

## **The Happy Boolo Project LEED & Zero Energy Home Tour Agenda and Project Profile**



### **Virtual Home Tour Webinar Agenda**

1. Introduction & Scenes
2. Overarching project goals
3. Thermal Envelope
4. Interior Minisplits
5. Addition and thermal envelope pt2
6. Outdoor heat pump
7. Ventilation and Dehumidification
8. Water heating
9. Electrical
10. Utility and energy usage
11. Indoor Water conservation
12. Appliances
13. Outdoor water usage / Sustainable Sites /
14. WE Total Water Usage
15. Discussion on Integrative Project Team
16. Q&A

### **Give a summary of the project**

In 2020, we renovated our 1964 split-level home with an energy efficient, air-tight thermal envelope, solar PV system, air-sourced electric heat pump for heating/AC, and mechanical ventilation. We also added a 12x12 hybrid garden shed/greenhouse in the back.

In 2021, we added a raised terrace over the garage for growing edibles, 10 (4x8) raised garden beds, and a 1,250-gallon rainwater harvesting system.

In 2022-2023, we replaced 2,100' of turfgrass with rain gardens planted with 2,300+ native Illinois sedges and forbs spanning 34 species and re-graded all impervious surfaces to direct rainfall into the rain gardens.

### **Give us success stories as well as lessons learned**

We are happy with the overall aesthetics of the renovation. The rain gardens with native IL plants on the outside contrast sharply with the "mow-and-blow" turfgrass landscapes up and down the street. The open floor plan for the kitchen and living room and the open stairwell provide beautiful interior aesthetics.

Our lessons learned include that we probably shouldn't have hired our architect as our building construction manager.

We also should have trusted our gut on selecting Marcus de la Fleur initially as our landscape architect.

### **Tell us what is unique or innovative about this project**

We replaced 2,100' sq. turfgrass in the front, back, and both sides with rain gardens filled with 2,300+ native Illinois sedges and forbs spanning 34 species. We built a 1,350-gallon rainwater harvesting system to provide water for all the plants. The system empties into one of the two rear rain gardens to facilitate winterization. The grading of all impervious surfaces (driveway, walkways, garage terrace, and patio) direct rainfall into the rain gardens, nearly eliminating our home's impact on the municipal combined stormwater system.

### **Any special thermal envelop, insulation or passive heating & cooling details?**

Depending upon the location and the floor, the home's thermal envelope uses either 1" or 1.5" closed-cell rigid foam insulation and either closed-cell spray foam insulation or eco-batt insulation between 4" stud and 6" stud walls. This combination of elements yields: R-65 (attic separated from upper floor), R-37 (new master suite), R-31.5 (2nd floor), R-29 1st floor, and R-39 (daylight basement). The ENERGY STAR windows provide a U-factor of 0.27 and a Solar Heat Gain Coefficient (SHGC) of 0.18. The SHGC provides some passive cooling in the summer by reflecting radiant heat from the sun without allowing it through the window while the double-paned, argon-filled construction prevents thermal transfers from the inside out during winter.

### **Any special HVAC systems worth mentioning? Describe them**

We have five 9,000-btu Mitsubishi minisplit indoor units driven by a 4-ton Mitsubishi outdoor multi-unit that can modulate its own capacity, a CERV2 for mechanical ventilation, and an AprilAire E080 for dehumidification (added on after project in 2021 because initial HVAC design could not remove humidity from the home).

### **Explain your water conservation strategies**

Our main water conservation effort was replacing 2,100' sq. of turfgrass with rain gardens that store up to 11,200 gallons of water and are filled with deep-rooted native Illinois plants. We also installed a 1,350-gallon rainwater harvesting system under the deck. These two strategies allowed us to pursue the performance route for LEED versus the prescriptive route. Inside the home, we are using WaterSense plumbing fixtures in our bathrooms and an ENERGY STAR washing machine. We also added two WaterSense toilets (and selected bidet models to conserve water used in toilet paper manufacturing).

### **Explain your materials & durability strategies**

We went the deconstruction route to donate salvaged materials to a community charity, avoiding much of the waste associated with conventional remodels. Our cabinetry was made without formaldehyde or adhesives that off-gas. We used Trex deck materials (95% recycled). We also selected FSC-certified wood for flooring and our garage terrace deck tiles, while we used our own milled lumber from a tree in front for kitchen shelves, fireplace mantle, and our raised garden beds. We also used no-VOC paint for the interior walls and trim. We used Hardie Board as the siding.

### **Detail the health and indoor environmental quality benefits**

Because the materials we selected minimize off-gassing, our indoor air quality is healthier than in a conventional home. We also have removed the "faith-based ventilation" of an open-flue conventional water heater with a sealed-combustion tankless water heater that is more energy efficient while eliminating the threat of backdraft-induced carbon monoxide issues. We also replaced our wood-burning fireplace with a sealed-combustion gas fireplace and replaced our gas dryer with a ventless electric dryer. The CERV2 mechanical ventilator detects CO2 and VOC levels and automatically vents or recirculates as appropriate. We can actually smell fresh outdoor air pouring into a room when the CERV is in vent mode! Our AprilAire is coupled with the CERV2 and allows us to manage the humidity level from a smartphone (we keep it at 53%).

### **Tell us about your place or location strategies**

We didn't want to leave our neighborhood so we remodeled our home to be as energy efficient and sustainable as possible, given Illinois law, ComEd's Net Metering policy, and local ordinances. It serves our needs while we (hope) serves the greater purpose of educating other neighbors and others outside our neighborhood who are thinking the same way we are. We are within walking distance to schools, a grocery store, public transport, and a public pool.

### **Project Team details**

GreenHome Institute: LEED for Homes Provider

Eco Achievers: LEED Green & HERS Raters

Recyclean provided deconstruction and managed the appraisal process for the materials we donated.

Excellent Carpenters provided framing and general carpentry.

NJ Siding installed our siding.

Artistic Masonry modified our existing and installed our new masonry.

Julie Ondo Design provided our interior design for the kitchen and master suite.

All Bright Solar provided our solar PV system design and managed the installation and still provides monitoring.

Altmann Drywall and Painting installed our drywall and interior painting.

Christy Webber Landscapes built our wooden Bison tile raised terrace over our garage.

Abate Restoration, Compass Heating & Air, and Build Equinox combined to rescue our initial HVAC situation by formulating a dehumidification solution.

Marcus de la Fleur saved our landscape when our original landscape architect went AWOL.



## Green Building Certifications & Energy Standards Achieved

LEED Residential V4.1 Platinum Certification 95.5 points

GHI Zero Energy Certification: Predicting to produce 2.5 MMBTUS on energy per year.

HERS Index Rating – 9

116% more energy efficient than the LEED reference home

Energy Star Homes V3.1

EPA Indoor Air Plus Certified

Water Efficiency Total Water Use Reduction From Baseline: 74.11%

86% more efficient than the EPA Outdoor Water Use Baseline

Learn more at <https://www.happyboolo.com/>



**Baker + Myers SmartHaus Scorecard (ID: 1000183782)**

Project Address 631 North Drury Lane, Arlington Heights, Illinois 60004, USA

Note: The information on this tab is READ-ONLY. To edit this information, see the Credit Category tabs.



| Integrative Process |                     | Preliminary | Y | 2 of 2 | M | 0 | Verified | 2 |
|---------------------|---------------------|-------------|---|--------|---|---|----------|---|
| IPc                 | Integrative Process |             |   | 2 of 2 |   | 0 |          | 2 |



| Location and Transportation |                                   | Preliminary | Y | 7 of 10  | M | 0 | Verified | 7 |
|-----------------------------|-----------------------------------|-------------|---|----------|---|---|----------|---|
| LTP                         | Floodplain Avoidance              |             |   | Required |   |   | Verified |   |
| LTC                         | LEED for Neighborhood Development |             |   | 0 of 10  |   | 0 |          |   |
| LTC                         | Site Selection                    |             |   | 6 of 6   |   | 0 |          | 6 |
| LTC                         | Compact Development               |             |   | 0 of 1   |   | 0 |          |   |
| LTC                         | Community Resources               |             |   | 1 of 1   |   | 0 |          | 1 |
| LTC                         | Access to Transit                 |             |   | 0 of 2   |   | 0 |          |   |



| Sustainable Sites |  | Preliminary | Y | 4 of 5   | M | 0 | Verified | 4 |
|-------------------|--|-------------|---|----------|---|---|----------|---|
| SSp               | Construction Activity Pollution Prevention |             |   | Required |   |   | Verified |   |
| SSc               | Heat Island Reduction                      |             |   | 0 of 1   |   | 0 |          |   |
| SSc               | Rainwater Management                       |             |   | 2 of 2   |   | 0 |          | 2 |
| SSc               | Nontoxic Pest Control                      |             |   | 2 of 2   |   | 0 |          | 2 |



| Water Efficiency |                   | Preliminary | Y | 13 of 15 | M | 0 | Verified | 13 |
|------------------|-------------------|-------------|---|----------|---|---|----------|----|
| WEp              | Water Use         |             |   | Required |   |   | Verified |    |
| WEp              | Water Metering    |             |   | Required |   |   | Verified |    |
| WEc              | Total Water Use   |             |   | 13 of 15 |   | 0 |          | 13 |
| WEc              | Indoor Water Use  |             |   | 0 of 11  |   | 0 |          |    |
| WEc              | Outdoor Water Use |             |   | 0 of 4   |   | 0 |          |    |



| Energy and Atmosphere |  | Preliminary | Y | 38 of 40 | M | 0 | Verified | 38 |
|-----------------------|--|-------------|---|----------|---|---|----------|----|
| EAp                   | Minimum Energy Performance                             |             |   | Required |   |   | Verified |    |
| EAp                   | Energy Metering  |             |   | Required |   |   | Verified |    |
| EAp                   | Education of the Homeowner, Tenant or Building Manager |             |   | Required |   |   | Verified |    |
| EAc                   | Annual Energy Use                                      |             |   | 36 of 36 |   | 0 |          | 36 |
| EAc                   | Efficient Hot Water Distribution System                |             |   | 1 of 2   |   | 0 |          | 1  |
| EAc                   | HVAC Start-Up Credentialing                            |             |   | 0 of 1   |   | 0 |          |    |
| EAc                   | Refrigerant Management                                 |             |   | 1 of 1   |   | 0 |          | 1  |



| Materials and Resources |                                     | Preliminary | Y | 9 of 12  | M | 0 | Verified | 9 |
|-------------------------|-------------------------------------|-------------|---|----------|---|---|----------|---|
| MRp                     | Certified Tropical Wood             |             |   | Required |   |   | Verified |   |
| MRp                     | Durability Management               |             |   | Required |   |   | Verified |   |
| MRC                     | Durability Management Verification  |             |   | 1 of 3   |   | 0 |          | 2 |
| MRC                     | Environmentally Preferable Products |             |   | 5 of 5   |   | 0 |          | 5 |
| MRC                     | Construction Waste Management       |             |   | 2 of 2   |   | 0 |          | 2 |
| MRC                     | Material-Efficient Framing          |             |   | 1 of 2   |   | 0 |          |   |



| Indoor Environmental Quality |   | Preliminary | Y | 15 of 16 | M | 0 | Verified | 14 |
|------------------------------|---|-------------|---|----------|---|---|----------|----|
| EQp                          | Ventilation   |             |   | Required |   |   | Verified |    |
| EQp                          | Combustion Venting                                    |             |   | Required |   |   | Verified |    |
| EQp                          | Garage Pollutant Protection                           |             |   | Required |   |   | Verified |    |
| EQp                          | Radon-Resistant Construction                          |             |   | Required |   |   | Verified |    |
| EQp                          | Air Filtering   |             |   | Required |   |   | Verified |    |
| EQp                          | Compartmentalization                                  |             |   | Required |   |   | Verified |    |
| EQc                          | Enhanced Ventilation                                  |             |   | 3 of 3   |   | 0 |          | 3  |
| EQc                          | Contaminant Control                                   |             |   | 3 of 3   |   | 0 |          | 3  |
| EQc                          | Balancing of Heating and Cooling Distribution Systems |             |   | 5 of 6   |   | 0 |          | 6  |
| EQc                          | Low-Emitting Products                                 |             |   | 4 of 4   |   | 0 |          | 2  |



| Innovation |                              | Preliminary | Y | 4 of 6   | M | 0 | Verified | 4 |
|------------|------------------------------|-------------|---|----------|---|---|----------|---|
| INp        | Preliminary Rating           |             |   | Required |   |   | Verified |   |
| INc        | Innovation                   |             |   | 4 of 5   |   | 0 |          | 4 |
| INc        | LEED Accredited Professional |             |   | 0 of 1   |   | 0 |          |   |



| Regional Priority |                   | Preliminary | Y | 4 of 4 | M | 0 | Verified | 4 |
|-------------------|-------------------|-------------|---|--------|---|---|----------|---|
| RPC               | Regional Priority |             |   | 4 of 4 |   | 0 |          | 4 |

| Total |  | Preliminary | Y | 96 of 110 | M | 0 | Verified | 95.0 |
|-------|--|-------------|---|-----------|---|---|----------|------|
|-------|--|-------------|---|-----------|---|---|----------|------|

Certification Thresholds Certified: 40-49, Silver: 50-59, Gold: 60-79, Platinum: 80-110

## WaterSense New Home Specification: Water Budget Tool (V 1.04)

### Enter your information in these columns.

This water budget tool shall be used to determine if the designed landscape meets Criteria 4.1.1 of the specification.

Please refer to the WaterSense Water Budget Approach for additional information.

Your Name:

Marcus de la fleur

Builder Name:

Woodridge Deck and Gazebo Co.

Lot Number/Street Address:

631 N Drury Lane

City, State:

Arlington Heights, IL

Zip Code (required):

60004

\* In Canada, enter just the first three characters of your postal code (e.g. A1A)

### These columns will automatically populate.

Peak watering month:

jun

1B: Average monthly reference evapotranspiration (ET<sub>o</sub>):

6.32 inches/month

2A: Average monthly rainfall:

3.61 inches/month

### Enter information about your landscape here:

#### STEP 1A - ENTER THE LANDSCAPED AREA (A)

3,599 Area of the designed landscape (square feet)

Is an irrigation system installed on this site?

No

Monthly **baseline** (gallons/month) based on the site's peak watering month:  
Monthly **landscape water allowance** or **LWA** (gallons/month) based on the site's peak watering month:

14,173 gallons/month

9,921 gallons/month

### Need help?

See the WaterSense website for help on [what to plant](#) or search for a [certified irrigation pro!](#)

#### Step 2B/Table 1.

|              | Hydrozone/<br>Landscape<br>Feature<br>Area (sq. ft.) | Plant Type or Landscape<br>Feature | Water Use   | N/A           | Landscape<br>Coefficient (K <sub>L</sub> ) | Default DU<br>(hidden) | Distribution<br>Uniformity (DU <sub>L0</sub> ) | LWR <sub>R</sub> (gal/month) |       |
|--------------|--|------------------------------------|---|---------------|--|------------------------|--|------------------------------|-------|
| Zone         |  |                                    |   |               |  |                        |  |                              |       |
| 1            | 1,148  | Shrubs                             | Low   | No Irrigation | 0.2  | 70%                    | 70%  | 370                          |       |
| 2            | 55   | Shrubs                             | Medium  | No Irrigation | 0.5  | 65%                    | 65%  | 111                          |       |
| 3            | 2,031  | Groundcover                        | Low   | No Irrigation | 0.2  | 70%                    | 70%  | 655                          |       |
| 4            | 365  | Groundcover                        | Medium  | No Irrigation | 0.5  | 65%                    | 65%  | 79                           |       |
| 5            |  |                                    |   |               |  |                        |  | -                            |       |
| 6            |  |                                    |   |               |  |                        |  | -                            |       |
| 7            |  |                                    |   |               |  |                        |  | -                            |       |
| 8            |  |                                    |   |               |  |                        |  | -                            |       |
| 9            |  |                                    |   |               |  |                        |  | -                            |       |
| 10           |  |                                    |   |               |  |                        |  | -                            |       |
| 11           |  |                                    |   |               |  |                        |  | -                            |       |
| 12           |  |                                    |   |               |  |                        |  | -                            |       |
| 13           |  |                                    |   |               |  |                        |  | -                            |       |
| 14           |  |                                    |   |               |  |                        |  | -                            |       |
| 15           |  |                                    |   |               |  |                        |  | -                            |       |
| Total Area = | 3,599 of 3599 square feet                            |                                    | Landscape Water Requirement or LWR for the Site (gal/month) |               |  |                        |  |                              | 1,933 |

You have used 20% of your allowance.  
This is 86% below the baseline.

# Home Energy Rating Certificate



**Property**

Mike Baker + Amy Myers  
631 Drury Ln  
Arlington Heights, IL 60004

**HERS**

Rating Type: Confirmed  
Rating Date: 2020-12-16  
Registry ID: 566778637

Certified Energy Rater: Emily Rhea  
Rating Number: 0431-0089

**HERS Index: -9**

**General Information**

|                    |                 |            |                        |
|--------------------|-----------------|------------|------------------------|
| Conditioned Area   | 2653 sq. ft.    | House Type | Single-family detached |
| Conditioned Volume | 23873 cubic ft. | Foundation | More than one type     |
| Bedrooms           | 4               |            |                        |

**Mechanical Systems Features**

Air-source heat pump: Electric, Htg: 11.0 HSPF, Clg: 18.9 SEER.  
Water Heating: Instant water heater, Natural gas, 0.98 EF, 0.0 Gal.  
Duct Leakage to Outside: NA  
Ventilation System: Balanced: HRV, 184 cfm, 35.0 watts.  
Programmable Thermostat: Heat=Yes; Cool=Yes

**Building Shell Features**

|                   |        |                   |                             |
|-------------------|--------|-------------------|-----------------------------|
| Ceiling Flat      | R-60.1 | Slab              | R-0.0 Edge, R-0.0 Under     |
| Sealed Attic      | NA     | Exposed Floor     | NA                          |
| Vaulted Ceiling   | R-49.0 | Window Type       | U-Value: 0.270, SHGC: 0.180 |
| Above Grade Walls | R-33.1 | Infiltration Rate | 1395 CFM50 (3.51 ACH50)     |
| Foundation Walls  | R-19.0 | Method            | Blower door                 |

**Lights and Appliance Features**

|                             |       |                        |          |
|-----------------------------|-------|------------------------|----------|
| Interior Fluor Lighting (%) | 0.0   | Range/Oven Fuel        | Electric |
| Interior LED Lighting (%)   | 100.0 | Clothes Dryer Fuel     | Electric |
| Refrigerator (kWh/yr)       | 654   | Clothes Dryer CEF      | 6.37     |
| Dishwasher (kWh/yr)         | 259   | Ceiling Fan (cfm/Watt) | 129.00   |

**Estimated Annual Energy Cost**

| Use               | MMBtu | Cost    | Percent |
|-------------------|-------|---------|---------|
| Heating           | 15.4  | \$323   | 1607%   |
| Cooling           | 1.7   | \$35    | 173%    |
| Hot Water         | 10.8  | \$5     | 26%     |
| Lights/Appliances | 19.2  | \$405   | 2012%   |
| Photovoltaics     | -49.7 | \$-1045 | -5196%  |
| Service Charges   |       | \$297   | 1478%   |
| Total             | -2.5  | \$20    | 100%    |

**Criteria**

This home meets or exceeds the minimum criteria for the following:

TITLE

Company

Address

City, State, Zip

Phone #

Fax #

REM/Rate - Residential Energy Analysis and Rating Software v16.0.6

This information does not constitute any warranty of energy costs or savings. © 1985-2021 NORESO, Boulder, Colorado.  
The Home Energy Rating Standard Disclosure for this home is available from the rating provider.

# ENERGY STAR v3.1 Home Report

## Property

Mike Baker + Amy Myers  
631 Drury Ln  
Arlington Heights, IL 60004

## Organization

Eco Achievers  
708-848-4980  
Emily Rhea

## HERS

Confirmed  
2020-12-16  
Rating No:0431-0089  
Rater ID:7051838



Weather:Chicago, IL

Baker + Myers Residence  
0431-0089-C1\_SmartHaus\_631\_Drury\_Ln\_ESv31\_IAP\_LFH\_QAD.blg

## Builder

SmartHaus

## Normalized, Modified End-Use Loads (MMBtu/yr)

|                       | ENERGY STAR | As Designed |
|-----------------------|-------------|-------------|
| Heating               | 23.2        | 22.6        |
| Cooling               | 9.6         | 4.7         |
| Water Heating         | 12.2        | 3.0         |
| Lights and Appliances | 24.6        | 19.2        |
| <b>Total</b>          | <b>69.5</b> | <b>49.5</b> |

|                                      |           |                             |
|--------------------------------------|-----------|-----------------------------|
| <b>ENERGY STAR HERS Index Target</b> | <b>60</b> | <b>41 HERS Index w/o PV</b> |
|                                      |           | <b>-9 HERS Index</b>        |

HERS Index w/o PV <= ES HERS Index Target to comply.

## ENERGY STAR v3.1 Mandatory Requirements

|   |   |
|---|---|
| X | Duct leakage at post construction better than or equal to ENERGY STAR v3/3.1 requirements.      |
| X | Envelope insulation levels meet or exceed ENERGY STAR v3/3.1 requirements.                      |
| X | <b>Slab on Grade Insulation is EXEMPT based on EPA slab insulation exemption rules.</b>         |
| X | Envelope insulation achieves RESNET Grade I installation, or Grade II with insulated sheathing. |
| X | Windows meet the 2009 IECC Requirements - Table 402.1.1.  |
| X | Duct insulation meets the EPA minimum requirements of R-6.                                      |
| X | Mechanical ventilation system has been measured in the home.                                    |
| X | ENERGY STAR Checklists fully verified and complete.   |



This home **MEETS** or **EXCEEDS** the energy efficiency requirements for designation as an EPA ENERGY STAR Version 3.1 Certified Home.

## Pollution Prevented

| Type of Emissions              | Reduction |
|--------------------------------|-----------|
| Carbon Dioxide (CO2) - tons/yr | 6.9       |
| Sulfur Dioxide (SO2) - lbs/yr  | 29.5      |
| Nitrogen Oxides (NOx) - lbs/yr | 10.5      |

## Energy Cost Savings

|                     | \$/yr      |
|---------------------|------------|
| Heating             | 466        |
| Cooling             | 120        |
| Water Heating       | 5          |
| Lights & Appliances | 267        |
| <b>Total</b>        | <b>858</b> |

The energy savings and pollution prevented are calculated by comparing the Rated Home to the Reference Home as defined in the Mortgage Industry National Home Energy Rating Systems Standards as promulgated by the Residential Energy Services Network (RESNET). In accordance with these guidelines, building inputs affecting setpoints, infiltration rates, window shading and the existence of mechanical systems may have been changed prior to calculating loads.

**REM/Rate - Residential Energy Analysis and Rating Software v16.0.6**

This information does not constitute any warranty of energy costs or savings.

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# LEED for HOMES V4

**Property**

Mike Baker + Amy Myers  
631 Drury Ln  
Arlington Heights, IL 60004

**Organization**

Eco Achievers  
708-848-4980  
Emily Rhea

**HERS**

Confirmed  
2020-12-16  
Rating No:0431-0089  
Rater ID:7051838

Weather:Chicago, IL

Baker + Myers Residence

0431-0089-C1\_SmartHaus\_631\_Dr  
ury\_Ln\_ESv31\_IAP\_LFH\_QAD.blg

**Builder**

SmartHaus

**This home uses 116% less energy than the LEED Reference Home.**

**Source Energy Consumption (MMBtu/yr)**

|                     | LEED      |             |
|---------------------|-----------|-------------|
|                     | Reference | As Designed |
| Heating             | 70.2      | 49.2        |
| Cooling             | 14.3      | 5.3         |
| Water Heating       | 21.4      | 11.4        |
| Lights & Appliances | 83.7      | 61.6        |
| Photovoltaics       | 0.0       | -158.9      |
| Total               | 189.6     | -31.4       |

This home uses 116% less energy than the LEED Reference Home but does not meet section 1 of the the Minimum Energy Performance prerequisite because the HERS Index DOES NOT MEET the ENERGY STAR v3.0 HERS Index Target.

Design consumption is based on the following dominant features:

Number of Bedrooms: 4

Ceiling Flat: R-60.1

Vaulted Ceiling: R-49.0

Sealed Ceiling: NA

Above Grade Walls: R-33.1

Foundation Walls: R-19.0

Exposed Floor: NA

Slab: R-0.0 Edge, R-0.0 Under

Window Type: U-Value: 0.27, SHGC: 0.18

Infiltration: Blower door Htg: 1395 Clg: 1395 CFM50

Heating: Electric, Htg: 11.0 HSPF. Clg: 18.9 SEER.

Cooling: Electric, Htg: 11.0 HSPF. Clg: 18.9 SEER.

Water Heating: Instant water heater, Natural gas, 0.98 EF, 0.0 Gal.

Duct Leakage to Outside: NA

Ventilation System: Balanced: HRV, 184 cfm, 35.0 watts.

Programmable Thermostat: Heat=Yes; Cool=Yes

**REM/Rate - Residential Energy Analysis and Rating Software v16.0.6**

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# Indoor airPLUS Qualified Home

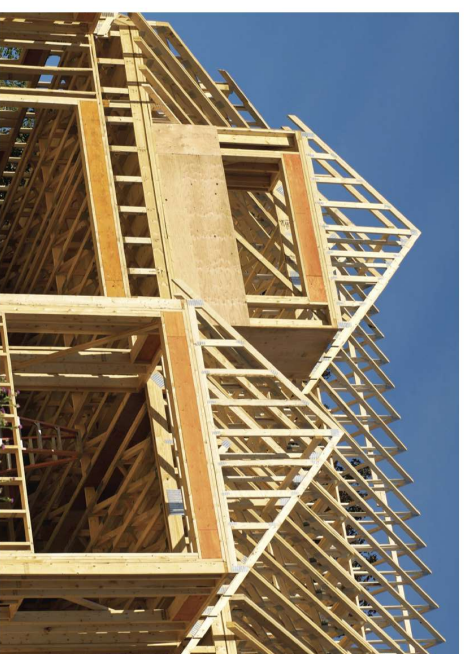
This home built at  
**631 Drury Ln**  
**Arlington Heights, IL 60004**  
was verified by  
**Emily Rhea**

to meet Indoor airPLUS construction  
specifications as established  
by the  
U.S. Environmental Protection Agency.



Indoor airPLUS qualified homes are  
designed to contribute to improved  
indoor air quality.

**2020-12-16**



## Indoor airPLUS Features

- Moisture and Mold Control
- Radon Resistant Construction
- Pest Barriers
- Effective Heating, Ventilating, and Air-Conditioning Systems
- Safe Combustion
- Healthier Building Materials

Not all features are required in all cases. To learn more about indoor air quality features in your home, ask your builder to review the Indoor airPLUS verification checklist with you, or visit [www.epa.gov/indoorairplus](http://www.epa.gov/indoorairplus).

The GreenHome Institute Hereby Certifies

# 631 Drury Ln

ARLINGTON HEIGHTS, IL 60004

FOR ACHIEVING ZERO ENERGY CERTIFIED  
CONSTRUCTION



CERTIFICATION BASED ON ACHIEVING -2.5 MMBTU/YEAR AND  
LEED CERTIFICATION

**Date of Certification: APRIL 26th, 2024**

|      |           | Total Site Electricity consumed minus solar (kWh) | Renewable electricity generated & used on-site (kWh) | Total Energy Exported to Grid if RECs owned (kWh) | Difference in solar usage | True Electrical usage KWH | Total Source Natural Gas Delivered for water heater (kBtu) | Total Source Natural Gas Delivered converted (kWh) | Total Energy Used in KWH | Total power generated | Difference |
|------|-----------|---|--|---|---------------------------|---------------------------|--|--|--------------------------|-----------------------|------------|
| 2023 | March     | 1272  | 872  | 462   | 410                       | 1682                      | 1766.1   | 517.61   | 2199.61                  | 872                   | 1327.61    |
| 2023 | April     | 487   | 1018   | 714   | 304                       | 791                       | 830.55   | 243.42   | 1034.42                  | 1018                  | 16.42      |
| 2023 | May       | 353   | 1460   | 1076  | 384                       | 737                       | 773.85   | 226.80   | 963.80                   | 1460                  | -496.20    |
| 2023 | June      | 677   | 1390   | 785   | 605                       | 1282                      | 1346.1   | 394.52   | 1676.52                  | 1390                  | 286.52     |
| 2023 | July      | 791   | 1380   | 589   | 791                       | 1582                      | 1661.1   | 486.84   | 2068.84                  | 1380                  | 688.84     |
| 2023 | August    | 848   | 1300   | 629   | 671                       | 1519                      | 1594.95  | 467.45   | 1986.45                  | 1300                  | 686.45     |
| 2023 | September | 672   | 978  | 449   | 529                       | 1201                      | 1261.05  | 369.59   | 1570.59                  | 978                   | 592.59     |
| 2023 | October   | 634   | 738  | 442   | 296                       | 930                       | 976.5  | 286.20   | 1216.20                  | 738                   | 478.20     |
| 2023 | November  | 1139  | 687  | 321   | 366                       | 1505                      | 1580.25  | 463.14   | 1968.14                  | 687                   | 1281.14    |
| 2023 | December  | 1741  | 390  | 155   | 235                       | 1976                      | 2074.8   | 608.09   | 2584.09                  | 390                   | 2194.09    |
| 2024 | January   | 1884  | 217  | 123   | 94                        | 1978                      | 2076.9   | 608.70   | 2586.70                  | 217                   | 2369.70    |
| 2024 | February  | 1003  | 960  | 721   | 239                       | 1242                      | 1304.1   | 382.21   | 1624.21                  | 960                   | 664.21     |
|      | Totals    | 11501.00  | 11390.00   | 6466.00   | 4924.00                   | 16425.00                  | 17246.25   | 5054.59  | 21479.59                 | 11390                 | 10089.59   |