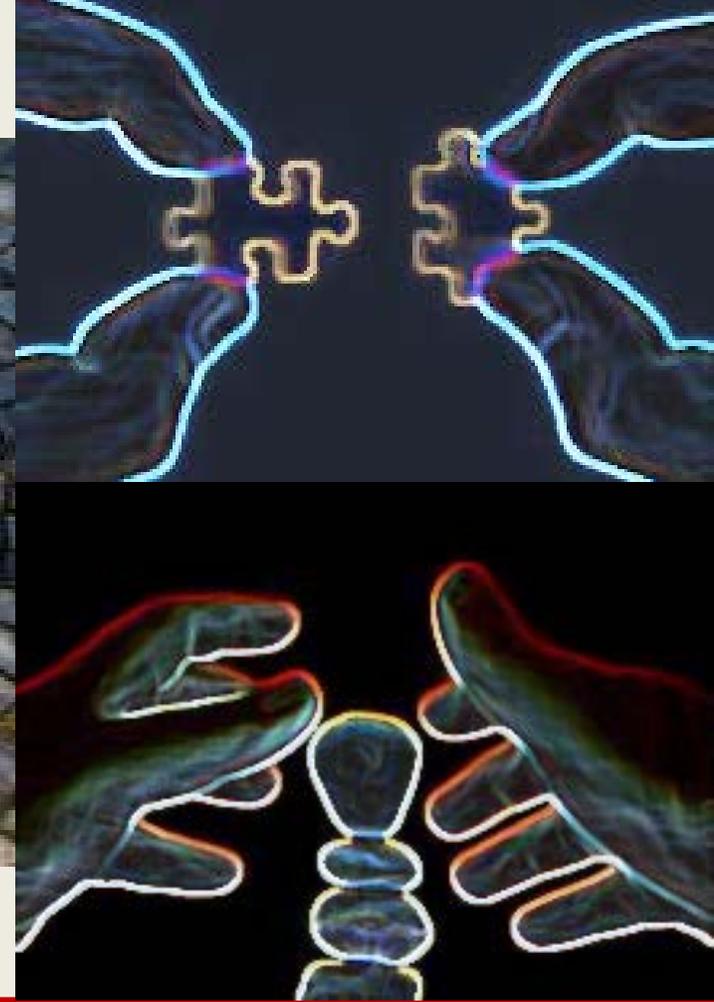
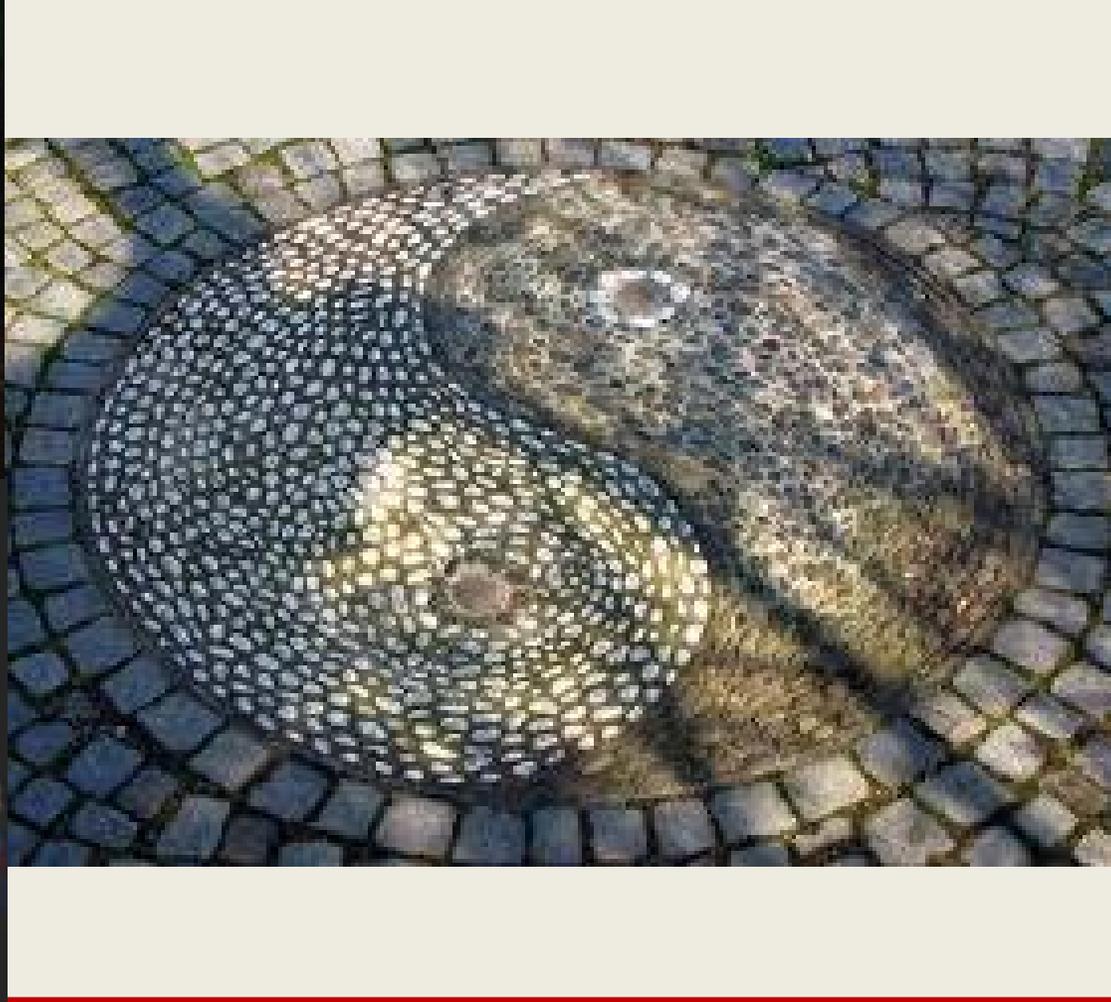
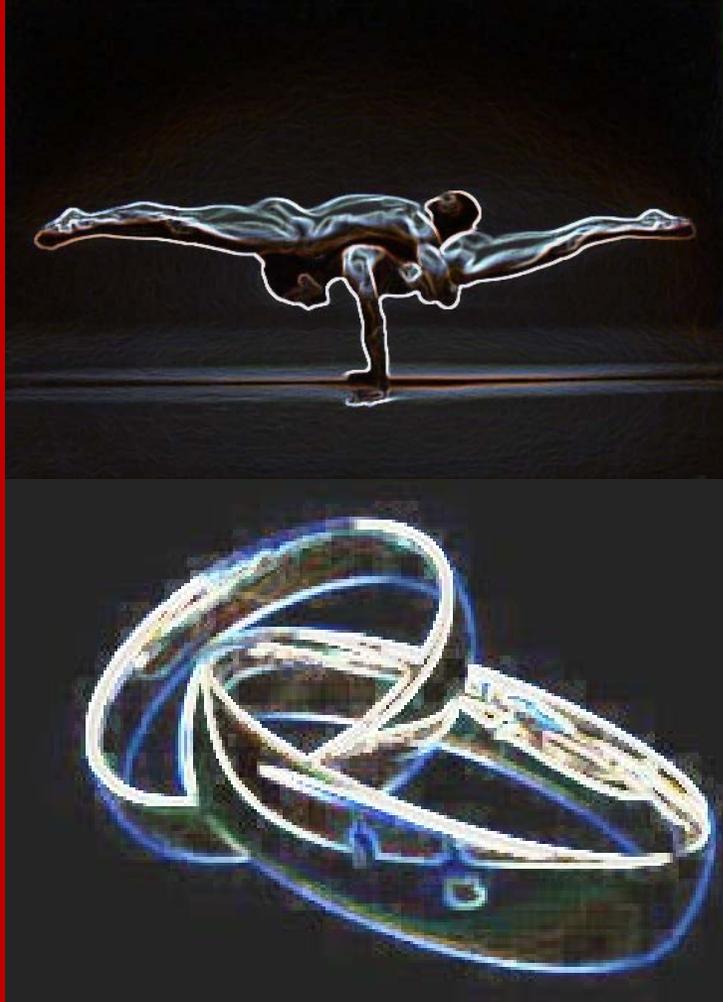


# Passivhaus for Multifamily

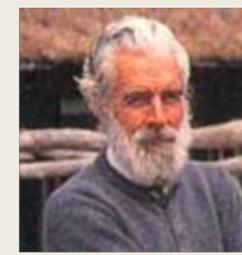
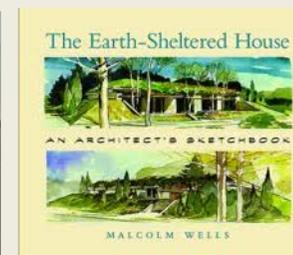
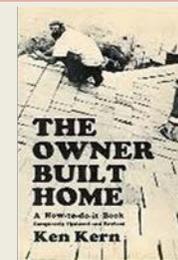
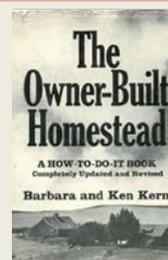
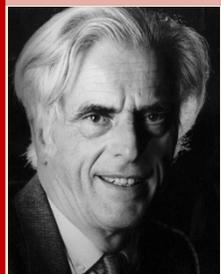
Presenter: **Adam J. Cohen**, RA VT, NH, CO, MD, CPHC NA & EU, LEED AP ®



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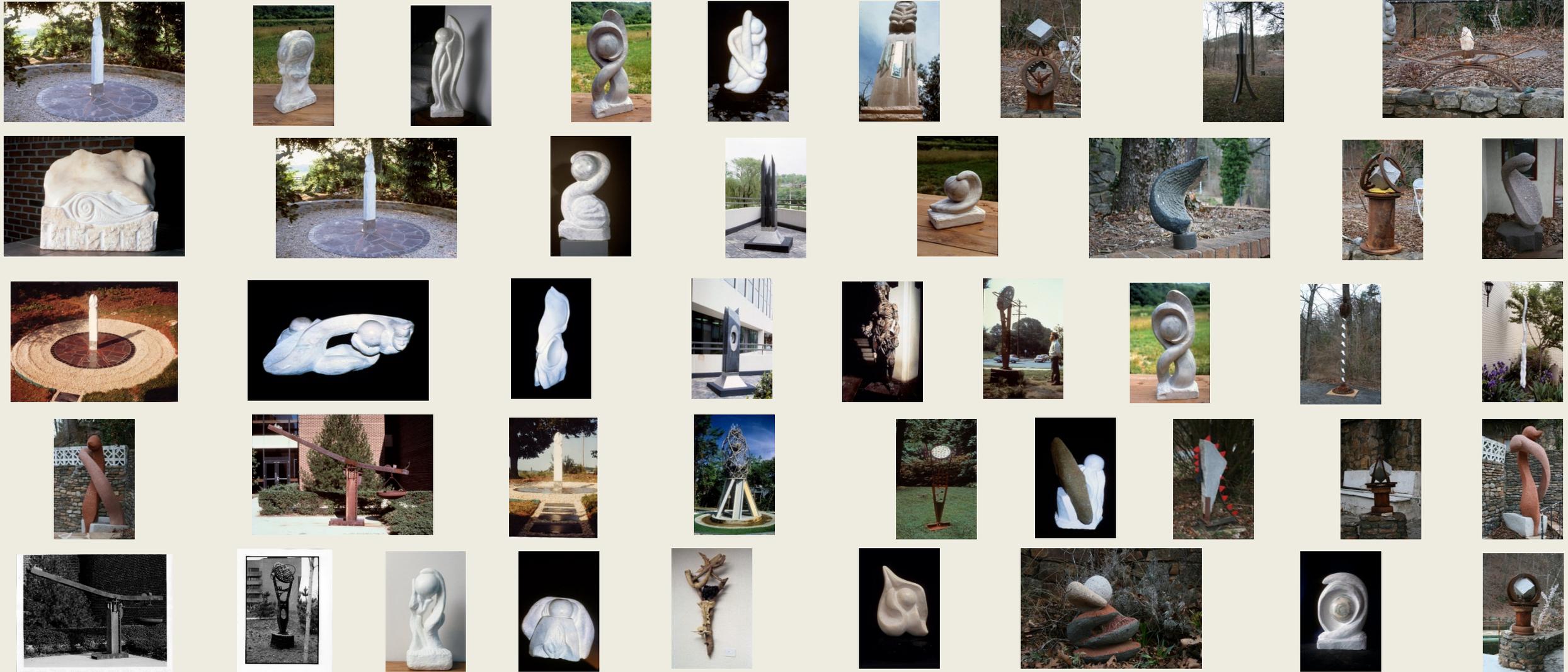
# Adam who?



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# Adam who?



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# Adam who?



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# Adam who?



## Near West Theater

- 20,000 sq ft
- Assembly
- New construction



## The Distillery

- 50,000 sq ft
- Mixed Use
- New construction



## Oracle Institute

- 8,000 sq ft
- Assembly
- New construction



## 2<sup>nd</sup> & Delaware

- 300,000 sq ft
- Mixed Use
- New construction



## St. Paul's

- 6,000 sq ft
- Residential
- New construction



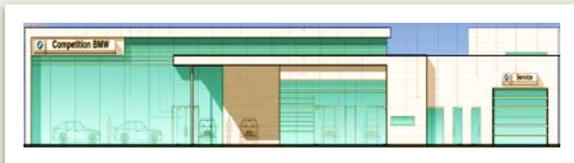
## Care First

- 20,000 sq ft
- Animal Hospital
- New construction



## Ambridge Crossing

- 50,000 sq ft
- Multi-Family
- New Construction



## Competition BMW of Smithtown

- 20,000 sq ft
- Retail showroom
- Renovation and addition



## Odin View Senior Living

- 50,000 sq ft
- Multi-Family
- New Construction



## Westhampton Residence Hall

- 50,000 sq ft
- Dormitory
- New construction



## Roxbury Place

- 50,000 sq ft
- Multi-Family
- New Construction



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# The Basics of Passivhaus



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# What is Passive Building?



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# What is Passive Building?

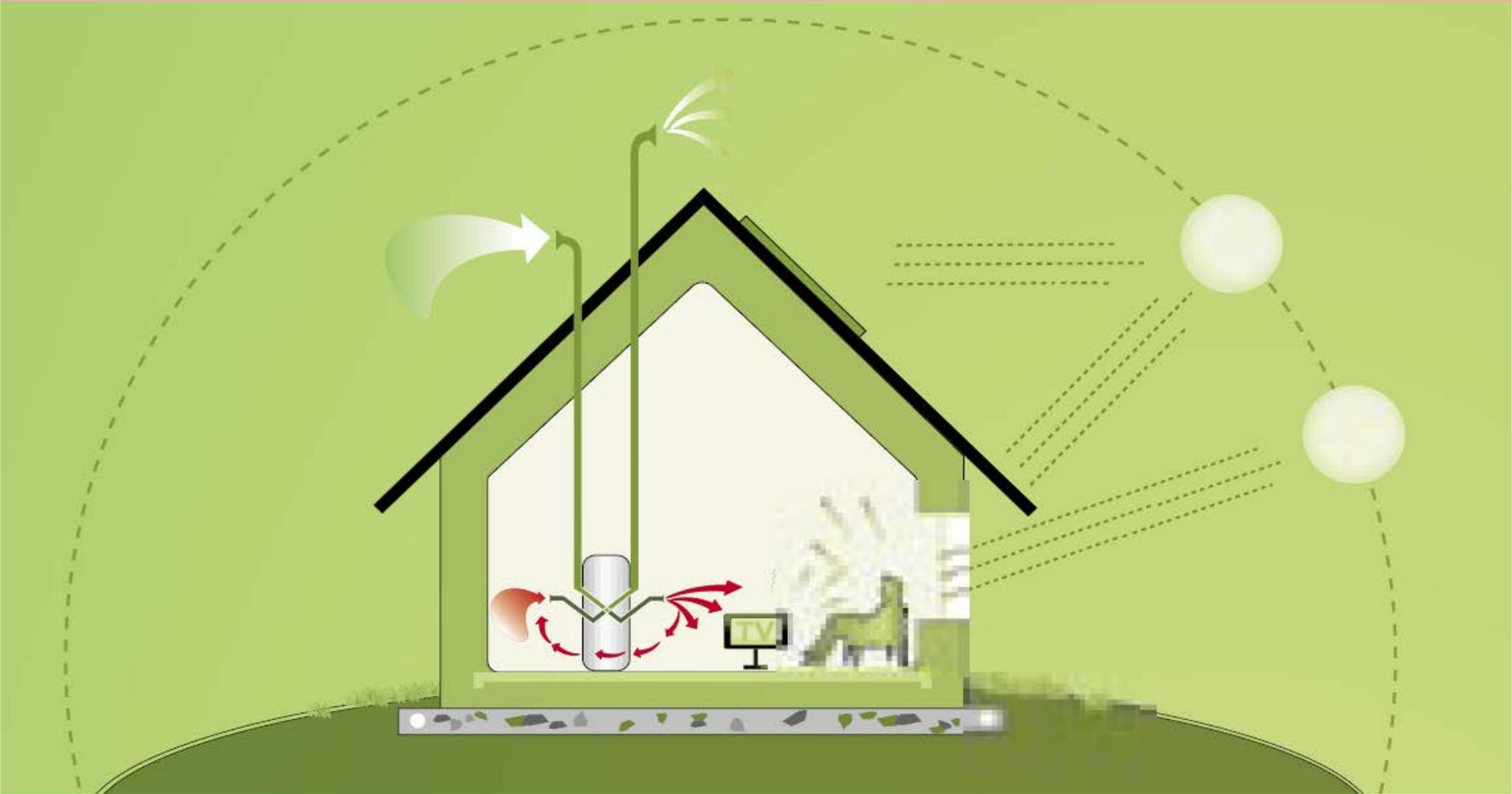


# What is Passive Building?



# What is Passive Building?

Bottom Line



Passive Building is an integrated design system based on building physics.

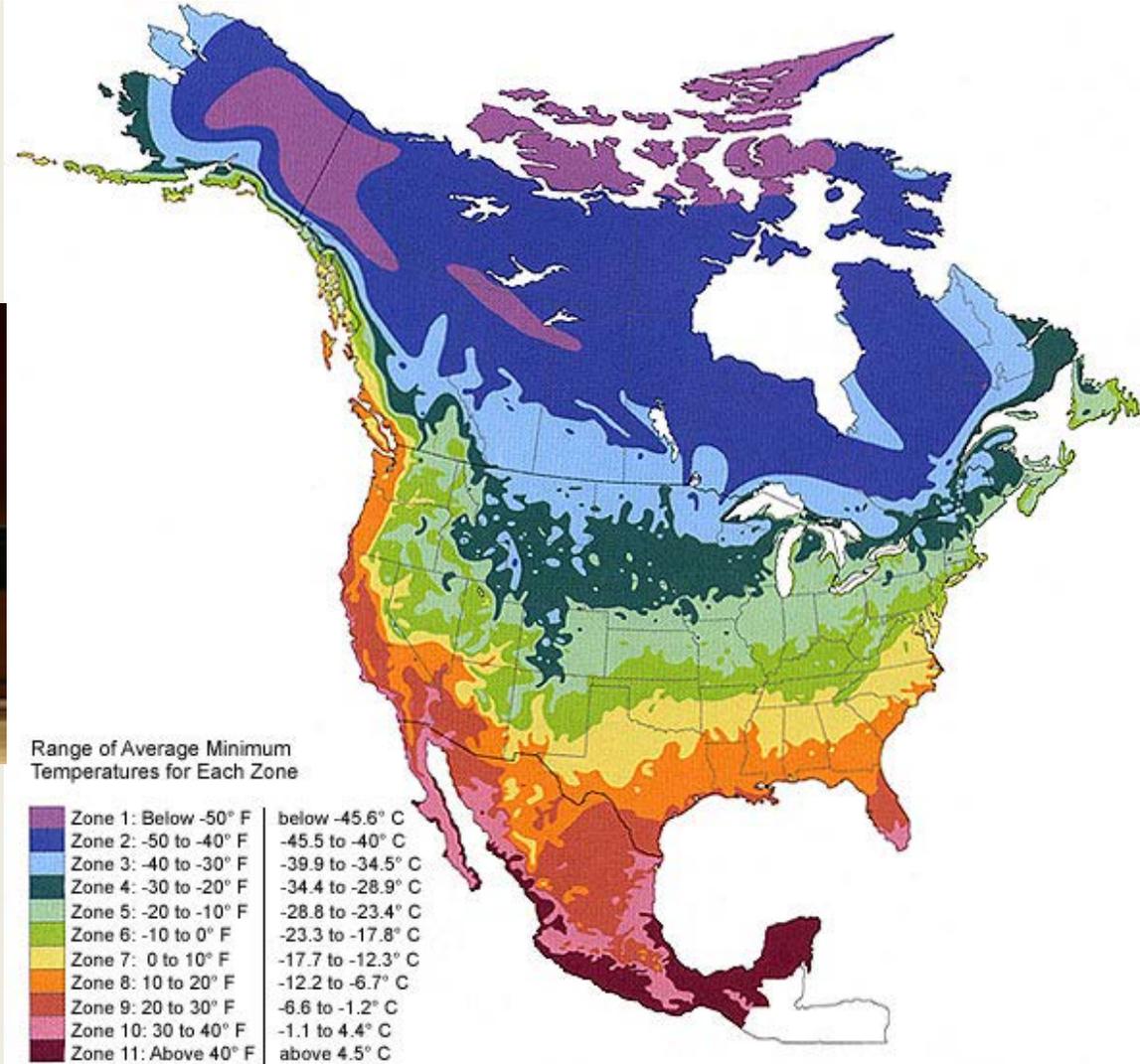


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# What is Passive Building?

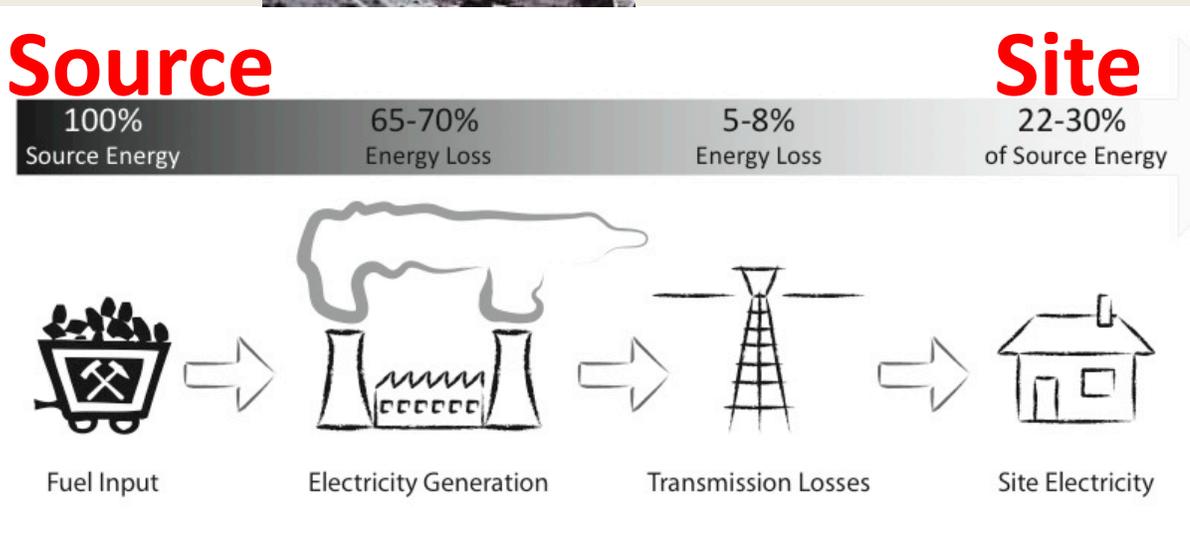
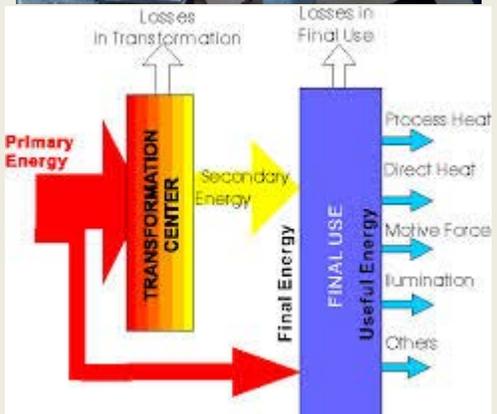
Performance-Based Not Prescriptive



# What is Passive Building?

Simple, clearly defined and verifiable parameters

1. Primary Energy (Source Energy)
2. Conditioning Energy
  - Heating
  - Cooling & Dehumidification
3. Air Tightness

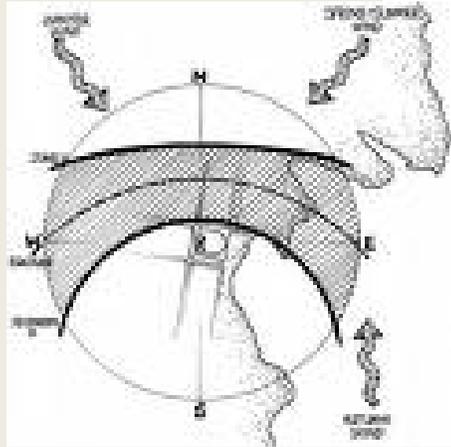
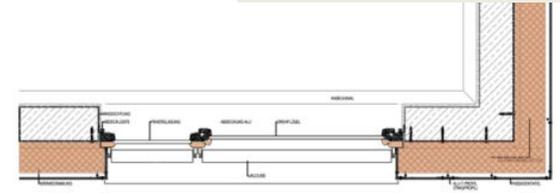
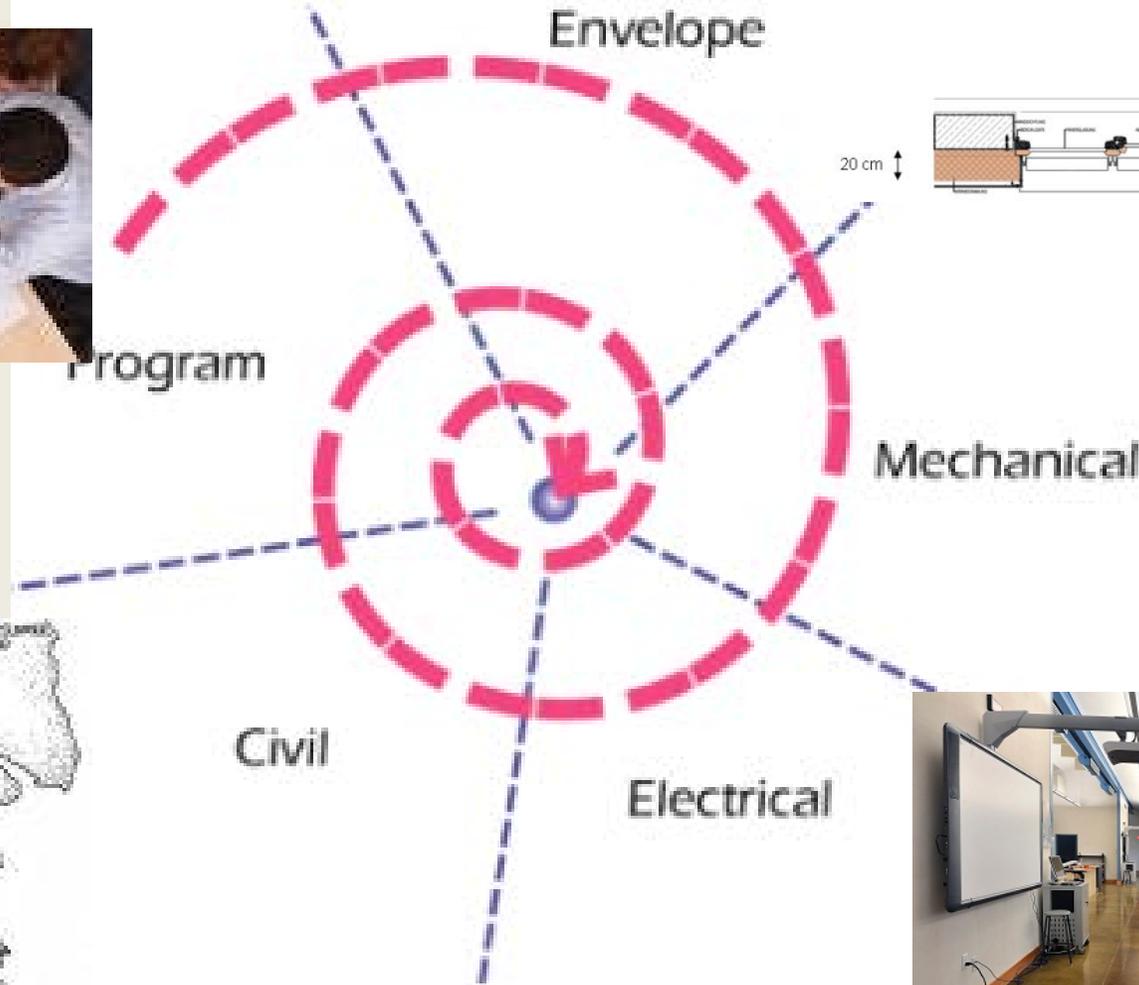


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# Understanding the building as a holistic system

Passivhaus is revolutionizing our design of building performance



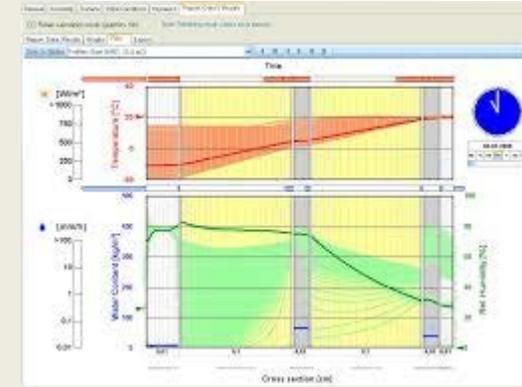
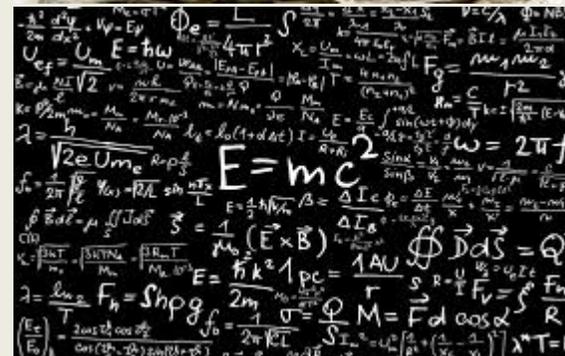
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# What is Passive Building?

“Investing in value instead of energy consumption requires little financial efforts but rather creativity and intelligent solutions” ~ Wolfgang Feist

- Tools
- Recommendations
- Creativity
- Budget
- Physics



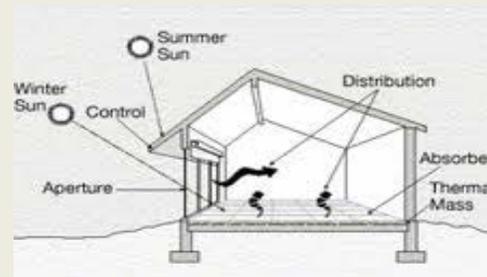
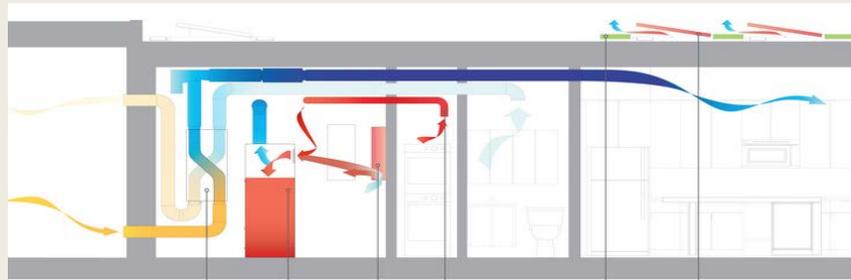
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# Passive Building Principles

## Basic Building Physics

- Minimize losses through envelope
  - Increased insulation levels
  - Air tight
  - Thermal bridge free
- Maximize and balance gains
  - High performance glazing
  - Shading
  - Passive ventilation
  - Interior gains
- Use efficient systems
  - Fresh air heat (& energy) recovery
  - High performance mechanical equipment
  - Highly efficient electrical systems (lighting, appliances, etc.)



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# Market Rate Implementation



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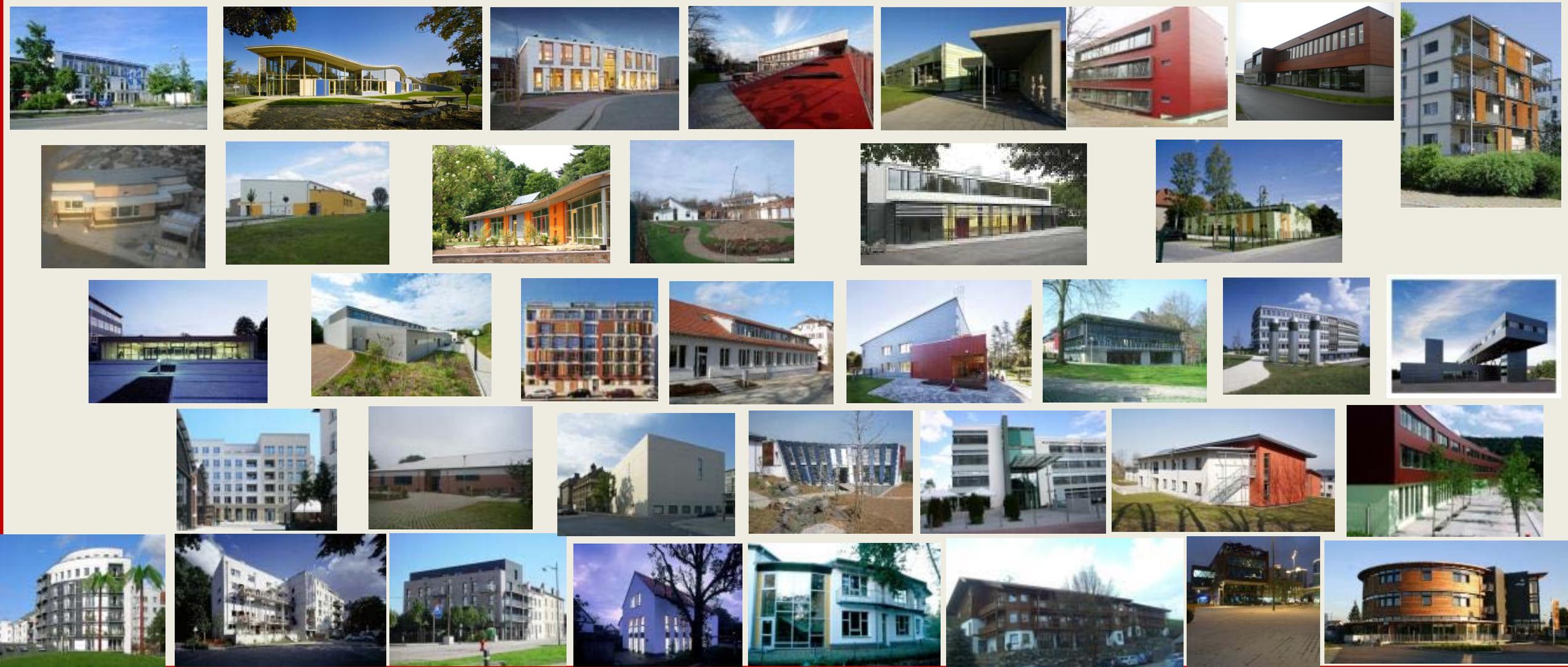
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# Commercial Passive Building

## European Examples



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# Define the Problem

The first step in solving a problem

- Design & Construction
  - Broken process
  - Lack of integration
  - Lack of respect
  - Lack of basic physics
  - Lack of a useful feedback mechanism
  - Lack of components

危機  
危機

*“Forget everything you know and walk in backwards” ~ Katrin Klingenberg*



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# What do we need to do?

- Break a process

- Create a system for integration

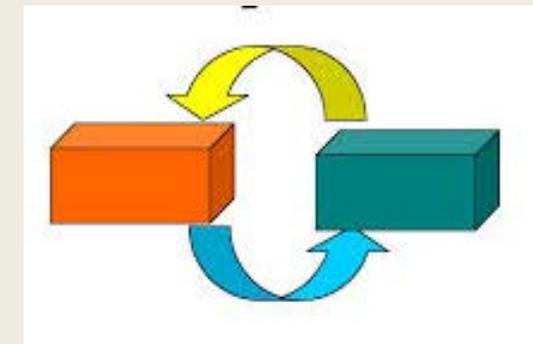
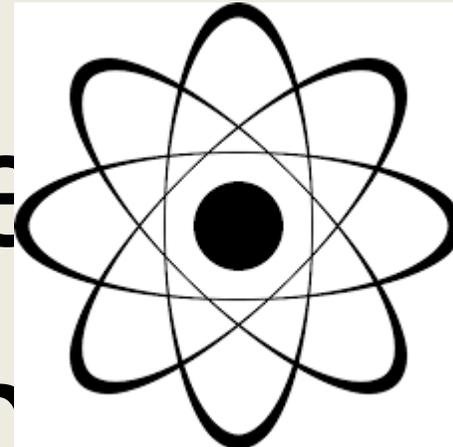
- Foster a respect sphere respect, humility and understanding

- Educate basic physics in the profession in basic physics

- Design and install feedback mechanisms

- Create, test, refine and market components

# Create, test, refine and market components



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# Craft Solutions

Eliminate non-value added work

- Envision the product properties
  - The product will seek to create and leverage efficiencies in design, manufacturing and construction to create a market rate product as part of a solution for high performance construction in sector being served.
- Design
  - The product will allow designers flexibility but will allow designer to trade flexibility for reliable cost savings, quality control, ease of detailing, ease of energy modeling, robust durability
- Manufacturing
  - The product will embrace a lean standardized approach with minimized shop drawing, automated parts creation, single point entry, efficiency in factory motion
- Construction
  - The product will be intuitive to North American trades, consolidate or eliminate site labor, create simple solutions to complex issues



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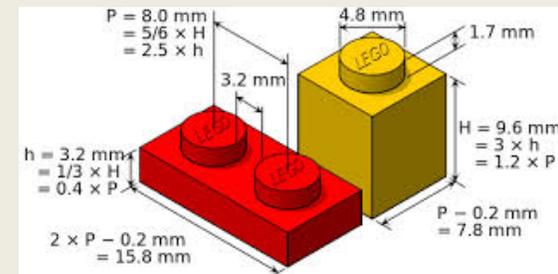
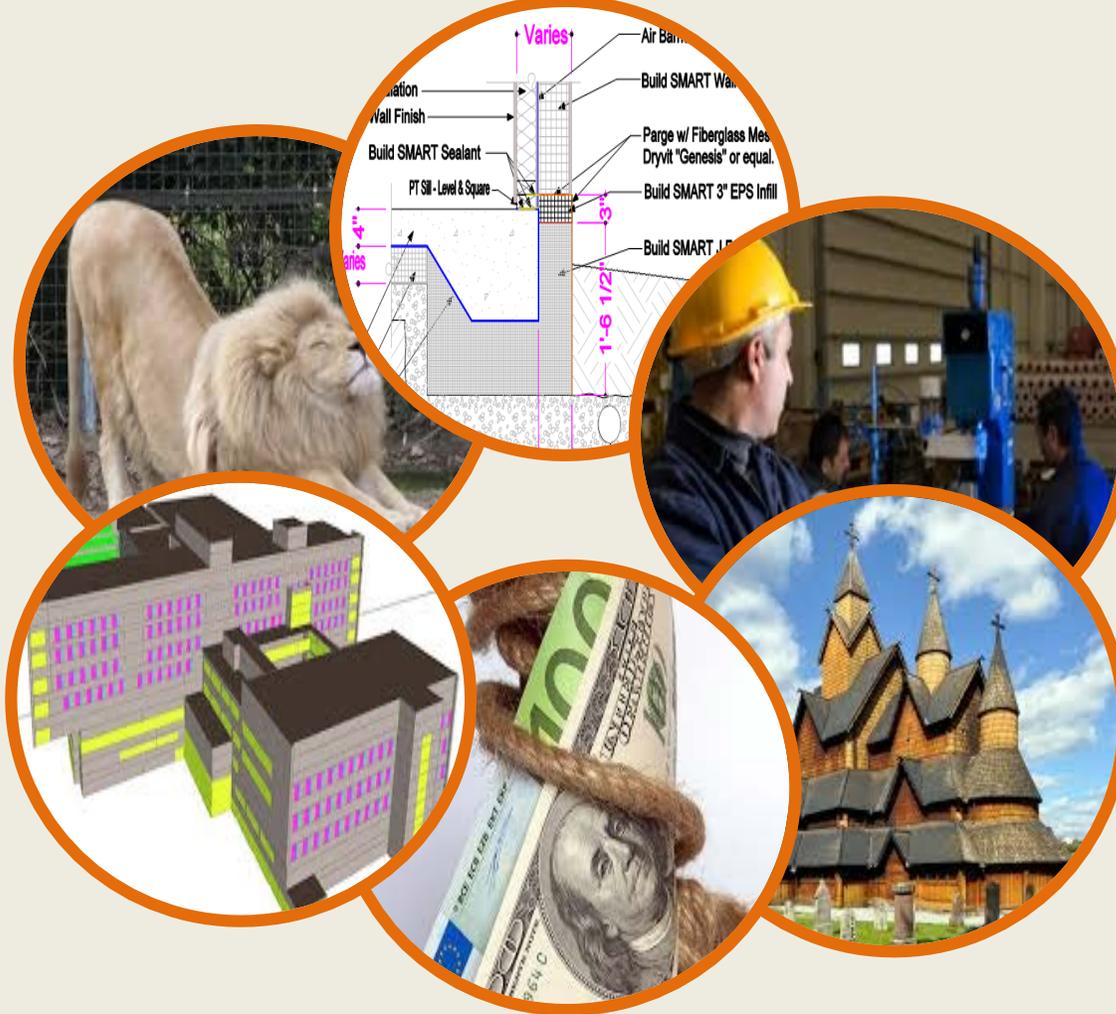


# Design

Allows designers flexibility, constrains flexibility for reliable cost, quality control, ease of detailing, ease of energy modeling, robust durability

- **Standard System**

- Think Lego ®
  - Design Flexibility
  - Ease of Detailing
  - Quality Control
  - Robust & Durable
  - Reliable Cost
  - Easy Energy Models



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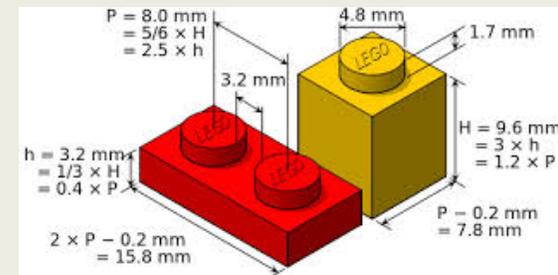


# Design

Allows designers flexibility, constrains flexibility for reliable cost, quality control, ease of detailing, ease of energy modeling, robust durability

- **Standard System**

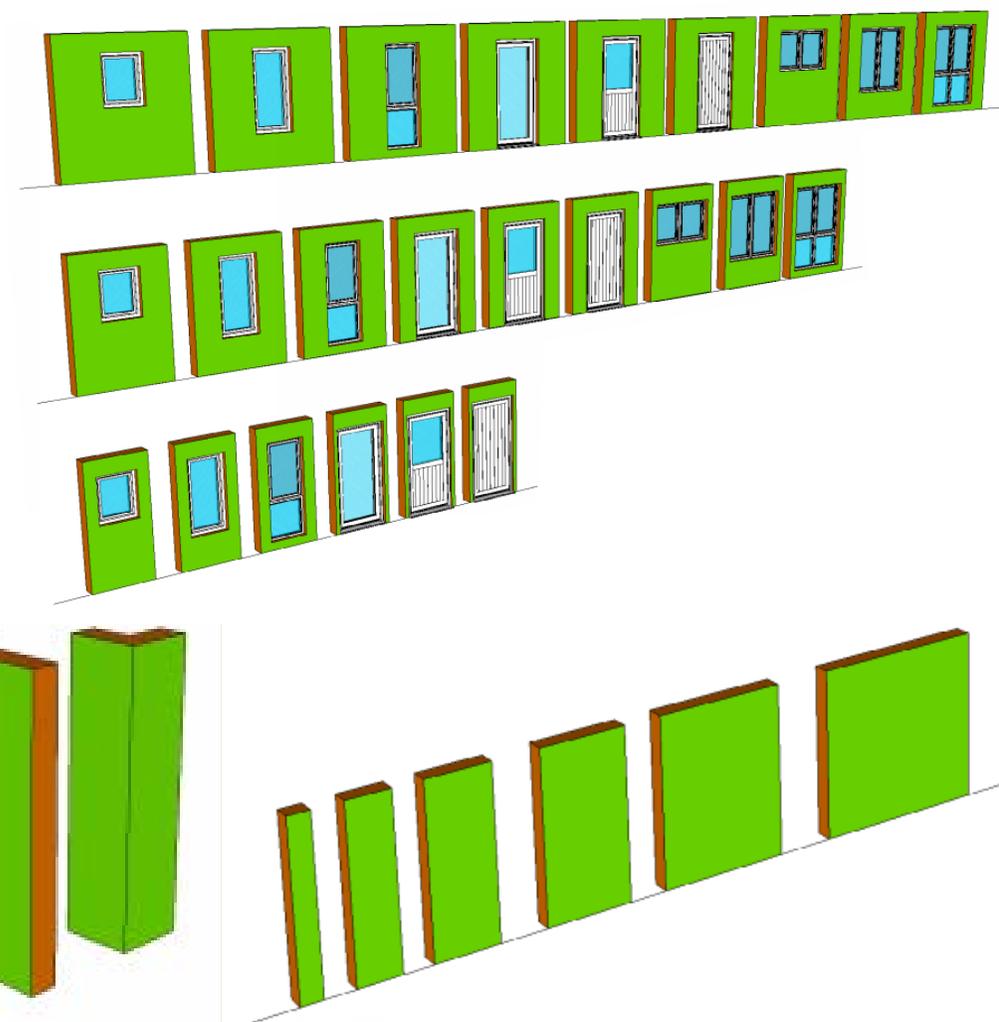
- Think Lego ®
  - Design Flexibility
  - Ease of Detailing
  - Quality Control
  - Robust & Durable
  - Reliable Cost
  - Easy Energy Models



# Manufacturing

Embrace a lean standardized work approach, minimized shop drawing, automate parts creation, single point entry, efficiency in factory motion

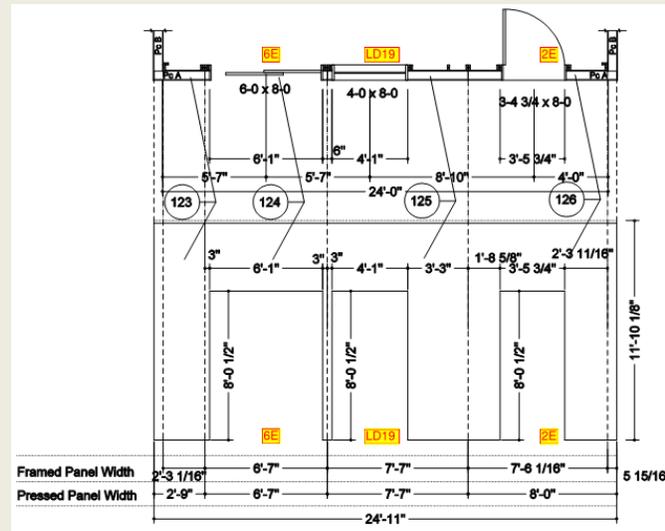
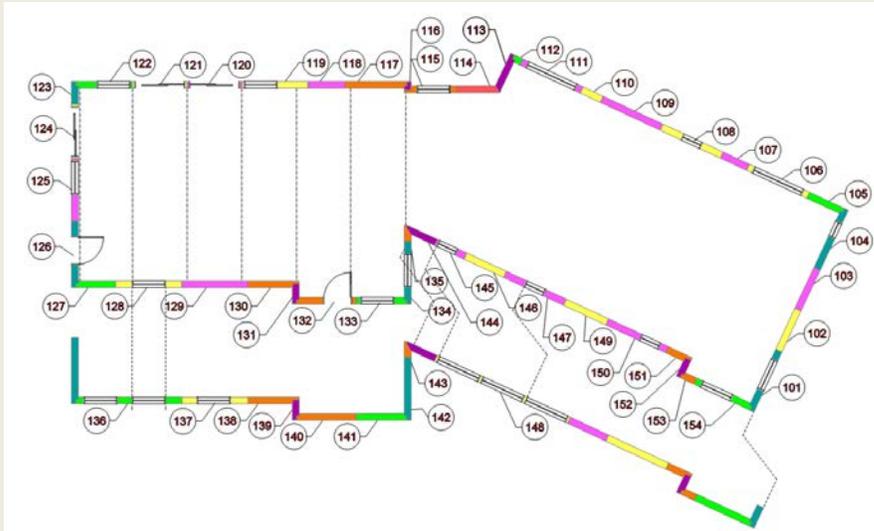
- **Standard System** (inspired by Henry Ford – “Any color as long as it’s white”)
  - 8' & 9' Heights
  - 1', 2', 3', 4', 6', 8' Straight Panels
  - 2' Inside and Outside Corners
  - Standard Passivhaus Certified Single & Twin Windows and Doors
  - Affordable (Data from 54 projects priced)
    - Single Family \$20-\$30 (USD) per sq ft floor area
    - Multi Family - \$8-\$15 (USD) per sq ft floor area
    - Eliminates Shop Drawings
    - Components pre-cut & jigged to reduce production time
    - EU Windows & Doors
      - Simplified Purchase
      - Delivered Installed & Airtight



# Manufacturing

Two Systems, One Purpose – Making Passivhaus accessible to a larger market

- **Custom System**
  - ANY Height
  - ANY Configuration
  - ANY Munster Joinery Passivhaus Certified Windows and Doors
  - Affordable? - \$40-\$60 (USD) per sq ft floor area
    - NEED Shop Drawings
    - ALL Components - custom cut and layout
    - EU Windows & Doors –
      - Simplified Purchase
      - Delivered Installed & Airtight (when size allows)



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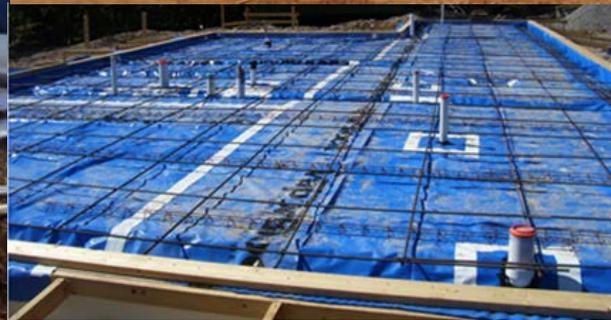
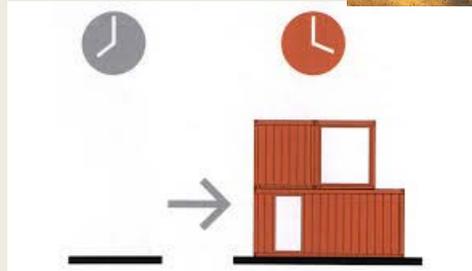


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# Construction

The product will be intuitive to North American trades, consolidate or eliminate site labor, create simple solutions to complex issues

- Modular systems
  - Slab Foundations
  - Basement Foundation
  - Framed Walls
- Require basic skills
- Requires less labor
- Allows faster construction



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# Construction

## J Form



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# Construction

J Form ~ Bottom Plate



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# Construction

## J Form ~ Bottom Plate



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# Construction

## J Form - Finish



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# Construction

## Walls



# Construction

## Walls



# Construction

## Walls



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# Construction

## Walls



# Construction

Band



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# Construction

## Walls



# Construction

## Walls



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# Construction

## Walls



# Construction

Lid



# Construction

Ready for Testing



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# Construction

.5 ACH 50 – BEFORE LEAK CHASING!!



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# Construction

## Basement

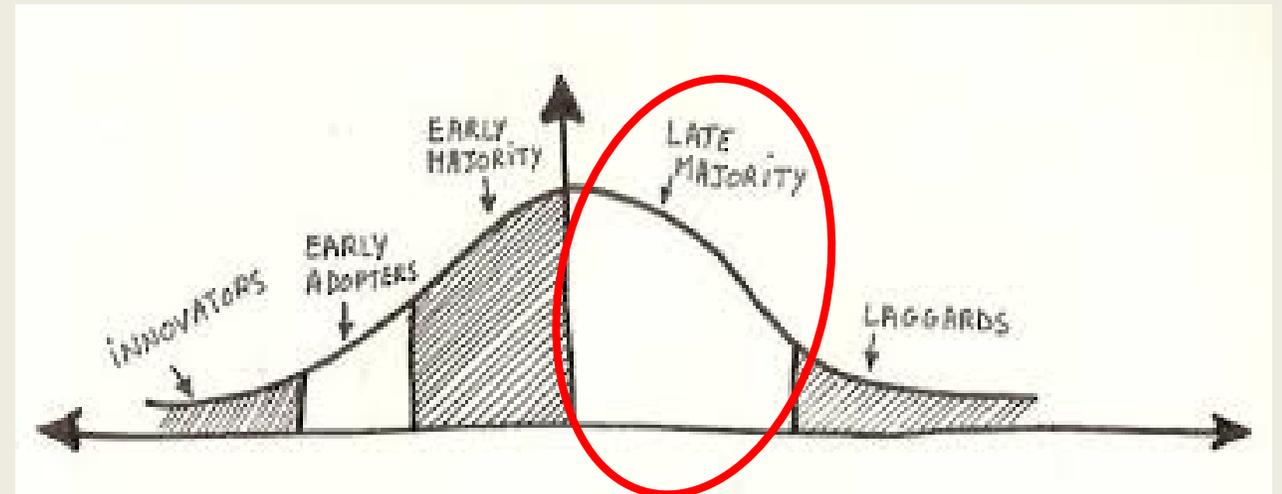
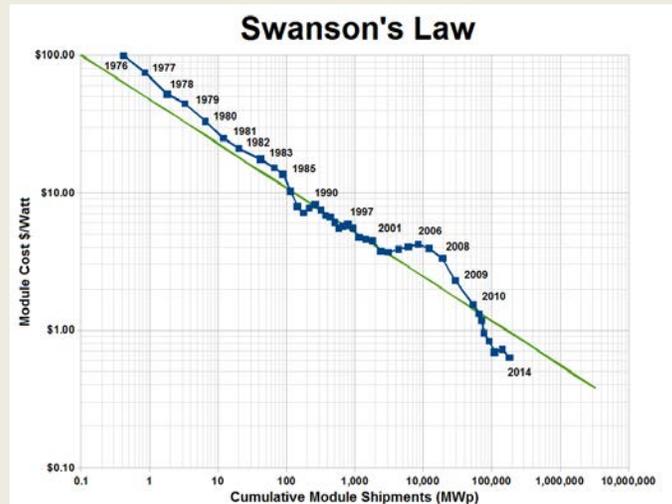


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# Is this really the solution?

Of course not, it's a step on the way!

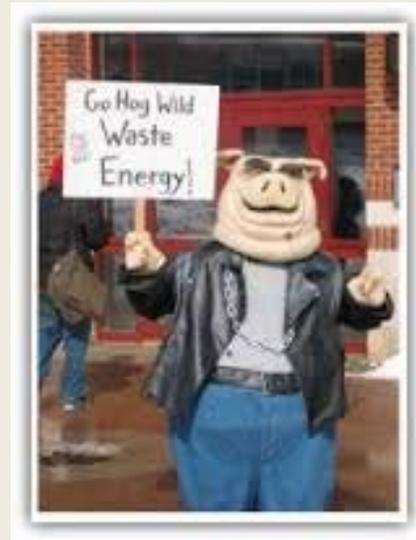


# Conclusion

And now a message from Dr. Feist

“Investing in value instead of energy consumption requires little financial efforts but rather creativity and intelligent solutions”

~ Wolfgang Feist



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# Questions & Contact



**Adam J. Cohen, RA: MD, VT, NH, CO, CPHC NA & EU, LEED AP ©**

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540.312.8400



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