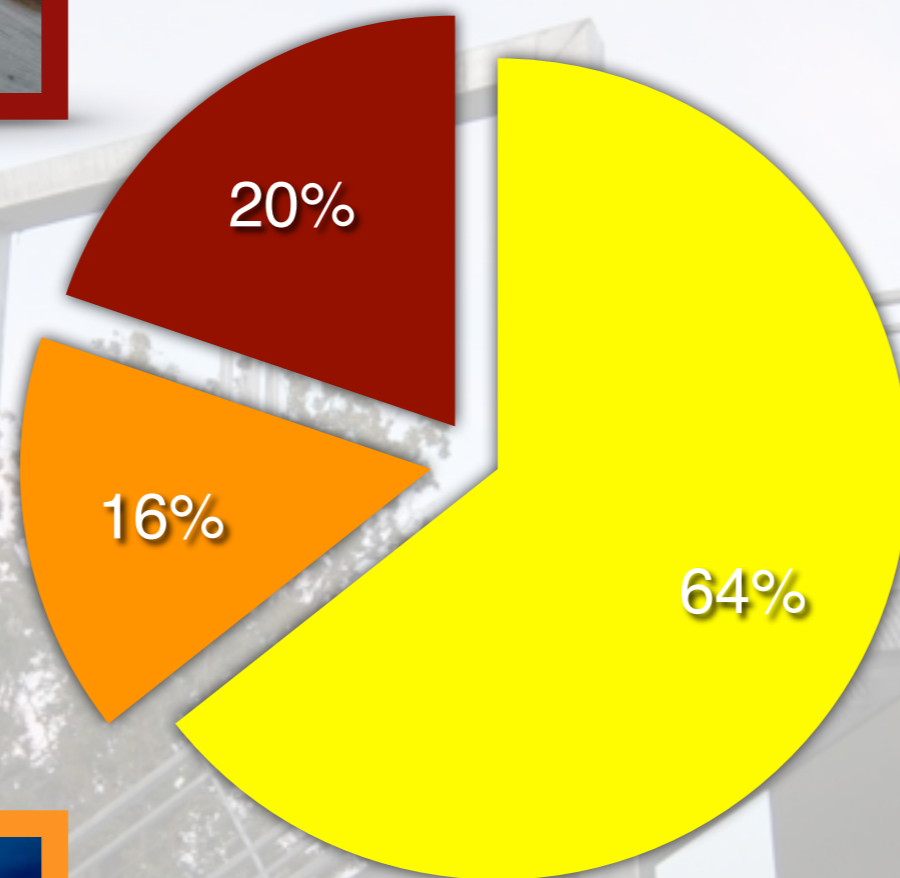
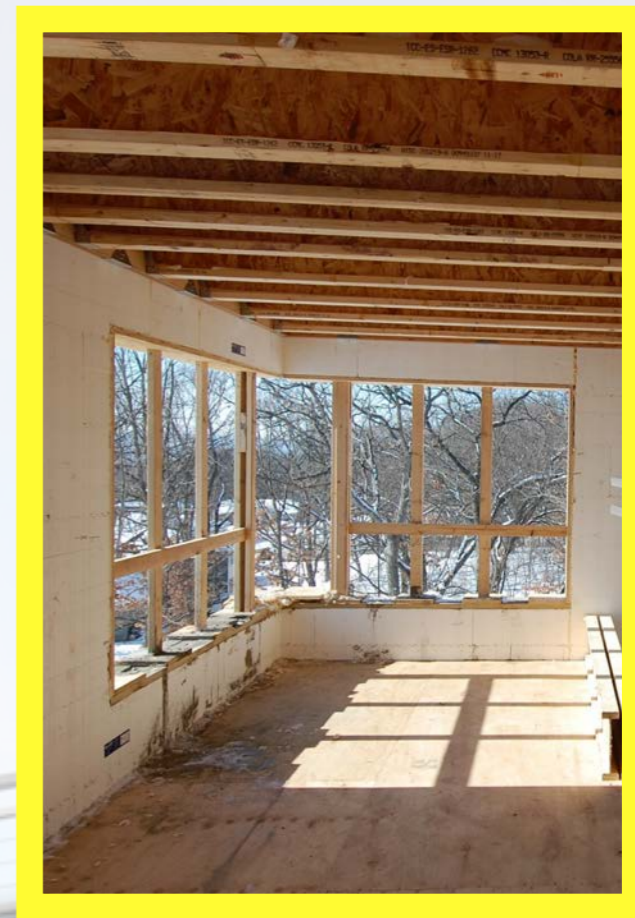






# Heating a Passive House



- Solar Heat Gains = 6,054 kWh/ a
- Internal Heat Gains = 1,457 kWh/ a
- Active Heating = 1,842 kWh/ a



PHPP<sub>(House)</sub>: 25 kWh/(m<sup>2</sup> a)  
 Measured<sub>(Site)</sub>: 39 kWh/(m<sup>2</sup> a)  
 Outlook<sub>(Site)</sub>: 30 kWh/(m<sup>2</sup> a)  
 Production: 45 kWh/ (m<sup>2</sup> a)

- WI Home
- PV
- Other aux.
- Well pump & Filtration
- Ventilator/ Earthloop
- DHW
- Plugloads
- Lighting
- Appliances
- Heating

Average Wisconsin home (CERTS) 30,250 kWh/ a

# **Alternate Pathway: Offsite offset**

# Northeast Nest

Low Energy Home with  
Passive House Components

# “Northeast Nest” Project Team

Architecture  
TE Studio

Interior Design  
InUnison Design

Structural Engineering  
Bunkers and Associates

General Contracting  
RJ Stegora, Inc.



intep

# "Northeast Nest"

## Building Envelope Specifications

### Exterior Walls

Below-grade exterior walls: U-value: 0,146 W/(m<sup>2</sup>K); R-39

- 5/8 "[16mm] drywall
- 11" [280mm] insulated concrete forms (ICF)  
[2.5" EPS (035) - 6" concrete - 2.5" EPS (035)]
- 4" [102mm] EPS insulation (035)
- Sto Flexyl

Above-grade exterior walls: U-value: 0,111 W/(m<sup>2</sup>K); R-51

- 5/8 "[16mm] drywall
- 2X6 Studs [140mm] with mineral wool batt insulation (040)
- 3/4" OSB [19mm] structural sheathing, air barrier, vapor retarder
- 12" I-Joist [305mm] with dense-pack cellulose insulation (039)
- 1/2" [12mm] wood fiberboard sheathing (068)
- Ventilated wood composite siding

### Slab

Insulated concrete slab (and footings): U-Value = 0.219 W/(m<sup>2</sup>K); R-26

- 4" [102 mm] concrete slab
- 6" [152 mm] EPS insulation (035)

### Roof

Cold roof, insulated second floor ceiling: U-Value = 0.081 W/(m<sup>2</sup>K); R-70

- 5/8 "[16mm] drywall
- 2X6 [140mm] framing; service cavity (086)
- 3/4 "[19 mm] OSB air barrier, vapor retarder
- 20 "[508] loose-fill cellulose (042)
- Vented attic



# “Northeast Nest”

## Building Envelope Specifications

### Window Frames

Optiwin, Alu2Wood

Timber window frame with insulation and exterior aluminum cladding

$U_w$ -Value = 0.84 W/(m<sup>2</sup>K) [ $U_{IP}$  = 0.148 Btu/(h ft<sup>2</sup> F)]

### Glazing

Glas Trösch

SILVERSTAR glaCE

EUROFLOAT

4:/18/4/18/:4

Argon filled

$U_g$ -Value = 0.54 W/(m<sup>2</sup>K) [ $U_{IP}$  = 0.095 Btu/(h ft<sup>2</sup> F)]

g-Value (SHGC) = 53 %

### Entry Doors

Doors of Distinction

Custom made entry door. Wood frame, wood finish, polyisocyanurate foam insulation core

$U_d$ -Value = 0.79 W/(m<sup>2</sup>K) [ $U_{IP}$  = 0.139 Btu/(h ft<sup>2</sup> F)]

# “Northeast Nest”

## Modeled Performance

### Annual Heating Demand

32 kWh /( $m^2a$ ) [10 kBTU/(sf yr)]

### Heat Load

18 W/ $m^2$  [5.7 Btu/h/ft<sup>2</sup>]

### Design Heat Load

4 KW [13.8 kBTU/h]

### Site Energy Demand

44 kWh /( $m^2a$ ) [14 kBTU/(sf yr)] = 9,700 kWh/ a

### Source Energy Demand

101 kWh /( $m^2a$ ) [32 kBTU/ (sf yr)] for Heating, Domestic Hot Water, Auxiliary- and Plug Loads

Will be much less in reality as electricity is sourced from wind power.

Calculated with the PHPP

# The Project