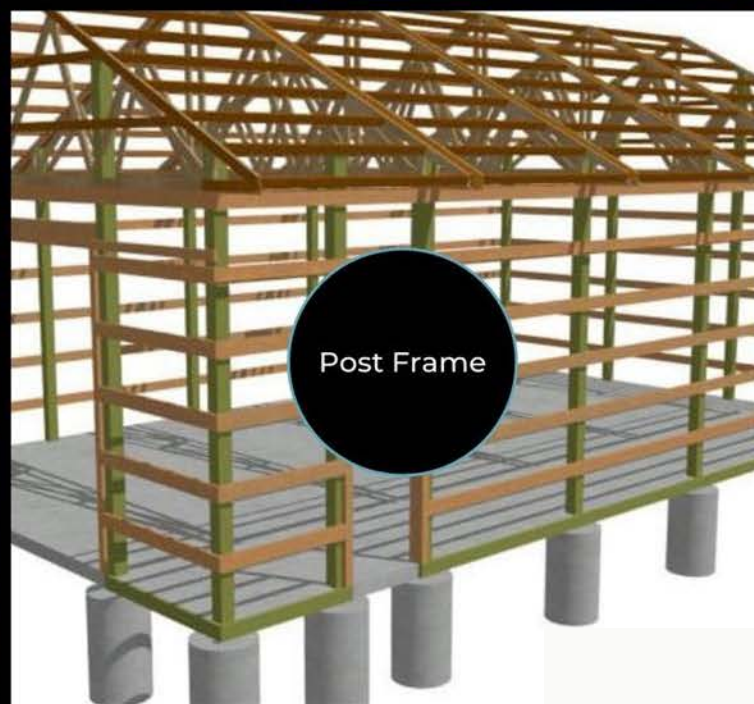
Insulated Concrete Formwork





Pros/Cons





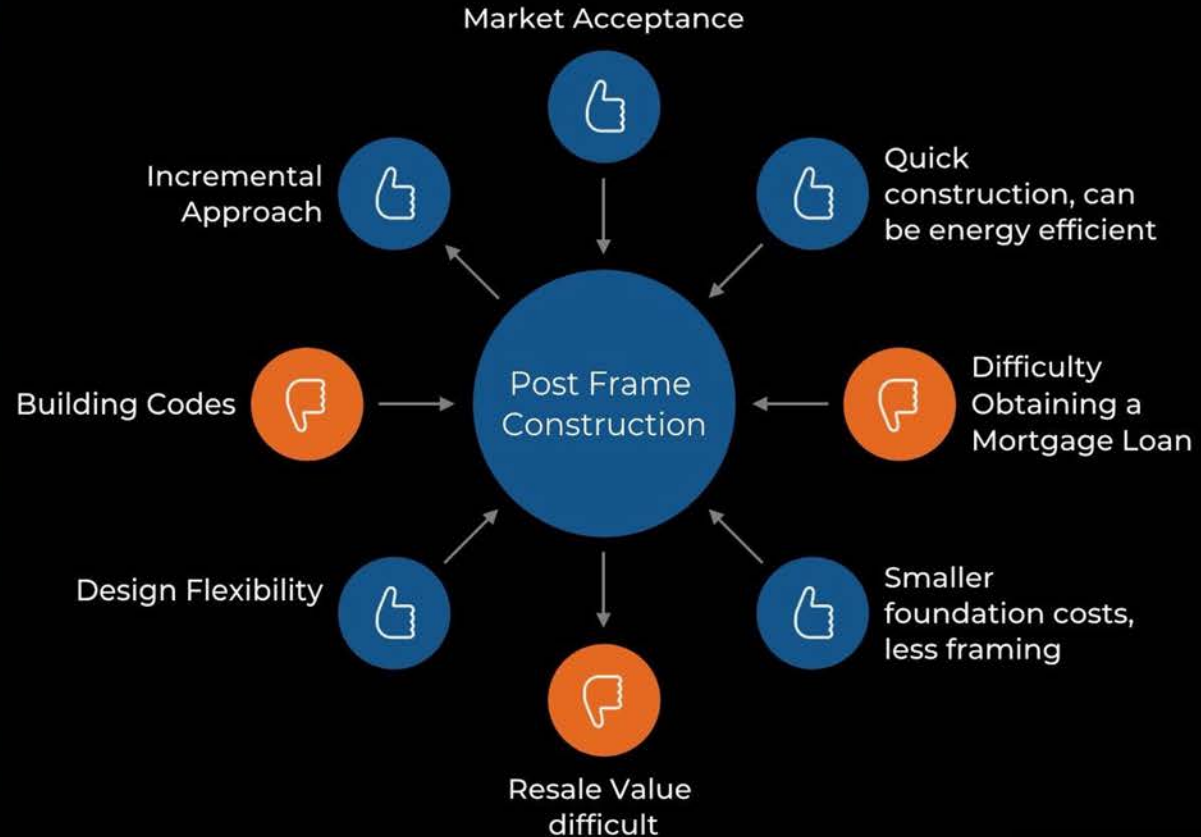
Post Frame Construction

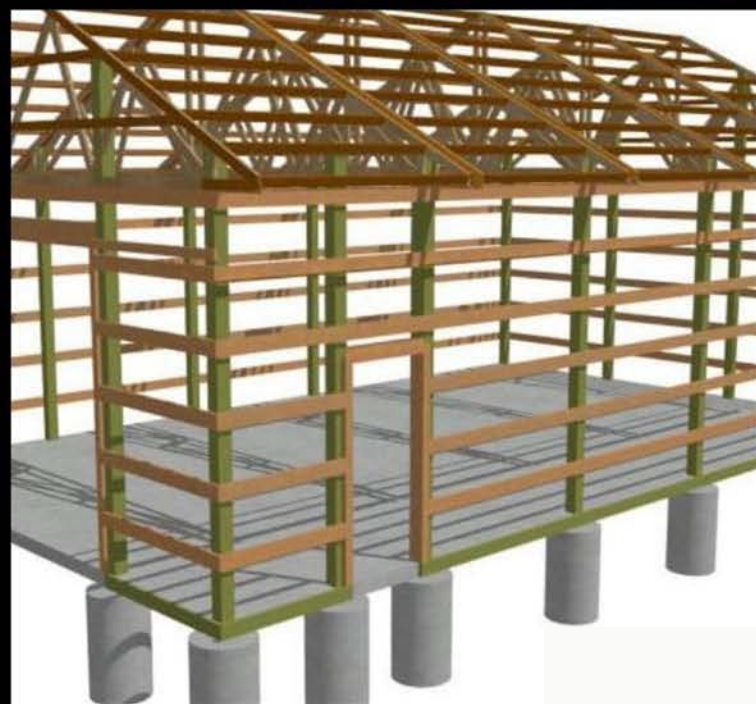
Post-frame construction is a simplified building technique that is an alternative to the labor-intensive traditional timber framing technique. (Barndominium)





Pros/Cons



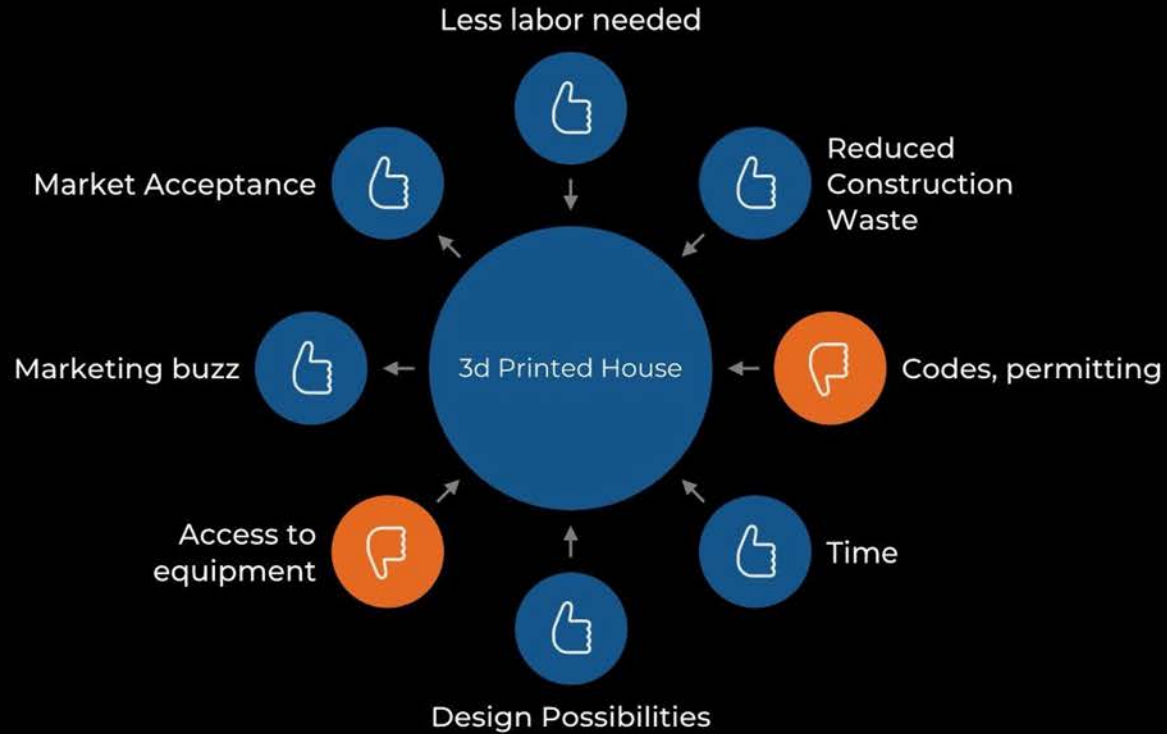


3d Printed House

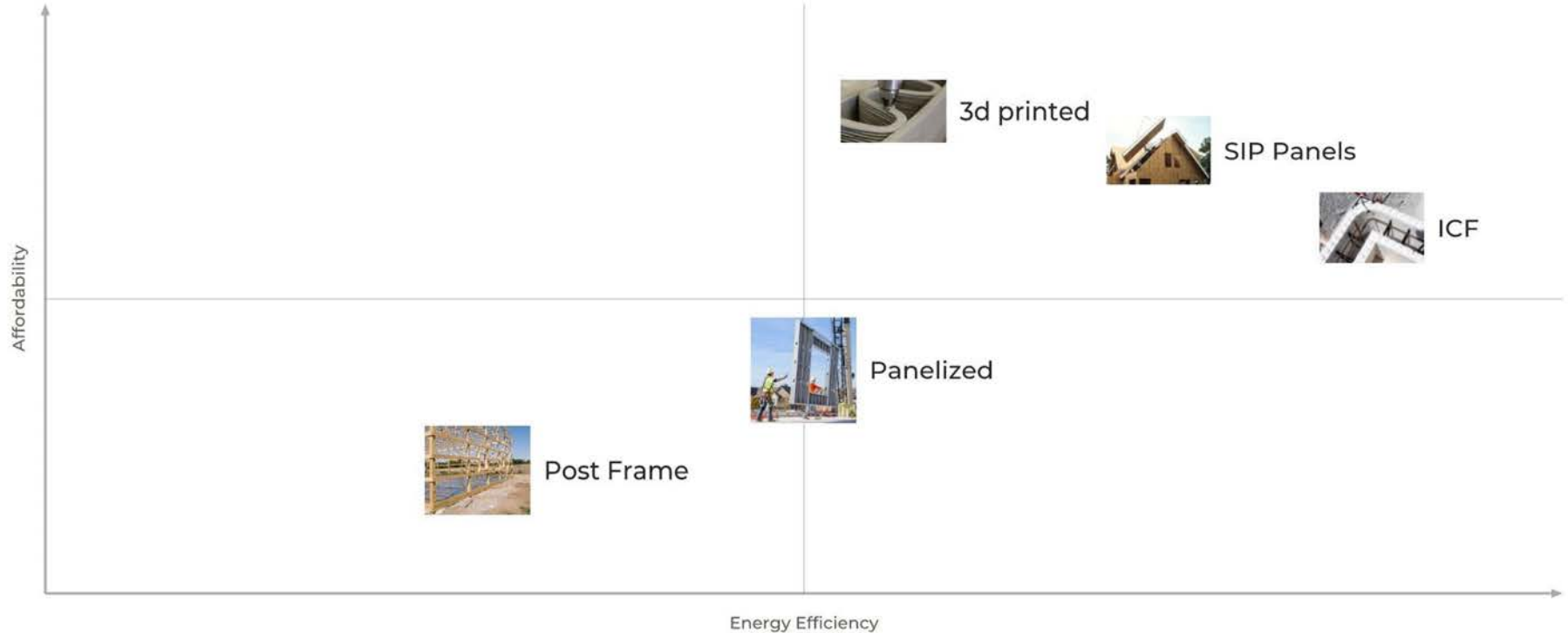




Pros/Cons



Affordability and Energy Efficiency



Innovations

Large Scale: Developers

Small scale: Builders

Conventional but
impactful





smart
design

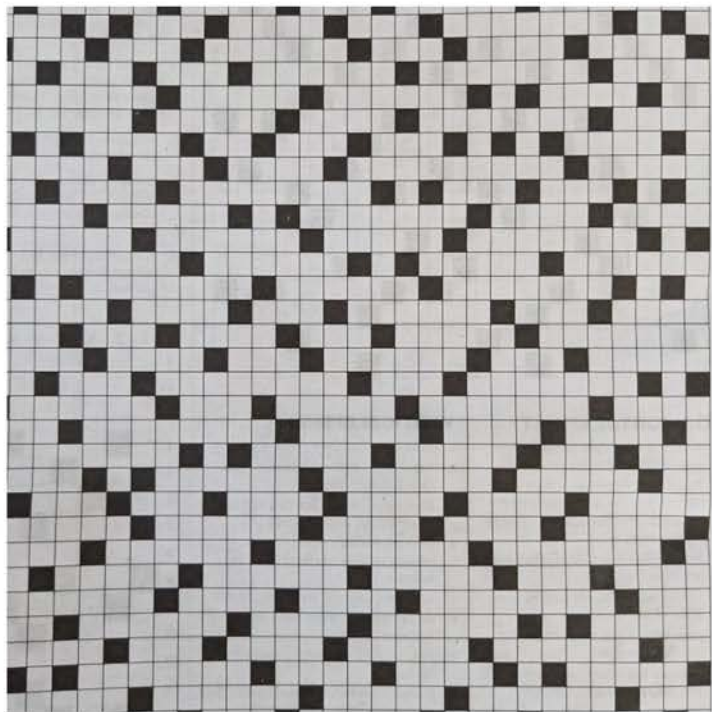
Smart Design



Build a box

- keep it simple - floorplan, roof, foundation
- complexity = \$\$

Smart Design



Use a grid

use a 2'x2' grid

same intervals as materials (carpet, 2x4s)

Smart Design



Use the vernacular

people have been building affordably for a long time, learn from them

simple form, small footprint, nice details

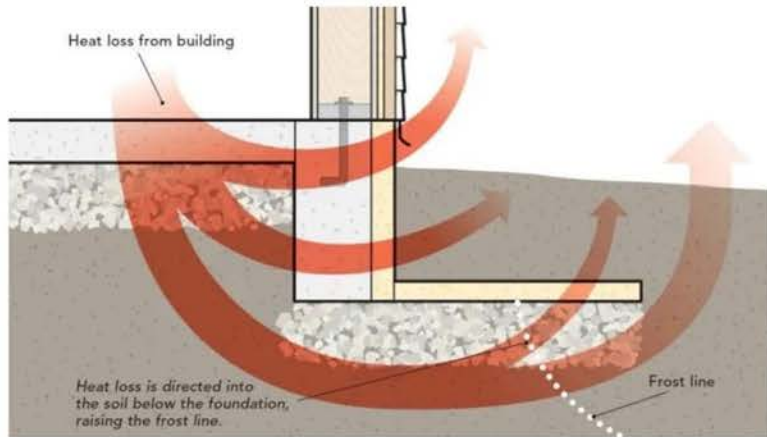
Smart Design



Holistic approach

Bring all the subs together from the beginning to plan out. See where there are redundancies and opportunities to make it cheaper.

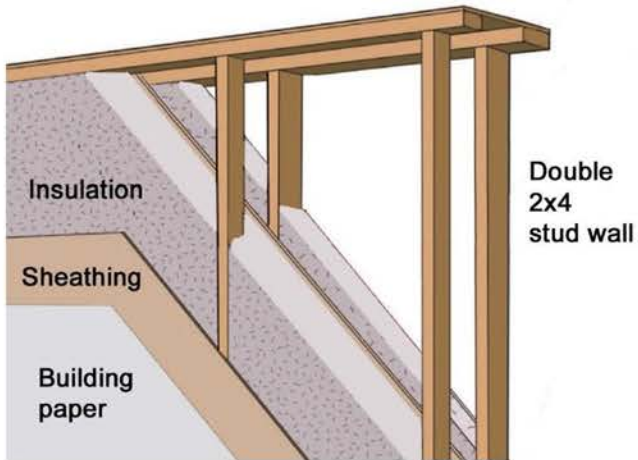
Smart Design



Foundations

Frost-Protected Shallow Foundations

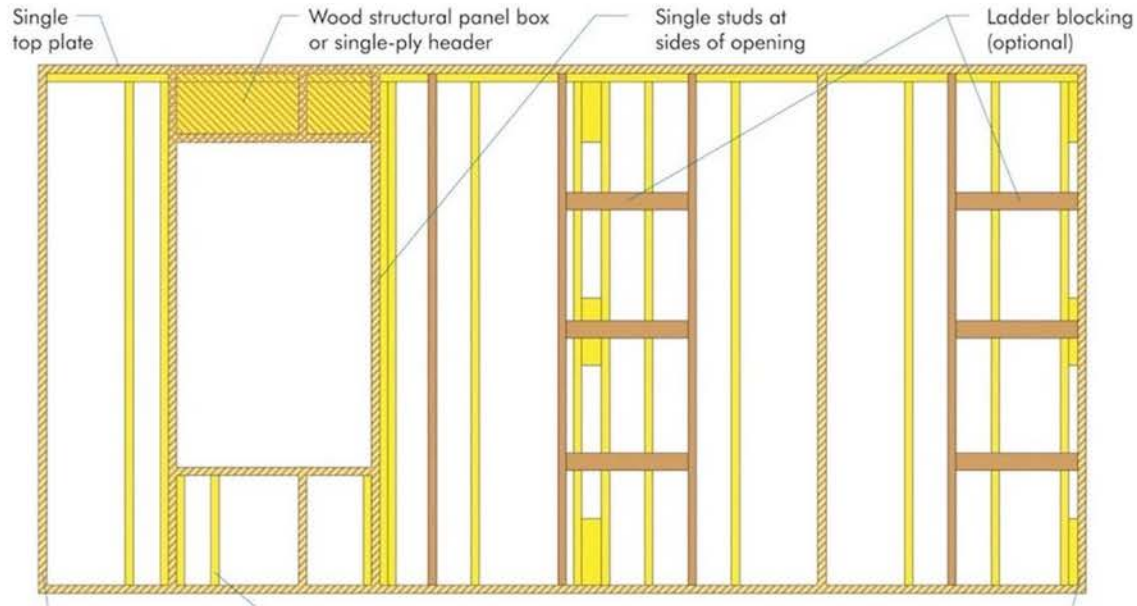
Smart Design



Framing

Double Stud Wall - allows for more insulation and no thermal break

Smart Design



Framing

Optimum Value
Engineered Framing -
saves wood

Smart **Design**



Materials

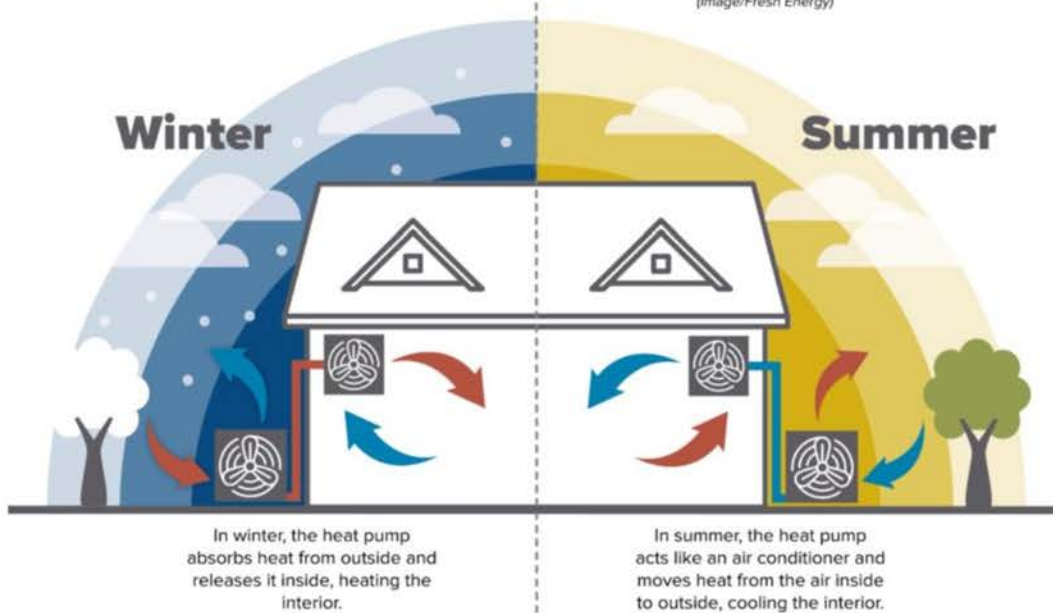
Local vs “green”

Complex decision

Smart Design

Air-Source Heat Pumps

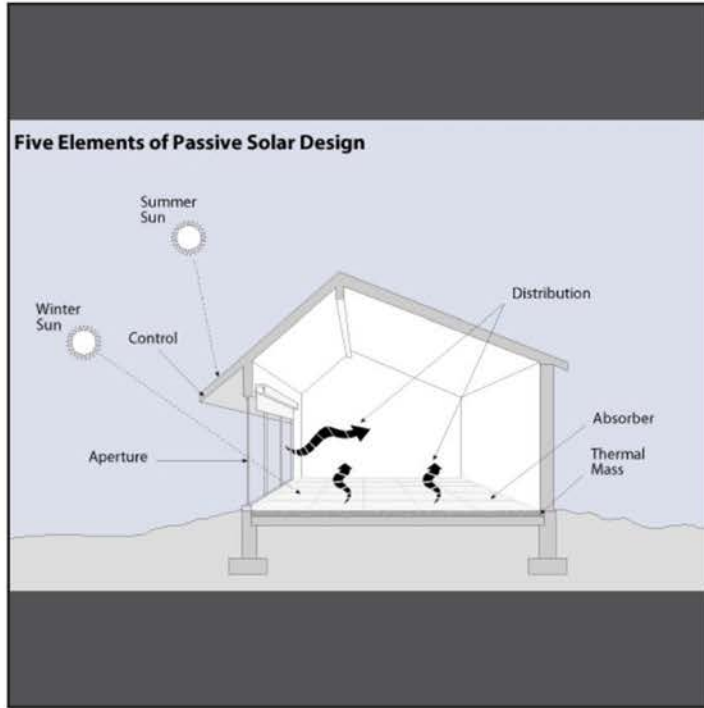
(Image/Fresh Energy)



Air Source Heat Pumps

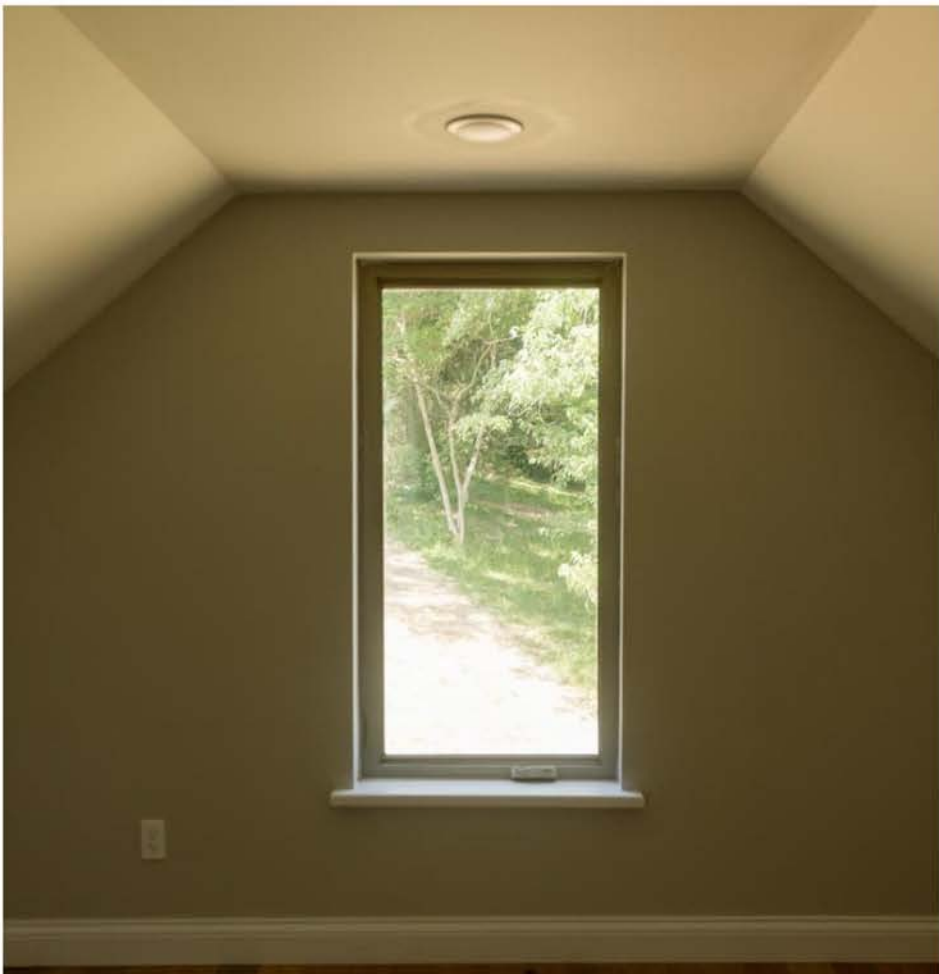
efficient, incentives available

Smart Design



Passive Heating, Cooling





Pretty Good House

Balance energy efficiency
with affordability

PRETTYGOODHOUSE

A GUIDE TO CREATING BETTER HOMES



DAN KOLBERT

EMILY MOTTRAM

MICHAEL MAINES

CHRISTOPHER BRILEY



“Have nothing in your house that you do not know to be useful, or believe to be beautiful.

William Morris”

William Morris

