



**AEROBARRIER®**

Air Sealing Technology from AeroSeal

## AeroBarrier Case Studies (v2)

11.15.22

# Market Segmentation

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**Single Family**



**Multifamily**



**Commercial**



**High Performance**

# AeroBarrier – Session 3 Agenda

## Case studies

- Single Family – 1
- Multifamily – 3
- Commercial – 1

# Passive House Homes and Buildings

**Passive House** = a very high performance building design and construction standard that results in ultra low energy use homes and buildings.



## 5 Key Principles:

- Continuous insulation
- Optimized windows and solar gains
- Air tight building envelope (0.6 ACH50)
- Balanced ventilation with heat recovery
- Minimized mechanical systems



# Net Zero Homes and Buildings

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**Net Zero Energy Home** = a high performance, energy efficient home that produces as much or more energy than it consumes.

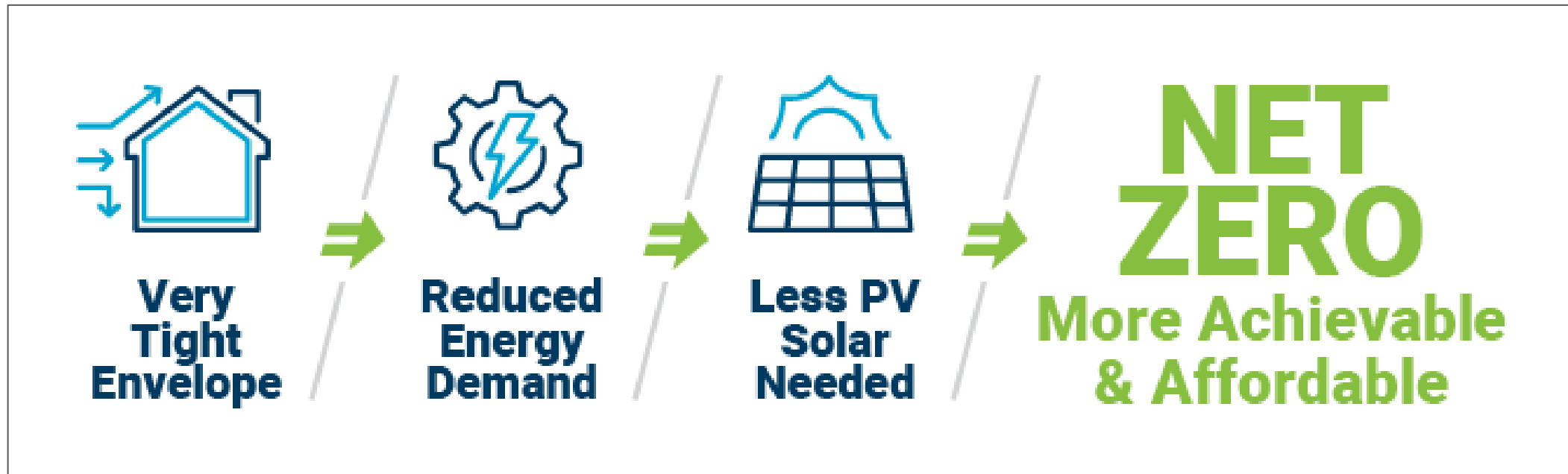
**Zero Energy Ready Home** = a high performance, energy efficient home that is designed and built so that, once renewable energy is added, the home will produce as much or more energy than it consumes.

Both target a building envelope air tightness of 1.5 ACH50



# Net Zero and AeroBarrier

AeroBarrier makes Net Zero more achievable and more affordable



# Case Study: Single Family Net Zero Mandalay Homes

## Project Details:

- Single family home – Zero Energy Ready
- Mandalay Homes – 8 DOE awards, most ZERH homes in USA
- Prescott, AZ
- 2000 SF home

## Project Goal:

- Determine best path to achieve Zero Energy Ready for every home Mandalay builds
- Compare AeroBarrier to other methods of air sealing



# Case Study: Single Family Net Zero Mandalay Homes

## Results:

- Pre AeroBarrier = 3.1 ACH50
- After AeroBarrier = 0.6 ACH50
- Only 8-14 solar panels needed vs. 30-60 panels
- Savings to achieve Net Zero of up to \$50,000 per home



“The answer is simple, by reducing the envelope leakage, it reduces energy demand... with innovative air sealing technologies, affordability of solar, and incorporating storage, we are able to scale zero energy on every home we build, no matter how low the sales price, and without passing a premium onto the home buyer.”

Mandalay Homes



# Case Study – Multifamily Net Zero Soleil Lofts

## Project Details:

- Multifamily – Net Zero Energy
- Soleil Lofts, The Wasatch Group
- Herriman, UT
- 600 units, solar, all electric



# Case Study – Multifamily Net Zero Soleil Lofts

Needed to cut energy consumption in half to meet performance targets and modeling showed air sealing was the best option

## Mechanical Changes:

- 3-bedroom units were modeled to get a 3.5-ton gas furnace.
- Sealed with AeroBarrier to 1ACH<sub>50</sub> consistently and now can use a 1.5-ton VRF electric system.



“We looked at other energy efficiency measures, including lighting and appliances, but energy modeling showed us they aren’t as cost-effective as air sealing.” The Wasatch Group

# Case Study – Multifamily Net Zero Soleil Lofts

## Project Results:

- 3 bedroom units were planned to have a 3.5 ton gas furnace
- Sealed with AeroBarrier to 1ACH50
- Now able to use 1.5 ton VRF electrical heating/cooling system
- 50% reduction in HVAC costs
- Energy use reduction of 50% to support use of PV solar to achieve Net Zero
- Utility rebates totaled substantially more than the cost of AeroBarrier
- Largest Net Zero project in Utah



# Case Study: Multifamily Passive House 153<sup>rd</sup> Street Apartments

## Project Details:

- 153<sup>rd</sup> Street Apartments
- Upper West Side, Manhattan, New York, NY
- 32 units

## Customer Pain Points:

- Apartments mostly complete and unable to achieve passive house requirement for air tightness between units (compartmentalization)
- Significant time and \$ spent in attempts
- Build was not able to progress to completion



# Case Study: Multifamily Passive House 153<sup>rd</sup> Street Apartments

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## Project Results:

- Passive house compartmentalization requirements were achieved
- 32 apartments were sealed in 8 days
- Project was able to move to completion and occupancy



“It was blowing people’s minds – mostly because monitoring compartmentalization in a multi-family building under construction is typically a very difficult, time consuming task. The level of coordination and commitment you need to get from all contractors on the job is as critical as it is nearly impossible to achieve. With AeroBarrier, it’s simply not a problem.”  
Chris Benedict, Architect

# Case Study – Multifamily Energy Star (Affordable Housing) River Glen Apartments (many units finished)

## Project Details:

- Multifamily – Energy Star & 3 ACH50
- River Glen Apartments, Signature Const.
- Rochester, MN
- 208 units, Low Income Housing
- 160 units 100% finished, 48 unfinished

## Customer Pain Points:

- Mostly complete affordable housing project couldn't meet air tightness requirement and allow occupancy of apartments
- Poor windows and mechanical dampers
- 40+ families in temporary hotel housing



# Case Study – Multifamily Energy Star (Affordable Housing) River Glen Apartments (many units finished)

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# Case Study – Multifamily Energy Star (Affordable Housing) River Glen Apartments (many units finished)

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## Project Results:

- Pre air sealing = 6.5 ACH50 average/unit
- Post air sealing = 1-1.5 ACH50 per unit
- Air tightness requirements met and families able to move out of hotel and into apartments
- Air sealing helped qualify for 45L on 50% of the units
- Now AeroBarrier is mandatory for Signature Construction in states requiring an ACH50 of 5 or less
- Signature Construction builds in 15 states



# Case Study: Existing University Building King Abdullah University of Science & Technology

## Project Details:

- Al Khawarizmi Building, King Abdullah University of Science and Technology
- Thuwal, Saudi Arabia
- LEED Platinum certified
- 68,550 square foot mechanical floor level
- 32,904 SF of Wall Surface Area, 757 lineal feet of exterior wall

## Customer Pain Points:

- Humid air leaking through building envelope into mechanical room causes operational issues
- Sensors and alarms activated up to 2x per week during humid season causing building evacuations

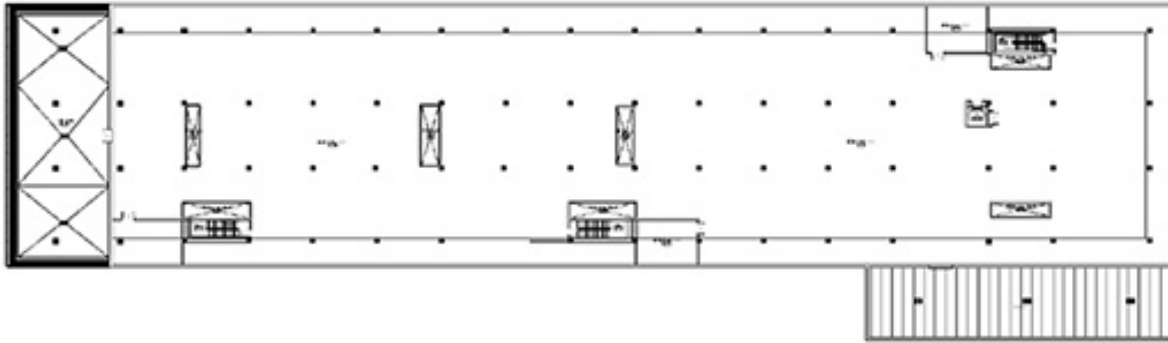


Al Khawarizmi Building – Applied Mathematics & Supercomputing Center

# Case Study: Existing University Building King Abdullah University of Science & Technology

## Building Context:

457'



150'

Mechanical Room Level Floor Plan

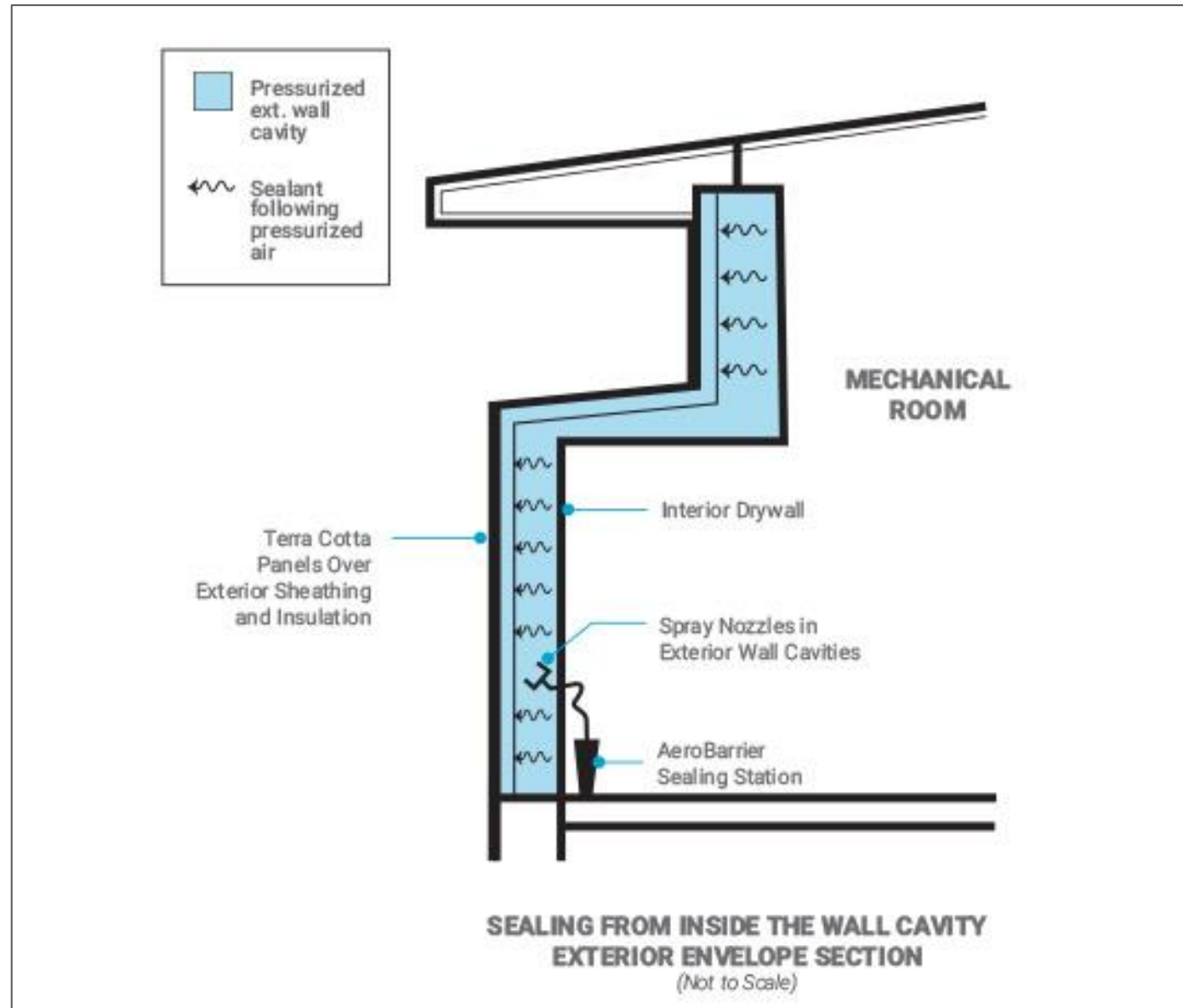


Exterior Wall at Mechanical Room

# Case Study: Existing University Building King Abdullah University of Science & Technology

## Air Sealing From Inside the Exterior Wall Cavity

- Mechanical equipment & sensors in mechanical space
- Needed to seal the envelope from inside the exterior wall cavity
- Pressurize the exterior wall cavity vs. the room
- Spray nozzles in the cavity
- Entire spray station the cavity



# Case Study: Existing University Building King Abdullah University of Science & Technology

## Air Sealing From Inside the Exterior Wall Cavity



Sealing Station Spray Nozzles Inside Exterior Wall Cavity



Entire Sealing Station Inside Exterior Wall Cavity

# Case Study: Existing University Building King Abdullah University of Science & Technology

## Air Sealing Innovations & Methodology



Pressurizing the Exterior Wall Cavity



Sealing Air Leaks Behind Conduits While  
Protecting Control Panels

# Case Study: Existing University Building King Abdullah University of Science & Technology

## Project Results:

- Goal: Solve facility's alarms and mechanical shut down problems caused by condensation from humidity and moisture infiltration issues
- Amount of exterior wall sealed: 32,904 SF of wall surface area, 757 lineal feet of ext wall
- Before AeroBarrier: 41.28 ACH50, 61,571 CFM leakage
- After AeroBarrier: 2.2 ACH50, 3,732 CFM
- Results: approx. \$94% reduction in air leakage and \$126,800 in estimated annual operational savings



“The AeroBarrier technology is mind-blowing. And this project is a remarkable achievement for us. It’s one of the most satisfying projects I’ve worked on in my entire career as an engineer.”

Biju Reghuvaran, KAUST

# THANK YOU!