

# Sustainable Building and Design: Think Globally, Act Locally

Photo credit: Clare Dougan



Rachel Wagner

Wagner Zaun  
Architecture

[www.wagnerzaun.com](http://www.wagnerzaun.com)

# Sustainable

Sustain:

- “To maintain, or cause to continue”
- “To endure without failing or yielding; to bear up under.”



Webster's Collegiate Dictionary,  
5<sup>th</sup> edition

What do we need to be sustained?

# What do we need to be sustained?

- Water
- Food
- Shelter

What do we use?

# What do we use?

- Land
- Water
- Living things
- Fossil fuels
- Minerals and other raw materials  
(resources)

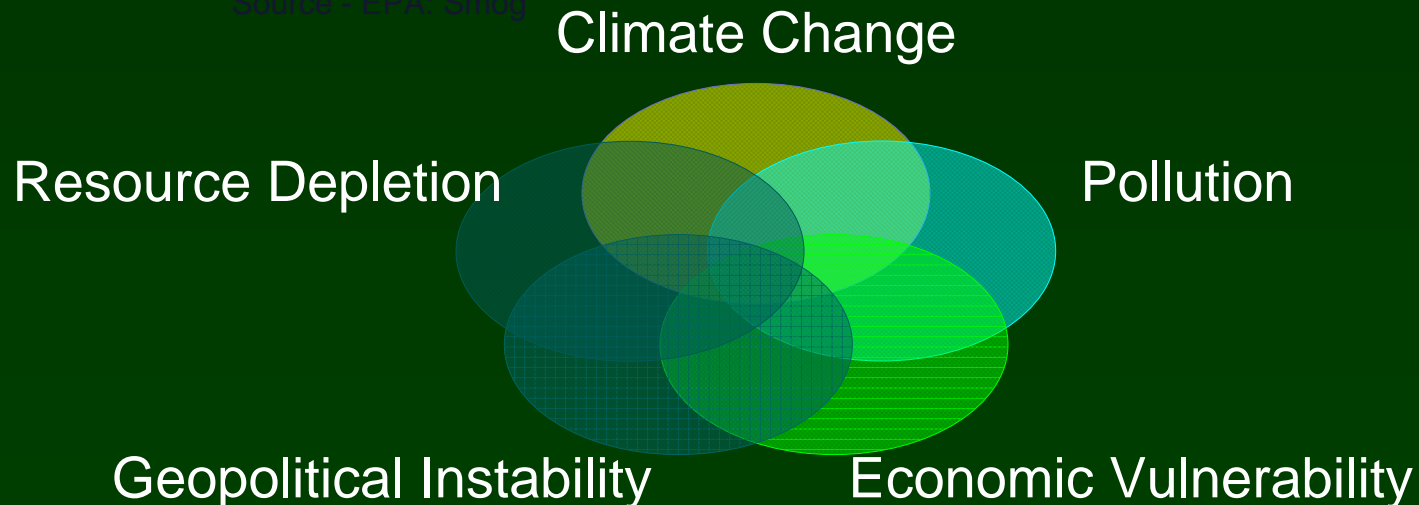
# Context

Americans make up 5% of the world's population but use close to 25% of the world's resources.

# Global effects of resource use



Source - EPA: Smog



“Sustainable Development meets the needs of the present without compromising the ability of future generations to meet their needs.”

“Our Common Future,” 1997 U.N World Commission on Environment and Development

# Sustainability and Buildings



Wagner Zaun  
Architecture

# Context

“Architecture consumes approximately 48% of all the U.S. energy produced and is responsible for 46% of all U.S. CO2 emissions annually. ...”

Ed Mazria, Architect and founder of architecture2030

“It’s the Architecture, Stupid”, 2003

[www.architecture2030.org](http://www.architecture2030.org)

“... We know that buildings can be designed today to operate with less than half the energy of the average U.S. building at no additional cost.”

Ed Mazria, Architect and founder of architecture2030

“It’s the Architecture, Stupid”, 2003

[www.architecture2030.org](http://www.architecture2030.org)

# Act Locally



Wagner Zaun  
Architecture

# Is this a green building?



Wagner Zaun  
Architecture

“A green building is not green because it has PV on the roof – or a ground-source heat pump or a vegetated roof or integrated wind – “

Alex Wilson, Editor, Environmental Building News, May 2009

# Energy-efficient construction

“ – it’s green because it has an energy-conserving envelope, because it relies on natural daylighting, because it effectively controls unwanted heat gain “

Alex Wilson, Editor, Environmental Building News, May 2009

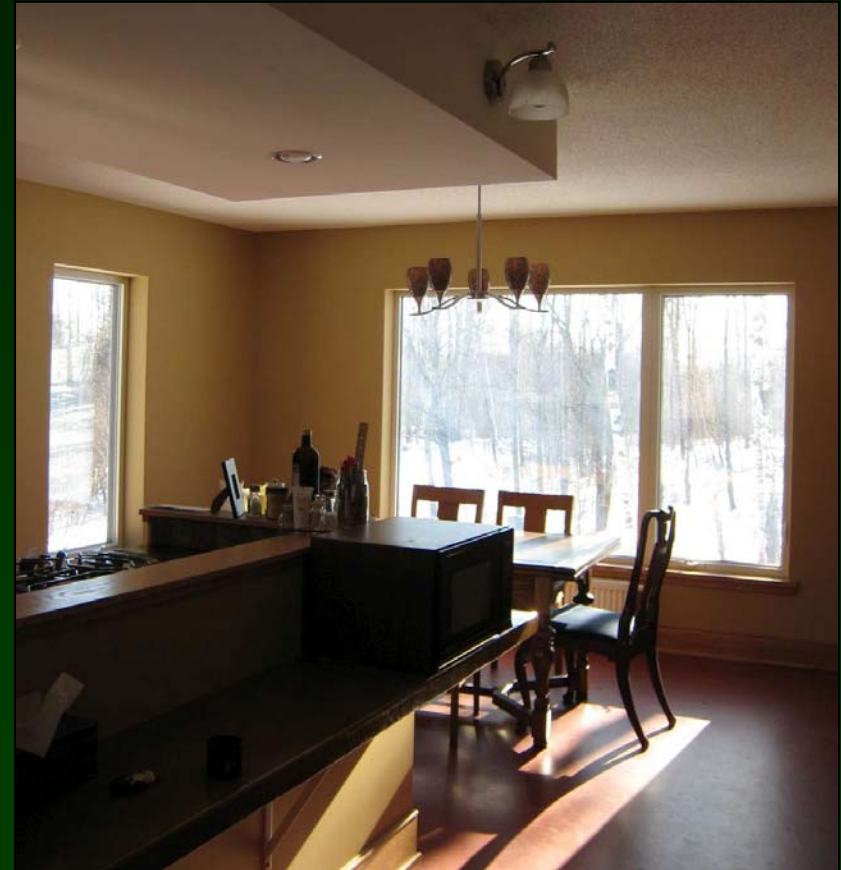
Wagner Zaun  
Architecture



# Sun on, lights off

“ – it’s green because it has an energy-conserving envelope, **because it relies on natural daylighting**, because it effectively controls unwanted heat gain “

Alex Wilson, Editor, Environmental Building News, May 2009



# Solar design: cheapest energy

“ – it’s green because it has an energy-conserving envelope, because it relies on natural daylighting, **because it effectively controls unwanted heat gain** “

Alex Wilson, Editor, Environmental Building News, May 2009

Wagner Zaun  
Architecture



FEB



JUNE

# Yes, this is a green building



Wagner Zaun  
Architecture

“I believe we are bombarded with messages encouraging us to take the ‘small steps’ precisely because those steps are a threat to no one.”

Alex Steffen, Activist, On Earth Day, 2006

Act Locally:  
take much bigger steps

# Opportunity in Existing Buildings



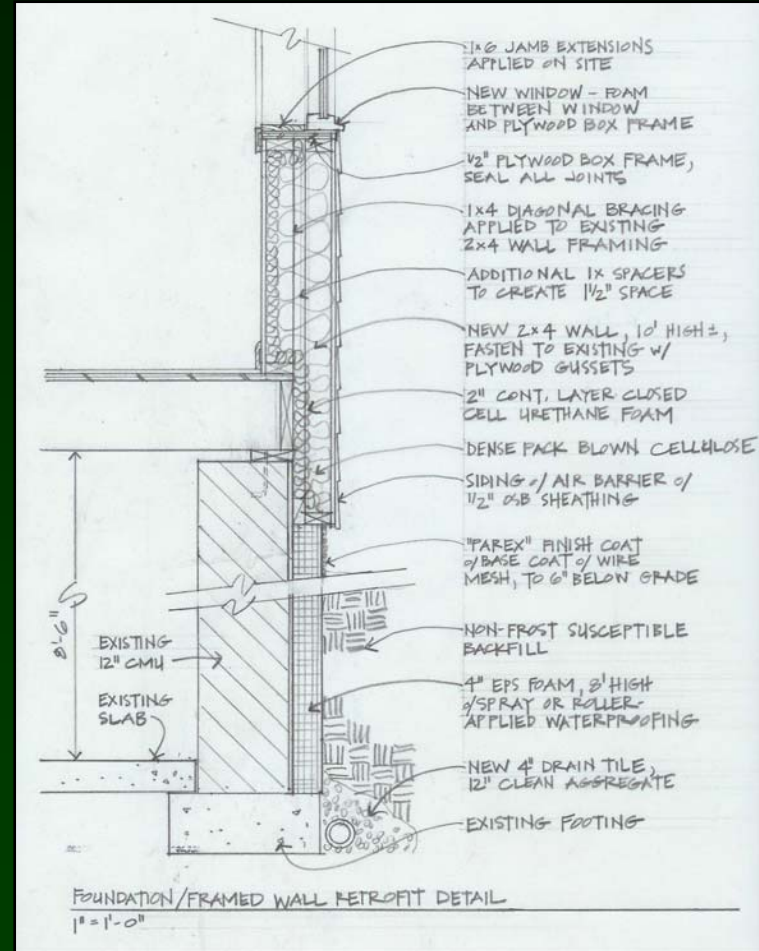
BEFORE



AFTER

Wagner Zaun  
Architecture

# Bigger Steps: Deep energy retrofit



# Bigger Steps: Deep energy retrofit



Wagner Zaun  
Architecture

Sustaining Our Buildings  
And  
Our Selves

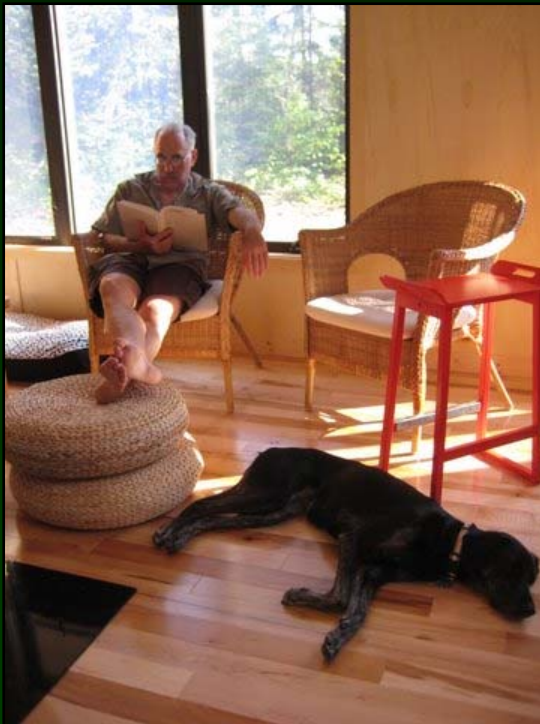
# Definition of Sustainable Building



- Energy efficient
- Climate-appropriate
- Durable
- Operable
- Resilient
- Robust
- Adaptable
- Able to be maintained

*...over time.*

# Facilitating Comfort and Joy



Part of Sustaining Ourselves

# Sustainable Design

- Understand the building's function.
- Maximize use of **the sun**.
- Do the math – measure energy needs.
- Minimize vulnerability to the building and its occupants (passive survivability).

# The Passive House Approach



Skyline House in Duluth, using 75% less energy

# Sustainable Building

1. Maximize the efficiency and durability of the envelope.
2. Maximize efficiency and adaptability of the systems.
3. Include Energy Flexibility.
4. Build with regard to the sun.

# Sustainable Living



Wagner Zaun  
Architecture

# Sustainable Thinking

1. Don't build what is already obsolete.
2. Build with the knowledge that purchased energy will only get scarcer and more expensive.
3. Think in systems from start to finish.

# Think about tomorrow – today.



Wagner Zaun  
Architecture

“The future is literally in our hands to mold as we like. But we cannot wait until tomorrow. Tomorrow is now.”

Eleanor Roosevelt, 1963

Wagner Zaun  
**Architecture**

17 N Lake Avenue  
Duluth, MN 55802  
218.730.0690

[www.wagnerzaun.com](http://www.wagnerzaun.com)