

# ***Guerilla Planning, Design & Partnerships for Disruptive Projects: Habitat for Humanity EcoVillage***



*Local Government Summit: Building Sustainable  
Communities through Energy & Resilience  
Wisconsin Academy of Science, Letters, & Arts  
Fond du Lac, WI  
(April 5, 2017)*



**Kelly D. Cain, PhD,  
Exec. Dir., St. Croix Institute  
Emeritus Professor, UW—River Falls**



# *Economically Disadvantaged People Living in State-of-the-Art Houses?*

Frank and Ernest



# **“Sustainability Is NOT Enough?”**

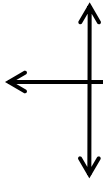
**COLLAPSE**

**Un-  
Sustain-  
ability**

***The Tipping Point  
of  
Sustainability***

**Beyond  
Sustain-  
ability**

**?**



**?**

**Carbon  
Positive  
1XBL**

**Carbon Neutral  
3XBL Approach**

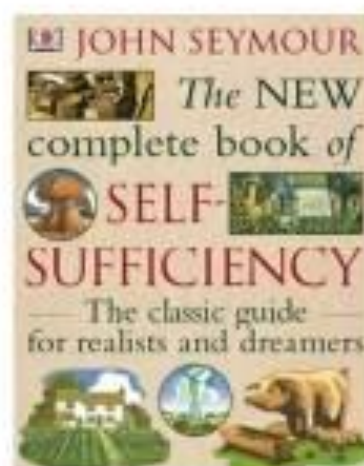
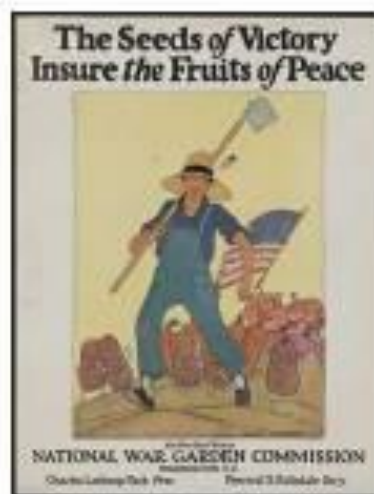
**Carbon  
Negative  
4XBL  
Approach**

**RESILIENCE**

# Core American Values ...

## *Life, Liberty, & the Pursuit of Happiness*

- **Self-Sufficiency**
- **Self-Reliance**
- **Self-Determination**
- **Creativity & Ingenuity**
- **Innovation**
- **Entrepreneurship**
- **Responsibility for Self, Family, Neighbors, & Community**





# *Energy & Resilience: the 'Re-Localization of Community Economics'*

- *City of River Falls - WI State Energy - 2010 Data:*
- *~\$3,300 / Person / Year?*
- *15,000 X \$3.3K = \$49.5M*
- *75% Leakage?*
- *~\$37 M*



# *Habitat EcoVillage: A Commitment to Disruptive Performance = RESILIENCE*



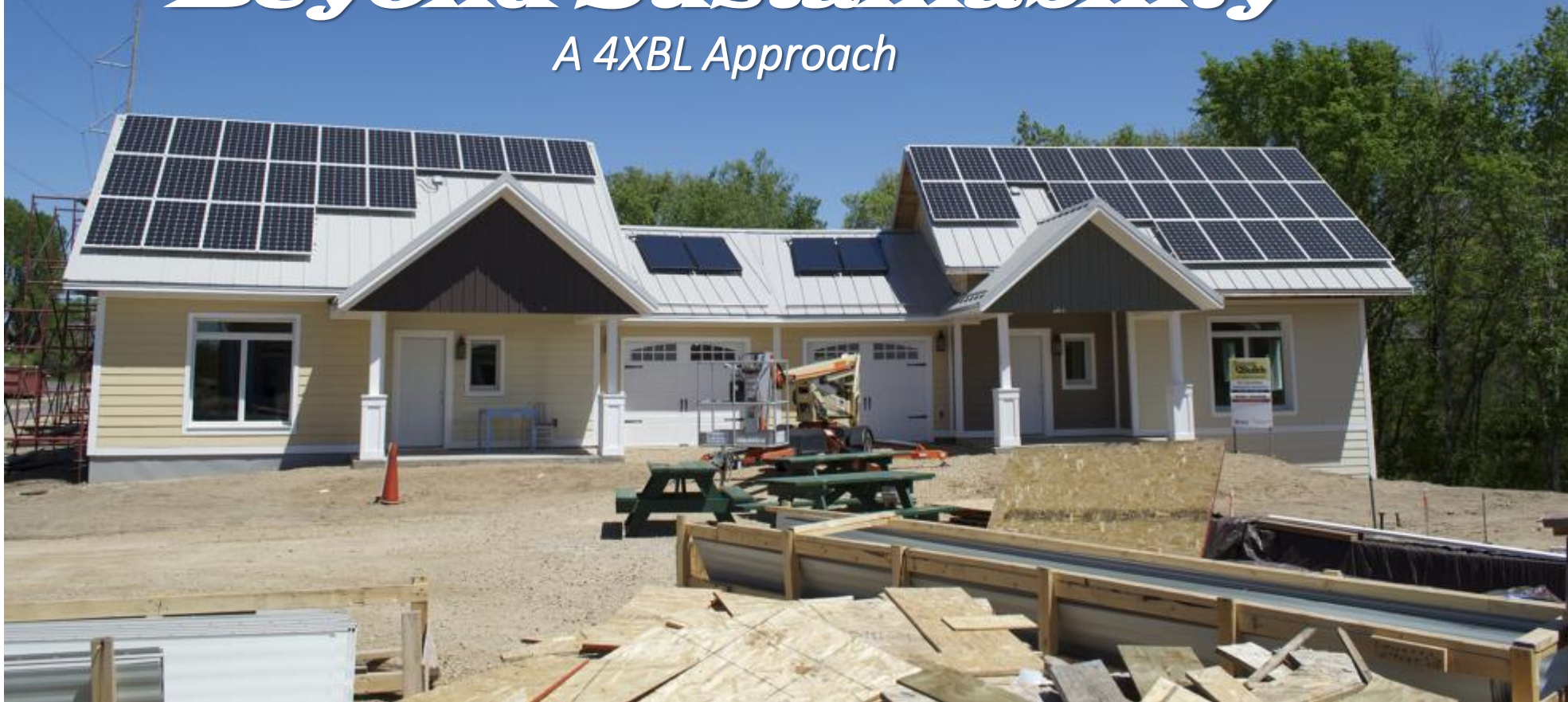
*Holistically  
Integrated  
Systems*



- *LEED Platinum – ‘Carbon Negative’*
- *Self-Sufficiency & Restorative by Nature*
- *Economic Stability & Security*
- *Social Transformation of Lives & Community*

## ***“Beyond Sustainability”***

*A 4XBL Approach*



# *Eco Village Vision*

National Demonstration Project  
for Sustainable Neighborhood Design

- 4XBL Beyond Sustainability-Based Project:
- Public – Private - Non-Profit Partnerships Driven
- 18 Homes, Community Center, & PV Field
- LEED® for Homes Platinum (LEED-ND Gold N/A)
- Carbon Negative / Renewable Energy Positive



From Grey Field to  
Green Community





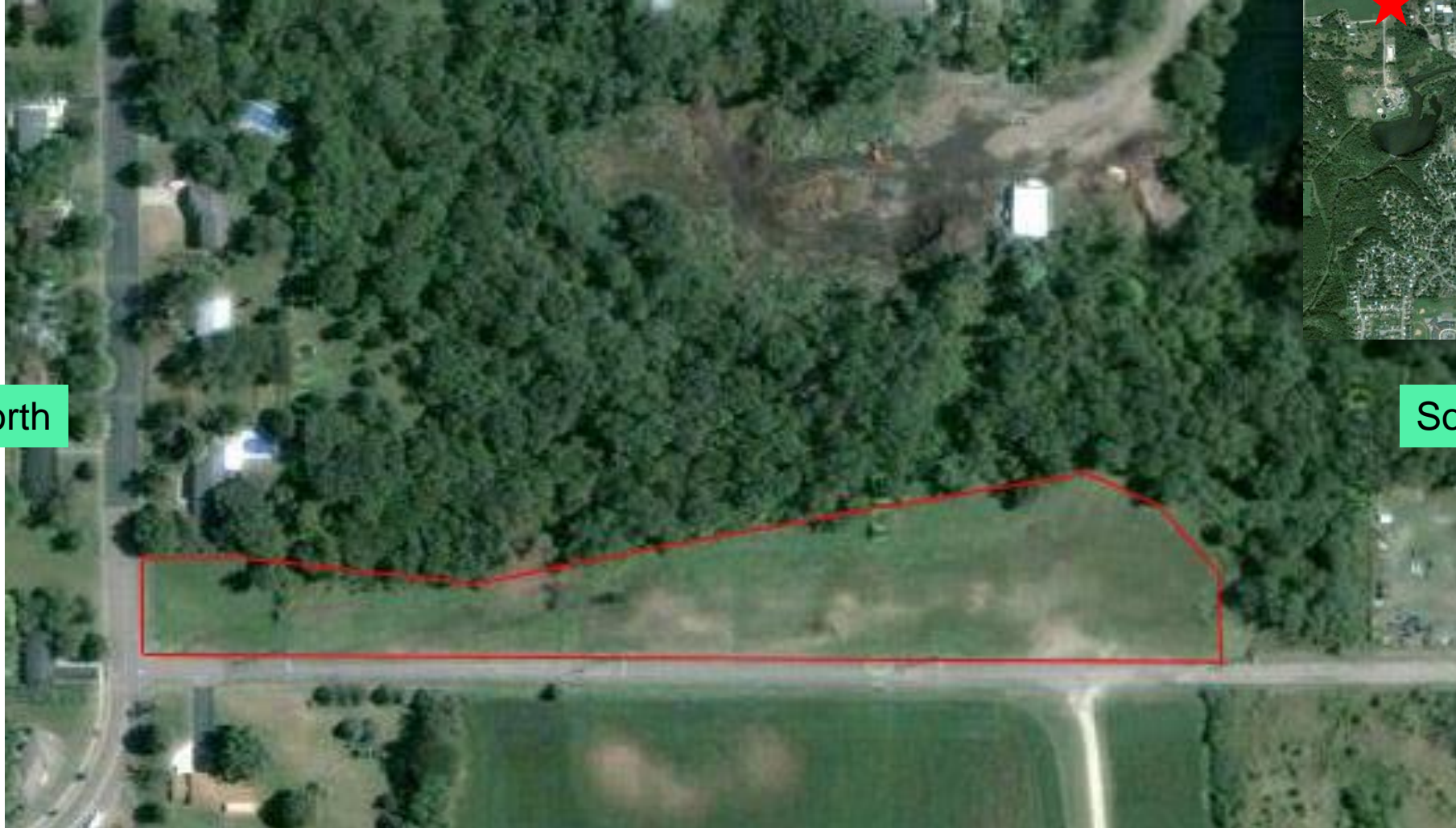
## *Eco Village Site Plan - Additional Site Features*

- 4 Community Garden Sites – CSA Model
- Edible Landscape & Native Habitat Restoration on Private & Commons
- Rainwater Harvest, Cisterns, & Irrigation
- BioSwales, Rain Gardens, Retention Pond, Pervious Boulevard Trail, Driveways & Sidewalks
- Pedestrian & Bike Trails Connect to City Walkways & Resources
- Neighborhood Park at Maple & Apollo Connects Neighborhoods



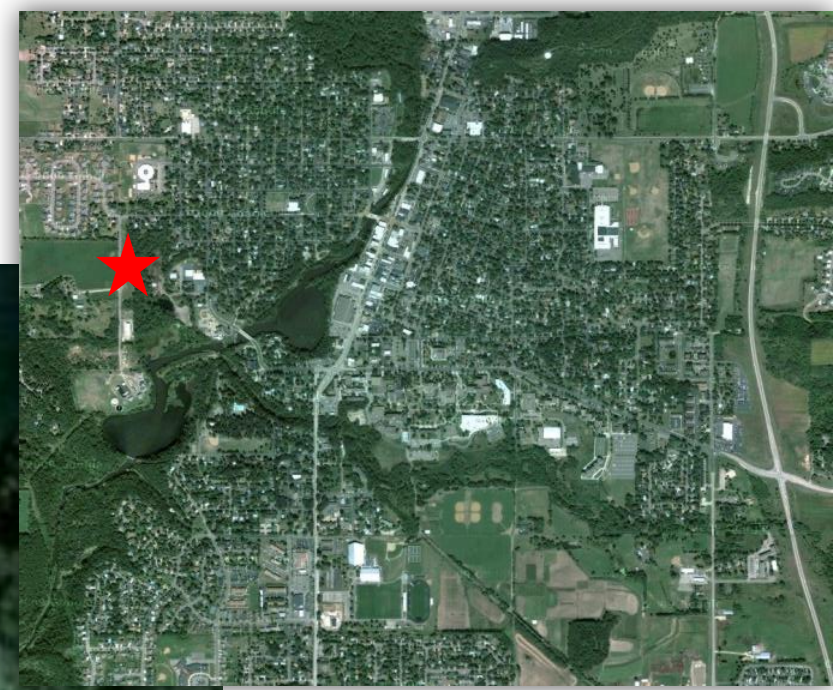


# EcoVillage Site



North

South

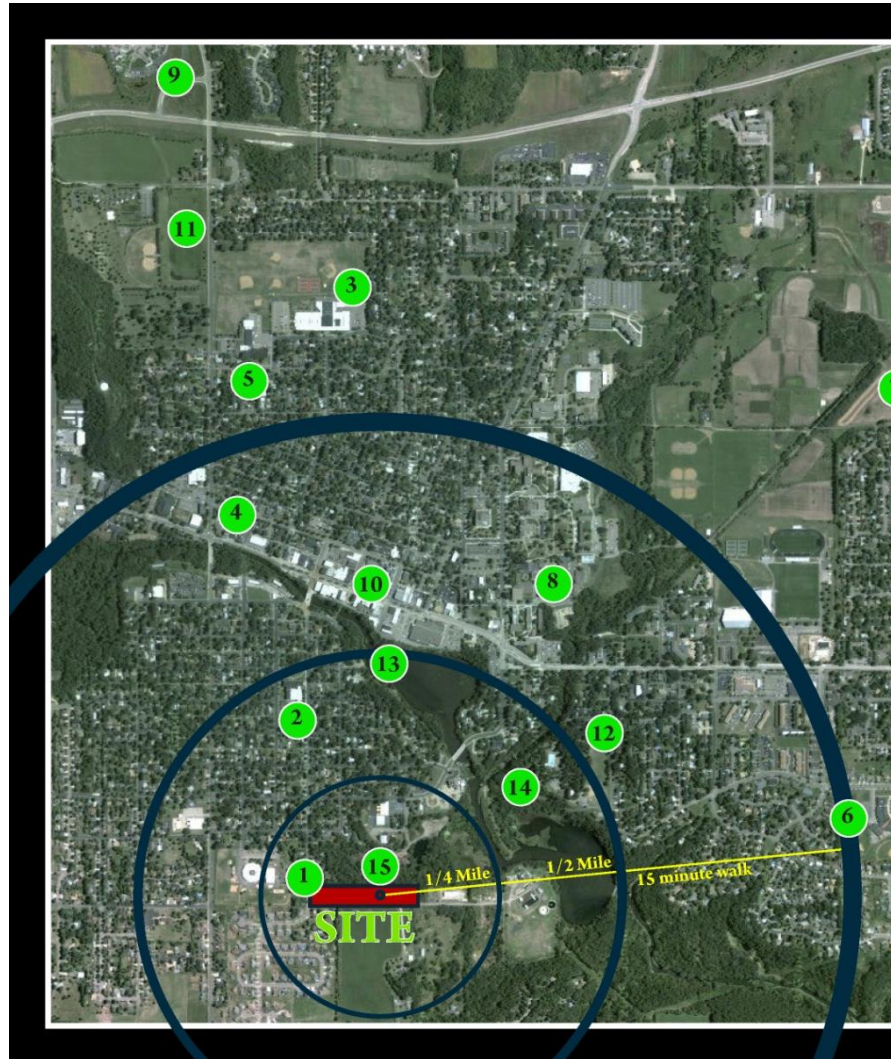




# EcoVillage Site: Relationship to Community

## **City of River Falls**

- » Connection to City
- » Distance from Downtown
- » Ease of Pedestrian Access to Services



### **Project Context:**

The Habitat for Humanity Eco-Village in River Falls, WI is nestled into an existing, established neighborhood of homes, schools and amenities.

### **\*\* Proximity to Extended Community, Services & Amenities.**

1. Westside Elementary School
2. Community Building River Falls Academy:
  - Renaissance Charter School (9-12)
  - River Falls Public Montessori School (K-5)
  - Habitat for Humanity Offices
  - YMCA Before & After School Care
  - Community Arts & Theater program
3. Meyer Middle School
4. St. Bridget's School
5. Greenwood Elementary School
6. Rocky Branch Elementary School
7. River Falls High School
8. UW River Falls
9. River Falls Medical Clinic
10. Downtown Stores & Businesses
11. Hoffman Park
12. Glen Park
13. Kinnickinnic River
14. River Falls
15. Community Composting



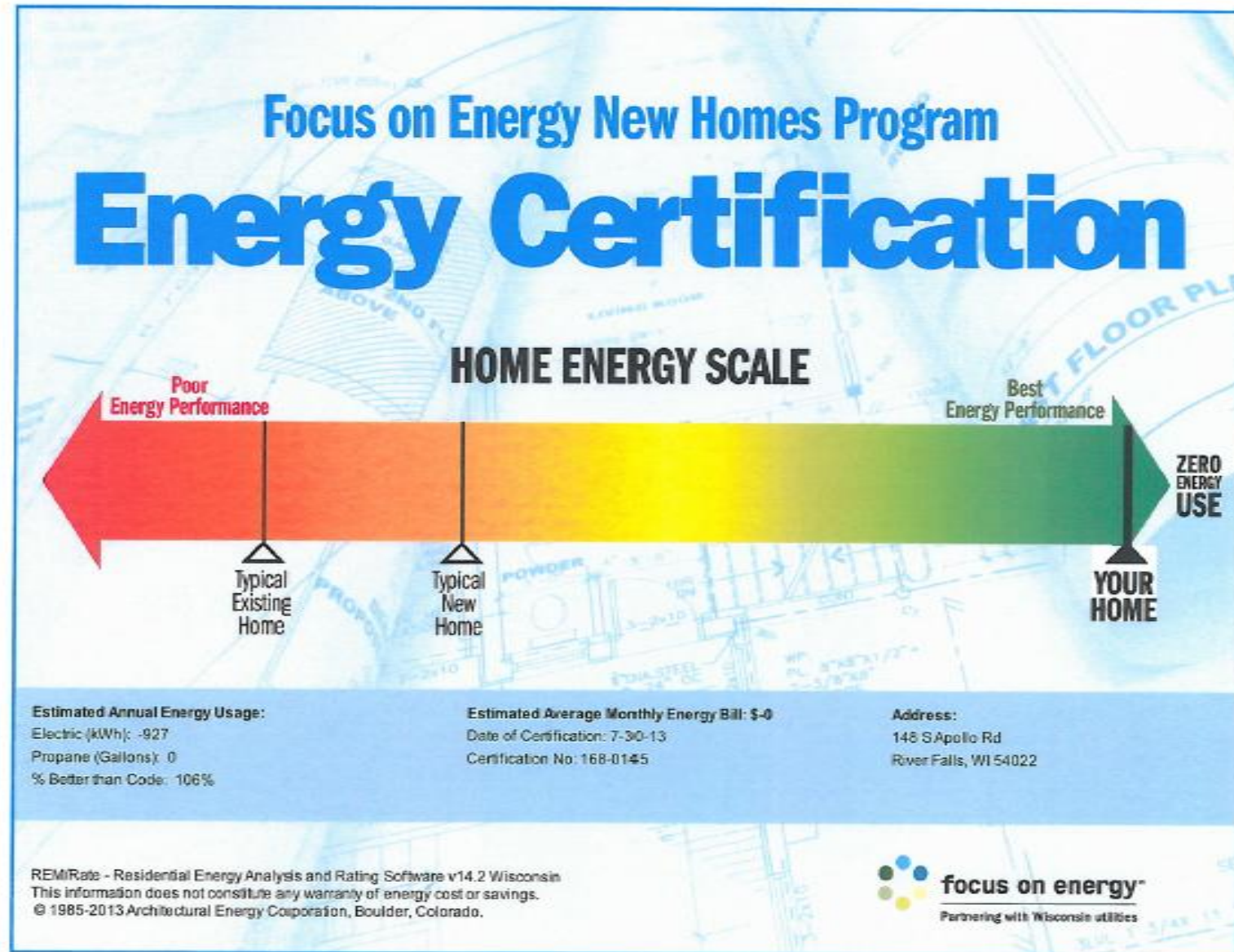
Challenges  
to net zero

Zone 6B

Solar  
Orientation

Behavior

**HERScores: -5 ⇔ +24**





# Envelop

“Build tight—  
ventilate right!”

Superinsulate

Eliminate Thermal  
Bridges

Seal





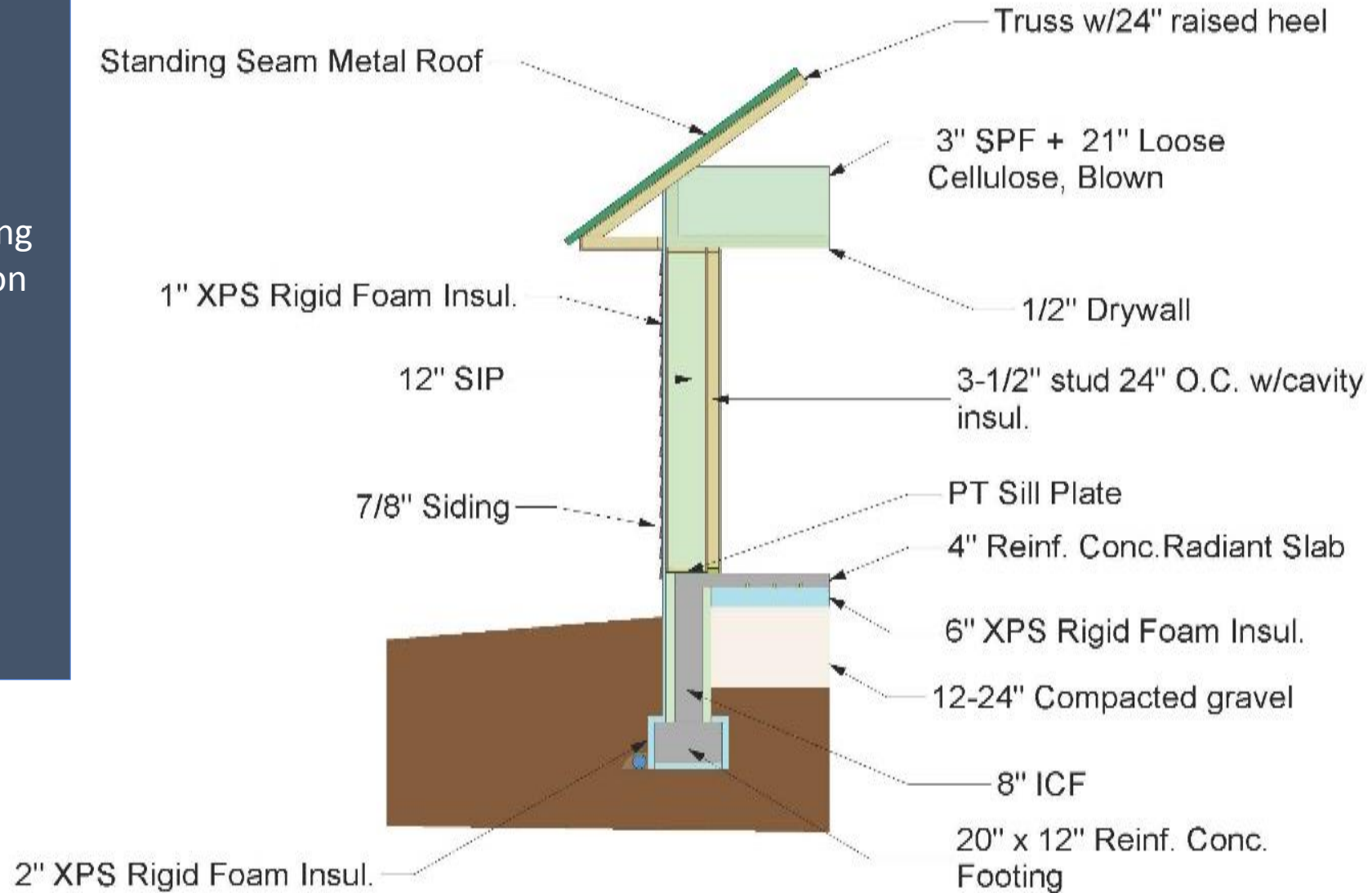
# FEMA STANDARDS STORM SHELTERS

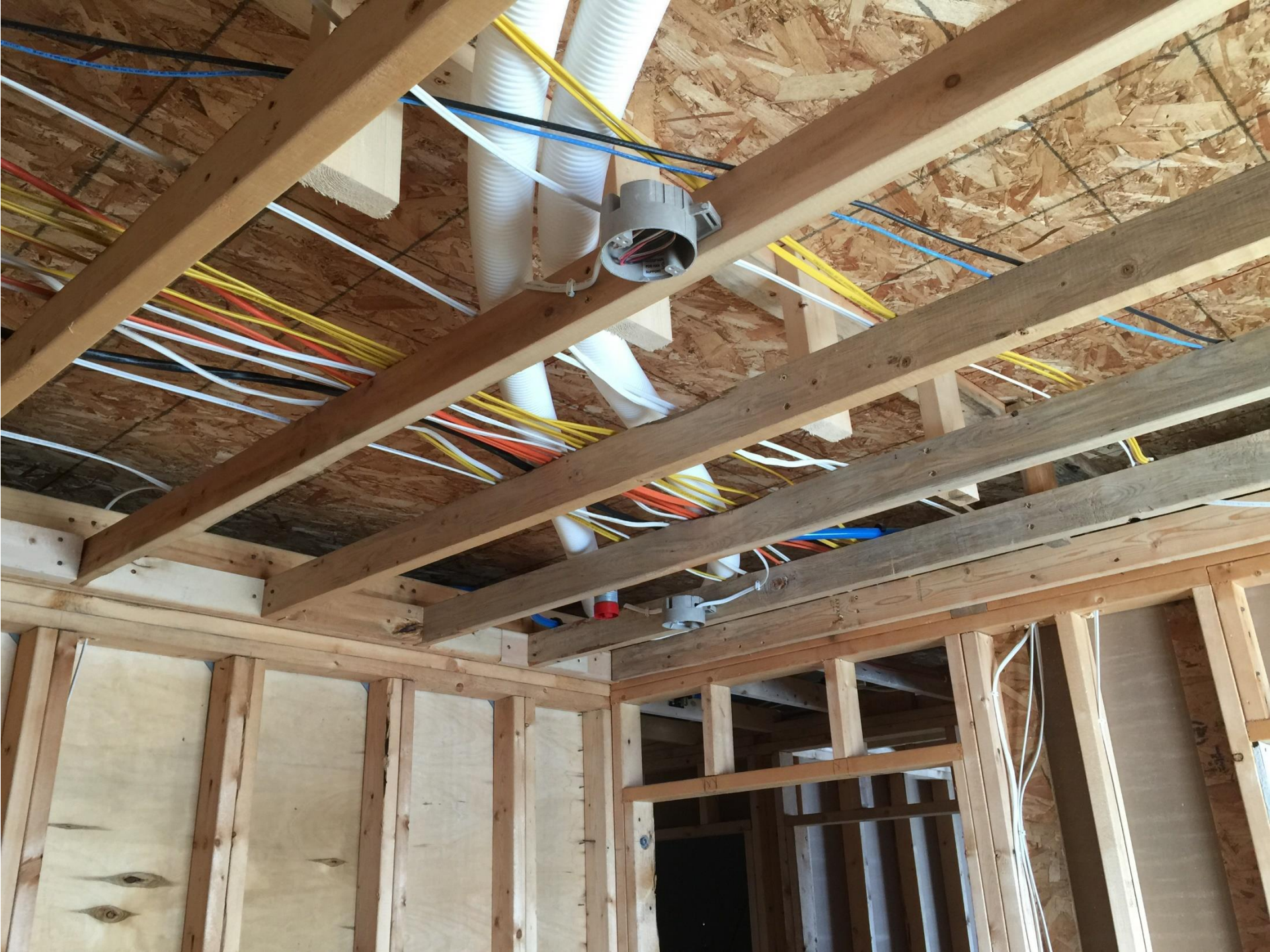




# Cross-Section

Building  
Section







Mini-split

Heating:  
16,000  
BTUH

Cooling:  
12,000BTUH

Low Temp: -  
15\*

SEER 25

Boiler  
2.5/4.5 KW

# ***HVAC***

Mini-split Heat Pump  
Fujitsu 12RLS



Radiant Slab



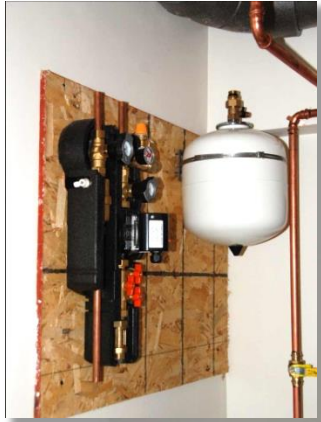
Uponor  
Anchor Partner



# *Solar Thermal*

Schuco/  
Viessmann  
solar  
thermal  
system

50 Gal  
Bradford  
White  
electric hot  
water  
heater



# ***Windows & PV's***

5.3-7.7 KW  
Solarworld  
PV arrays

50+ KW PV  
farm

Passive solar

Werner Electric  
Anchor Partner



Andersen Windows  
Anchor Partner

# ***Indoor Air Quality & Ventilation***

Energy  
Recovery  
Ventilation



**Zehnder ComfoAir 350**

- >90% heat recovery
- DC motor-low power
- Frost protection



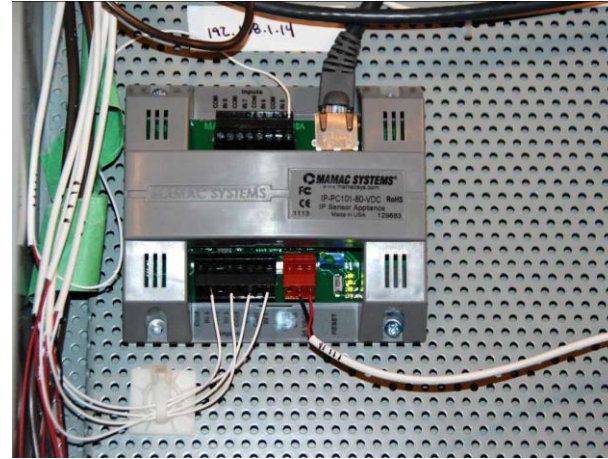
Performance  
Metrics

Energy  
Water  
Interior  
Temperatures

Relative  
Humidity

Monitoring  
Easement

# ***Performance Monitoring***



***Mamac Systems, Inc.***



EarthCam

Internet-  
based  
Image every  
15 minutes  
Image  
Archive  
Weather  
Archive

# EarthCam





A Habitat for Humanity project in River Falls, Wis., could be a model for economical and energy-efficient housing development



Nakeia Dismond put some sweat equity into the Eco-Village development where her family will live in its own twin home. Photos by RICHARD KINNOTT • rkinnott@startribune.com

## SUSTAINABLE & AFFORDABLE

By JIM BUCHTA • jrbuchta@startribune.com

Nakeia and Ramell Dismond are like most working-class families: After the rent is paid, they have no money left in the budget for their kids' activities or vacations.

That will change in a couple of months when they purchase a new twin home on the west edge of River Falls, Wis. There, crews are building a housing development that will produce all its own power, saving homeowners hundreds of dollars each month.

The project is the largest of its kind in the nation for Habitat for Humanity, the sixth-

biggest U.S. home builder last year. The non-profit says the development will create affordable housing at a time when mortgages have become tougher to get. It'll also serve as a national model, showing for-profit developers that homes can be both energy-efficient and economical on a large scale.

"A project of this size helps propel us further along that green and sustainable path," said Matt Clark, director of construction technologies at Habitat headquarters in Atlanta. "As an industry, we all need to be moving

Homes continues on D2 >



The Eco-Village home includes an Uponor radiant heating and cooling system in the floors. The community won't consume more energy than it produces.

StarTribune |

PIONEER PRESS

TwinCities.com

Los Angeles Times

post-gazette.com

Pittsburgh Post-Gazette



GREEN  
MECHANICAL  
CONTRACTOR



Along the Way...The message gets out & the story gets told

## River Falls Eco-Village



**ENTRANT:** St Croix Valley Habitat for Humanity  
**Project Location:** River Falls, WI  
**Category:** General



***BEST  
AFFORDABLE  
PROJECT  
2014***





# *It All Begins With a Solid Foundation ....*



**RIVER FALLS**  
*Municipal Utilities*

Thrivent  
**Builds**  
with Habitat for Humanity®

CORPORATION  
**Andersen**



**MAMAC**  
**SYSTEMS**

**EarthCam**



**CALSTAR**  
PRODUCTS™

**WE** **WERNER ELECTRIC**  
SOLUTION · SUPPLY · SUPPORT

UNIVERSITY OF  
WISCONSIN

**River Falls**  
GLOBAL. INNOVATIVE. EXCELLENT.



Wisconsin  
*City of*  
**RIVER FALLS**



**St Croix Valley**  
**Habitat for Humanity**

# Anchor Partners, Core Contributors, Suppliers & Subcontractors

- Andersen Windows
- City of River Falls
- Calstar Products (Pavers)
- Dow Building Solutions
- EarthCam, Inc.
- Extreme Panel Technologies
- FoxBlock
- MAMAC Systems, Inc.
- River Falls Municipal Utilities
- St. Croix Institute
- Thrivent Builds
- Uponor
- Werner Electric Supply
- West CAP (Western Wisconsin Community Action Agency)
- Zehnder America, Inc.
- Auth Consulting
- Building Knowledge, Inc.
- County Materials (concrete)
- Eau Claire Insulation
- Fox Block (ICFs)
- Frisbie Architects, Inc.
- International Brotherhood of Electrical Workers
- Kohler
- LP SmartSide
- River Falls Municipal Utilities
- St Croix Energy Solutions
- Steiner Inc.
- Two Pines Resource Group
- Whirlpool

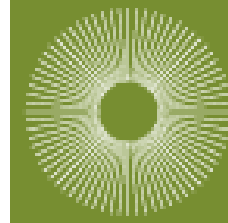


*Time to chat .....*

**“Achieving Sustainability  
should not be our children’s  
responsibility, .....**

**anymore than failure at such  
should be our generation’s  
legacy.”**

Cain/SCISCD, 2007



**w i s c o n s i n a c a d e m y**  
of sciences arts & letters

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***Leadership ~or~ The Risk of Irrelevance***

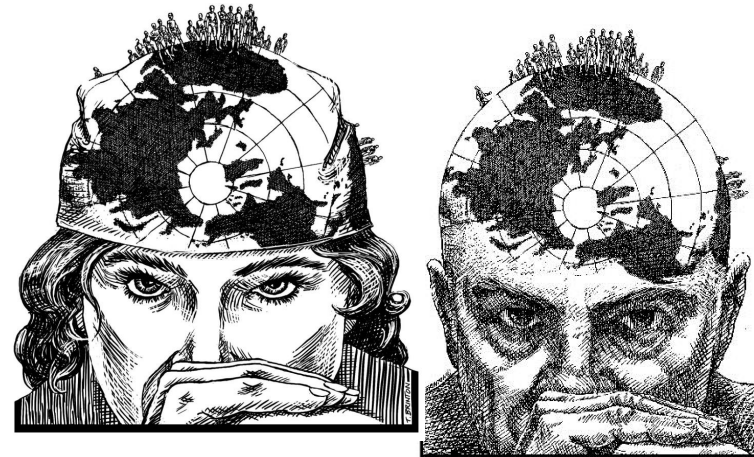


# *Sustainable Community Defined:*

- “Fundamentally, a community is sustainable/resilient only to the degree to which it is ‘locally’ self-sufficient in energy, food, water, shelter, clothing, transportation, health care, education, ‘the arts’, communications, safety/security, employment, and commerce scaled to the equitable needs of all its citizens and within the carrying capacity of native ecosystems over multiple generations.”



Cain / SCI / 2008





# **River Falls Food Self-Sufficiency** **Macro Economic Value & Leakage**

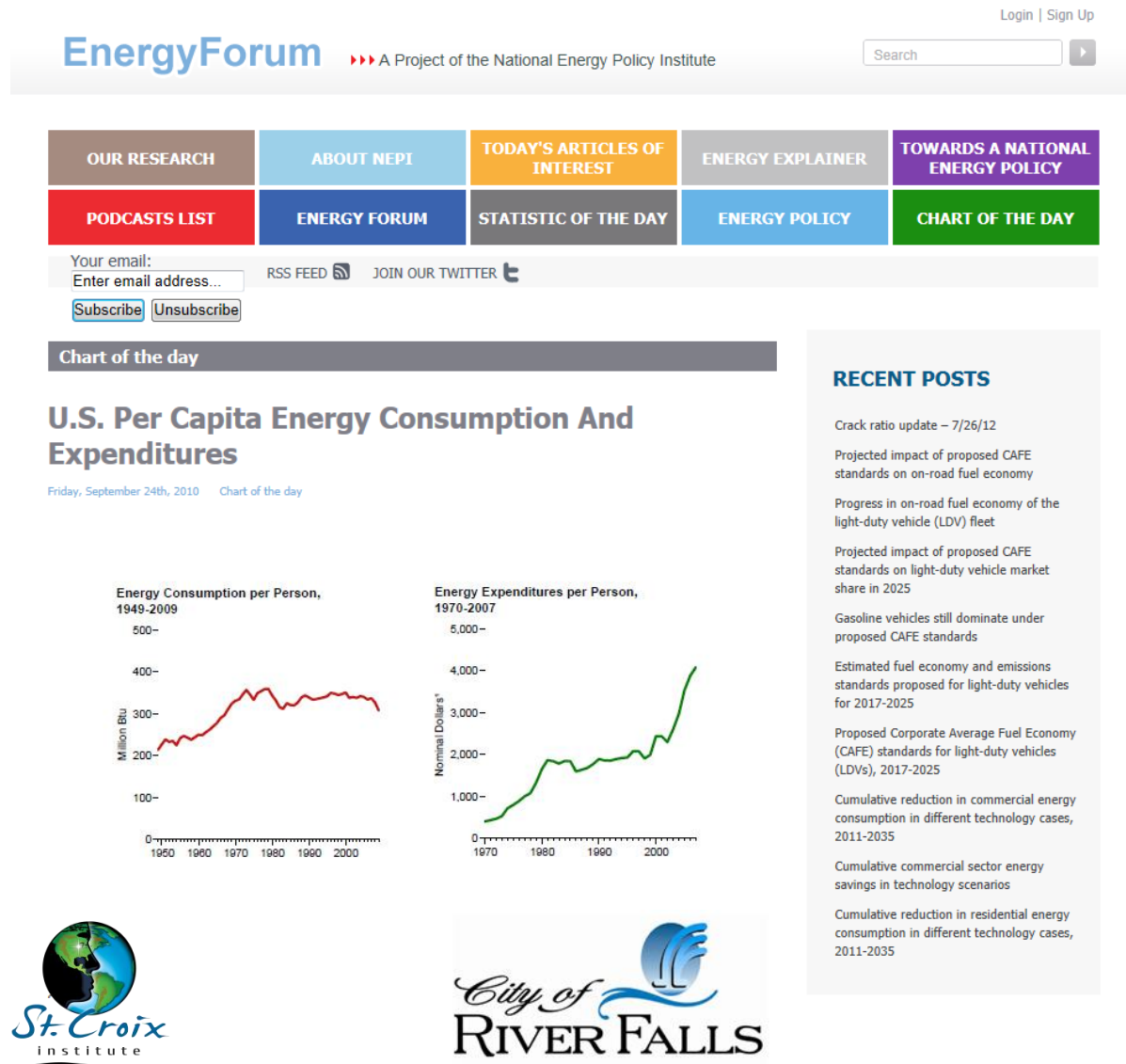
• **Population** (2010 Census) = **15,000**



• **Per Capita Expenditures** (Eat In & Dine Out) =  
Midwest **\$2500** (BLS, 2009) **X 15,000 = \$37,500,000**

**... w/75% Leakage of ~\$28 M**

# 'Re-Localization of Community Economics'



**WI 2010 Data:**  
**~\$3,300 /**  
**Person / Year?**

**15,000 X \$3.3K**  
**= \$49.5M**

**75% Leakage?**  
**~\$37 M**

## RECENT POSTS

Crack ratio update – 7/26/12

Projected impact of proposed CAFE standards on on-road fuel economy

Progress in on-road fuel economy of the light-duty vehicle (LDV) fleet

Projected impact of proposed CAFE standards on light-duty vehicle market share in 2025

Gasoline vehicles still dominate under proposed CAFE standards

Estimated fuel economy and emissions standards proposed for light-duty vehicles for 2017-2025

Proposed Corporate Average Fuel Economy (CAFE) standards for light-duty vehicles (LDVs), 2017-2025

Cumulative reduction in commercial energy consumption in different technology cases, 2011-2035

Cumulative commercial sector energy savings in technology scenarios

Cumulative reduction in residential energy consumption in different technology cases, 2011-2035