

The Phius Decision Room

Interactive Passive Building Scenarios



The Phius Decision Room: Interactive Passive Building Scenarios

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Build Zero Consulting is a building science and high-performance design consulting firm focused on helping project teams deliver durable, efficient, low-energy buildings. Our work includes Phius consulting, energy and hygrothermal modeling, enclosure analysis, and technical support from early design through construction and certification. We work across project types and climates, with a practical focus on balancing performance, constructability, cost, and real-world building operation.

The Phius Decision Room: Interactive Passive Building Scenarios

Learning Objectives

1. Evaluate passive building project decisions through the lenses of performance, certification, cost, constructability, and risk.
2. Compare how different project-team roles may interpret the same passive building scenario and prioritize different outcomes.
3. Interpret live audience responses to recognize where passive building decisions are straightforward, contested, or dependent on project context.
4. Apply lessons from interactive project scenarios to improve passive building design, certification, and construction coordination.

The Phius Decision Room: Interactive Passive Building Scenarios

The “Rules”

1. This is an interactive session
2. You are the Panel
3. Use the QR code to Vote along with the room.
You can also type in the link below the code.
4. After questions are answered I will ask for volunteers to explain their answers or to offer any insight
5. Yes, there are Rewards!



pe.app/ryanabendroth

What most often undermines high-performance on a real project?

What most often undermines high-performance on a real project?



The energy model is wrong

The details do not survive value engineering

The field installation misses the design intent

The project team never shared the same definition of “high performance”



Edit



Choices



Results



Lock



Correctness

The Phius Decision Room: Interactive Passive Building Scenarios

Let's Begin!



pe.app/ryanabendroth

Question 1

Respond using QR code or
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What are some conditions when heat loss to the ground is beneficial?

Question 1

Respond using QR code or
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What are some conditions when heat loss to the ground is beneficial?



During the cooling season, when the ground is cooler than the conditioned space

During a sunny winter day when a highly insulated building is overheating from solar gains

In a building with high internal gains, even when outdoor temperatures are relatively cool

In a cooling-dominated climate where ground temperatures remain below the indoor cooling setpoint for much of the year

All of the above



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

What metric should be used to determine how much slab insulation to install for a given project?

Question 2

Respond using QR code or
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What metric should be used to determine how much slab insulation to install for a given project?

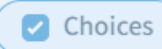


Heating Demand

Cooling Demand

Both Heating Demand and Cooling Demand

Site Energy



What is the most economical strategy for eliminating thermal bridging at the footings for slab on grade single family buildings?

Question 3

Respond using QR code or
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What is the most economical strategy for eliminating thermal bridging at the footings for slab on grade single family buildings?



Wrap around the entire footing and stem wall (if applicable) with foam insulation

Use insulating aggregates, since you need compacted fill anyway

Create a thermally broken transition between the slab insulation and wall insulation

Insulate on the exterior, interior, or both faces of the perimeter stem wall.



Edit

☒ Choices

☒ Results

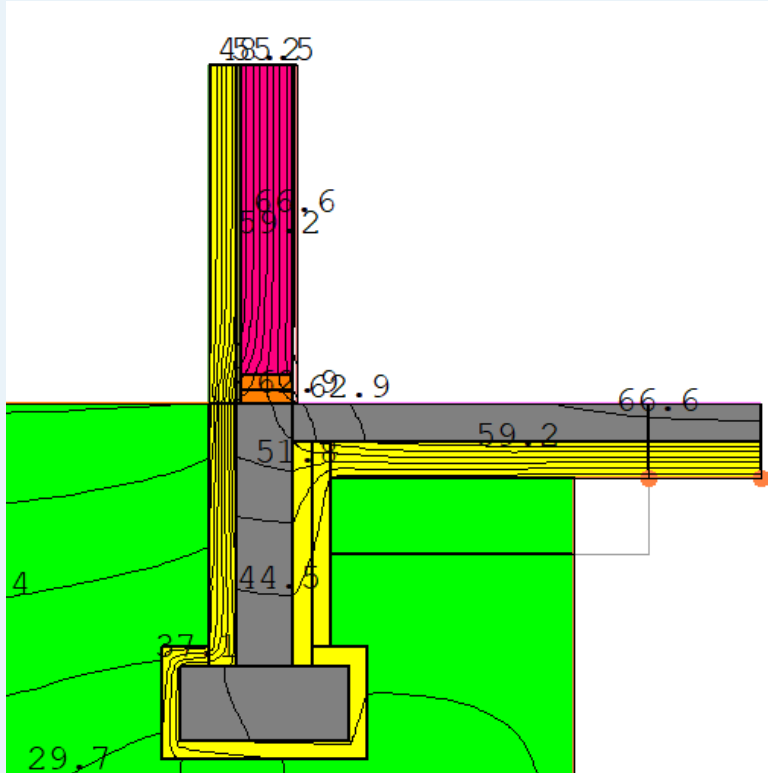
☐ Lock

☐ Correctness

Question 3

Respond using QR code or
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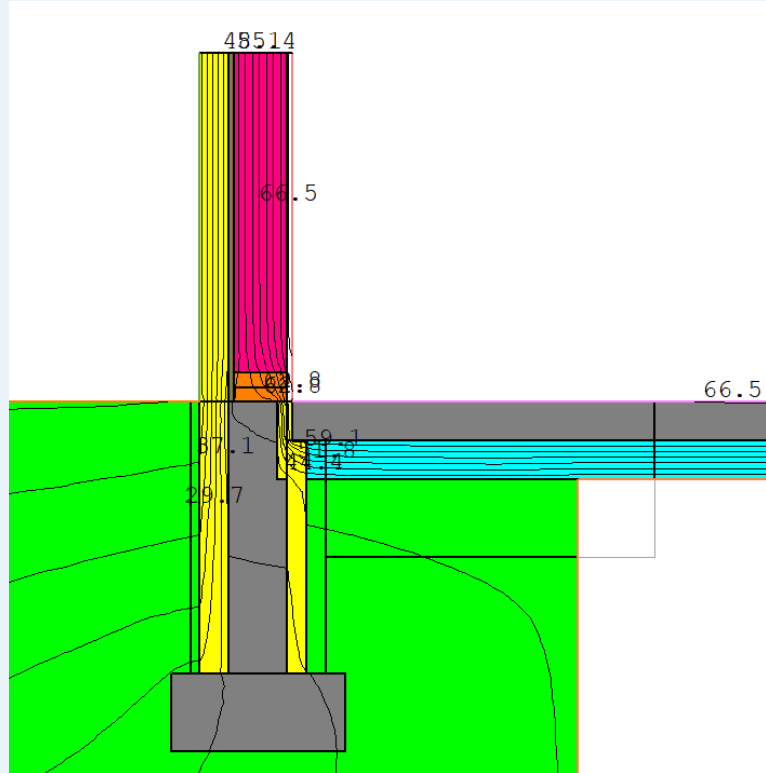
Psi = 0.061



Exterior: 3"
Interior: 3"
Thermal Gap: 0"

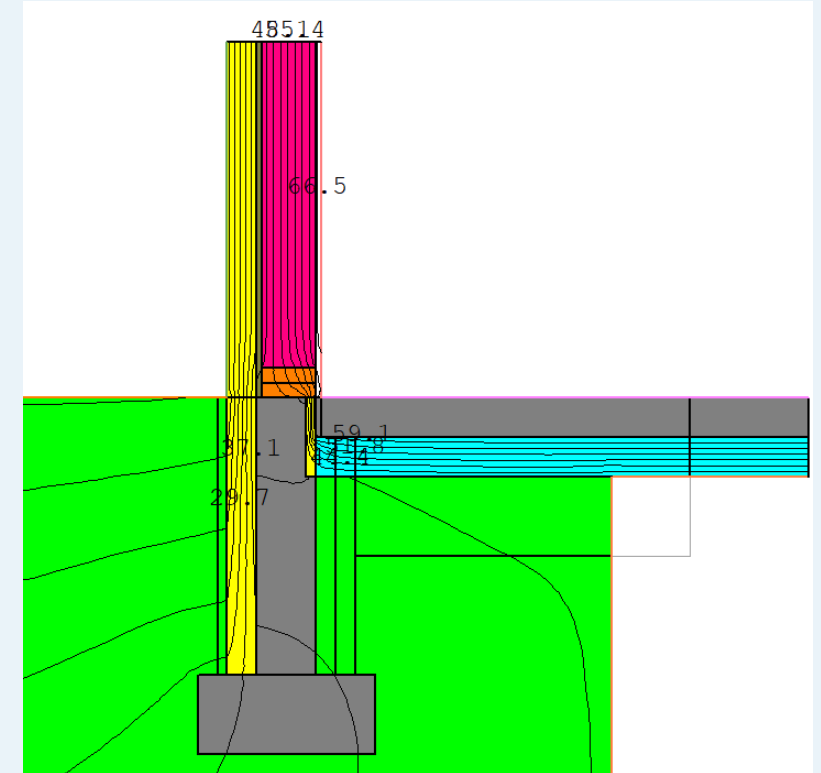
Psi = 0.017

Psi = 0.017 when gap is 1.5"



Exterior: 3"
Interior: 2"
Thermal Gap: 1"

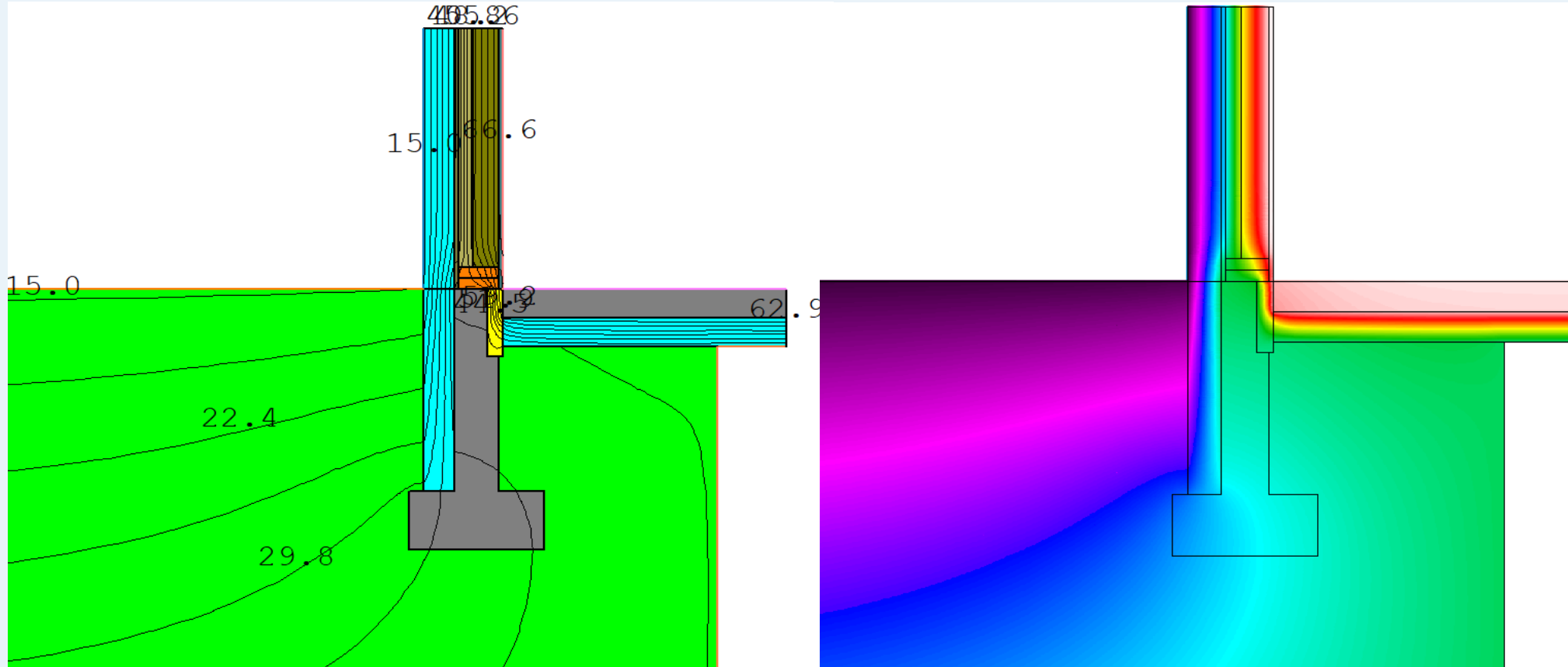
Psi = 0.008



Exterior: 3"
Interior: 0"
Thermal Gap: 2"

Question 3

Respond using QR code or
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Final Detail:
Psi = 0.004

Exterior: 4" EPS
Interior: 0"
Thermal Gap: 2"
Underslab: 4" EPS

Insert Foundation Image Here

Choose one of the marked areas as the best way to break the thermal bridge

Question 4

Respond using QR code or
pe.app/ryanabendroth

Untitled question



No image set

Upload an image before the audience can respond.

Choose File No file chosen



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

Assume a project in a hot climate such as Houston TX is concerned about thermal comfort and moisture performance at the slab to wall connection.

What changes should be made to the foundation insulation strategy?

Question 5

Respond using QR code or
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Assume a project in a hot climate such as Houston TX is concerned about thermal comfort and moisture performance at the slab to wall connection.
What changes should be made to the foundation insulation strategy?



Insulation under the slab should be removed.

All foundation insulation should be removed

Insulation under the slab should be removed, but slab edge insulation should be present to prevent issues during cold snaps

None of this really matters



☒ Choices

☒ Results

☐ Lock

☐ Correctness

What causes the most problems late in a Phius project?

What causes the most problems late in a Phius project?



Awaiting first audience response .

You are adding interior insulation to an existing solid masonry building. Which approach gives you the best chance of ending up with a safe and durable assembly?

Question 7

Respond using QR code or
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You are adding interior insulation to an existing solid masonry building. Which approach gives you the best chance of ending up with a safe and durable assembly?



Maximize the R-value and install a Class I vapor barrier on the interior

Leave an air space between the masonry and insulation so the wall can dry

Control rain first, maintain continuous air control, and verify the moisture behavior

Use closed-cell spray foam directly against the masonry because it solves both the air and vapor control problems



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

Smart vapor membranes are often used in cold climates on the interior of an insulated assembly to reduce moisture risk. What happens if the interior humidity stays high for long periods of time, such as in a greenhouse or pool room?

Question 8

Respond using QR code or
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Smart vapor membranes are often used in cold climates on the interior of an insulated assembly to reduce moisture risk. What happens if the interior humidity stays high for long periods of time, such as in a greenhouse or pool room?



The membrane becomes more vapor closed and provides additional protection

The membrane can become more vapor open, allowing more moisture into the assembly when you may not want it

The membrane actively regulates the humidity and keeps the assembly dry

Nothing changes. Smart membranes respond primarily to outdoor temperature



Edit

☒ Choices

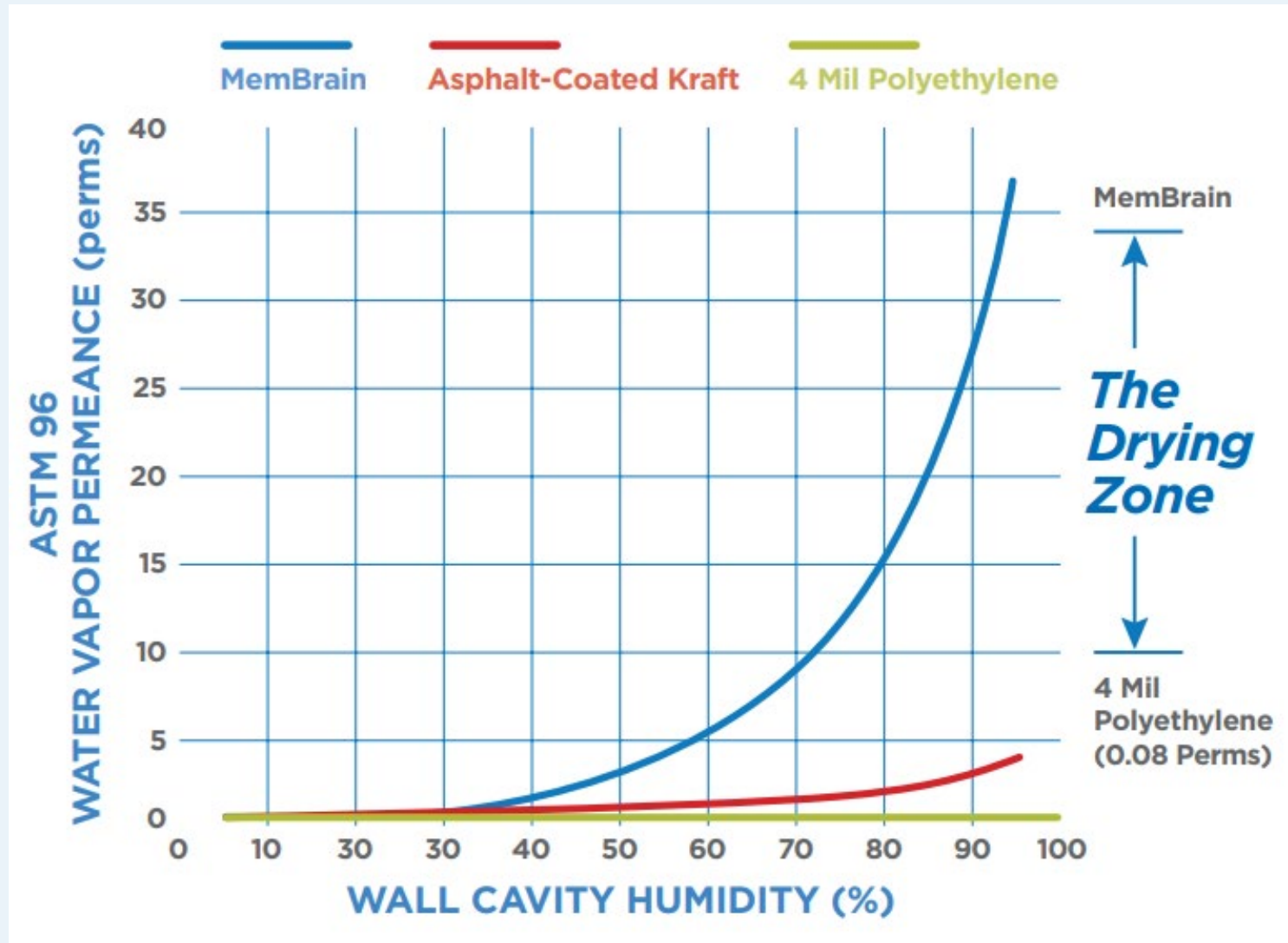
☒ Results

☐ Lock

☐ Correctness

Question 8

Respond using QR code or
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Source: Certainteed Saint-Gobain:
MemBrain™ Continuous Air Barrier & Smart Vapor Retarder Technical Brochure

You are designing a building in an area with significant wildfire risk. The client wants a foam-free enclosure with low embodied carbon, so you settle on a mineral-wool rainscreen. Which of the following can still become a weak point in the fire-resilience strategy?

Question 9

Respond using QR code or
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Which of the following can still become a weak point in the fire-resilience strategy?



The cladding

The vented rainscreen cavity and opportunities for ember entry

The WRB, attachment system, cavity barriers, and other components behind the cladding

All of the above



☒ Choices

☒ Results

☐ Lock

☐ Correctness

A project team wants to reduce the embodied carbon of the building. What information matters most when evaluating the carbon impact of a material change?

Question 10

Respond using QR code or
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A project team wants to reduce the embodied carbon of the building. What information matters most when evaluating the carbon impact of a material change?



Whether the product is marketed as a low-carbon material

The embodied carbon per unit of material

The material quantity used and its carbon impact over the same life-cycle period

Whether the product is locally sourced



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

A 283-unit mixed use multifamily building had ventilation rates per unit originally designed at 85 CFM/unit, even though many of the units could be ventilated at a much lower rate. How much does optimizing the ventilation airflow really matter to the energy model?

Question 11

Respond using QR code or
pe.app/ryanabendroth

A 283-unit mixed use multifamily building had ventilation rates per unit originally designed at 85 CFM/unit, even though many of the units could be ventilated at a much lower rate. How much does optimizing the ventilation airflow really matter to the energy model?



Very little. With a good ERV, the difference between 85 and 45-60 CFM/unit is almost negligible

It mostly affects fan energy, but has little effect on heating demand or heating load

It can have a significant impact because a relatively small amount of excess airflow per unit becomes a very large continuous load across hundreds of apartments

Lower airflow helps source energy, but generally increases heating demand because less heat is recovered



☒ Choices

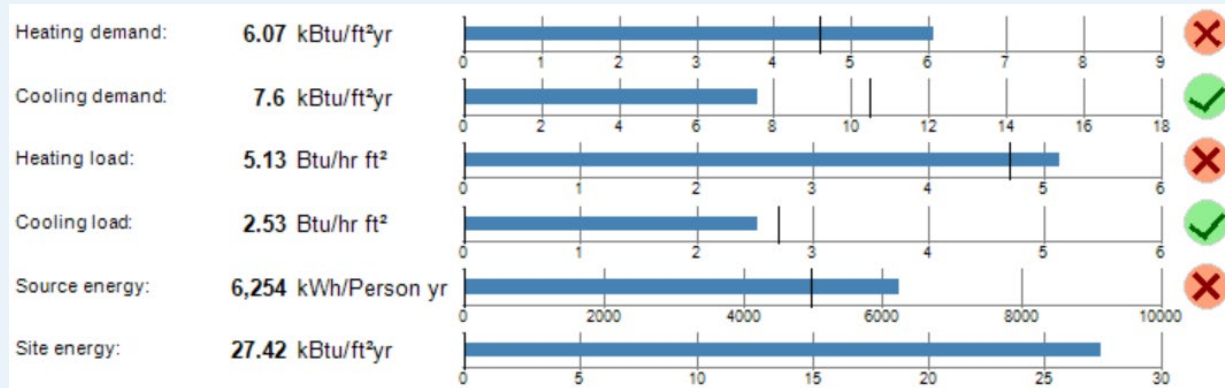
☒ Results

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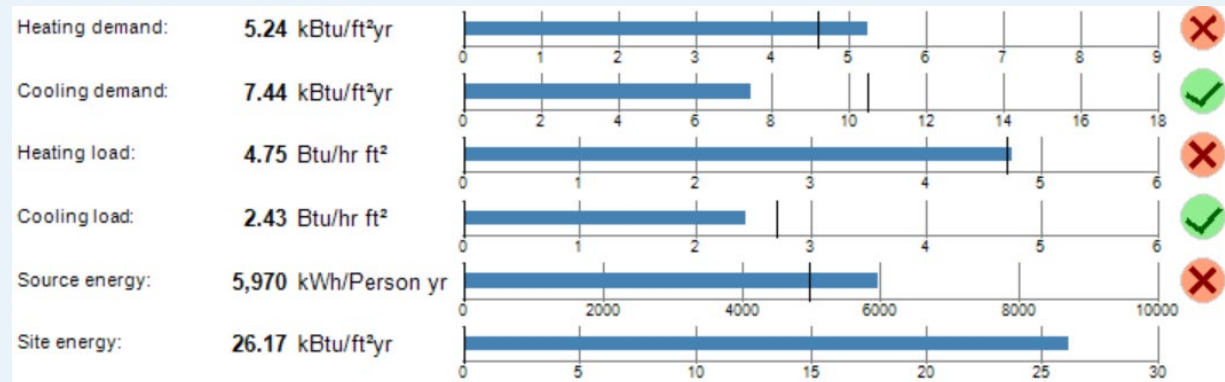
☐ Correctness

Question 11

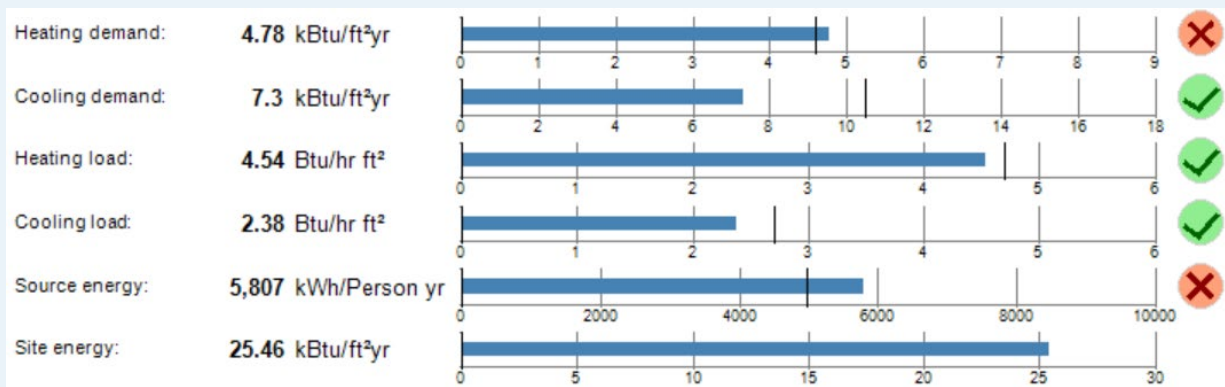
Respond using QR code or
pe.app/ryanabendroth



As Designed:
85 CFM/unit



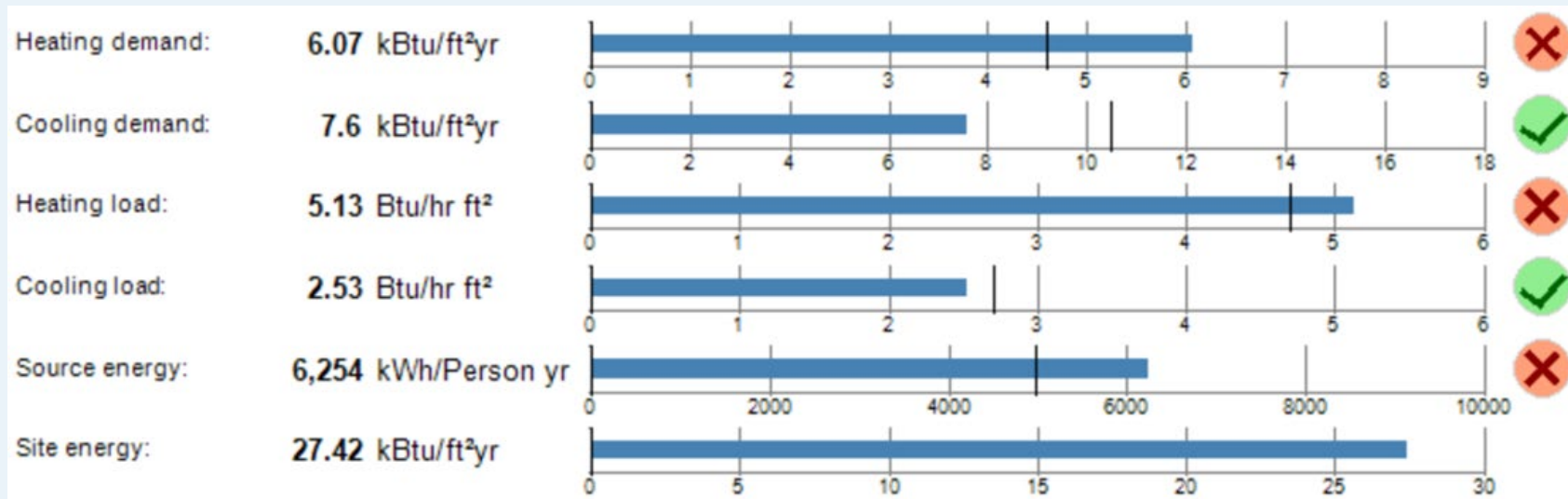
Optimized:
60 CFM/unit



Code Minimum:
45 CFM/unit

Question 11

Respond using QR code or
pe.app/ryanabendroth



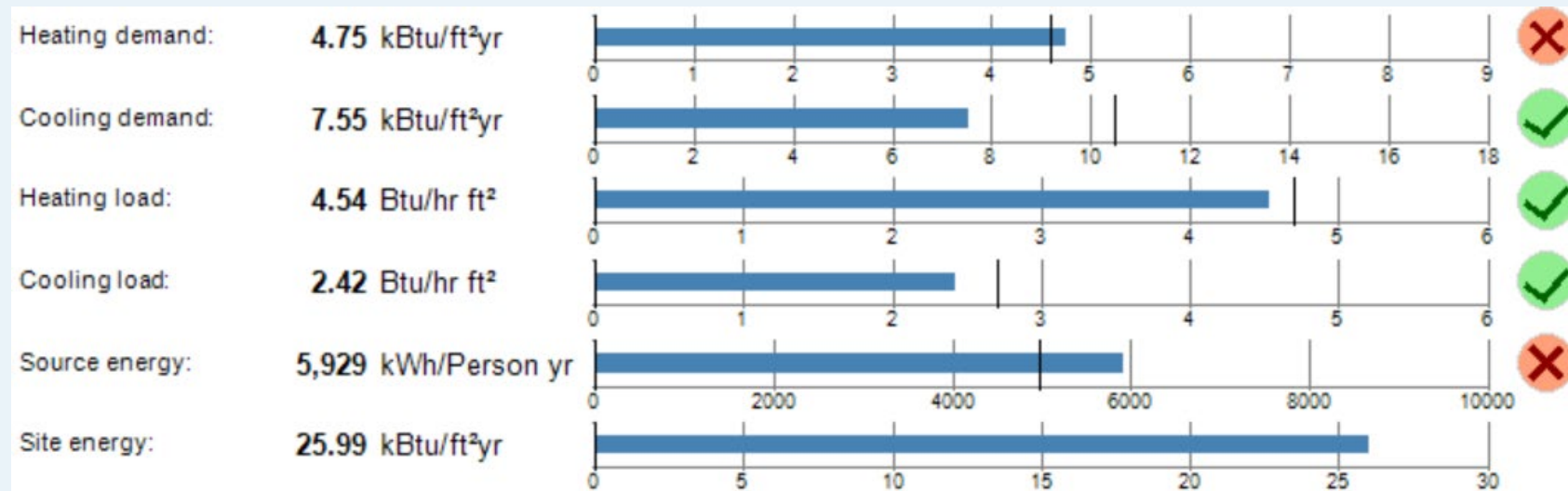
As Designed:

85 CFM/unit

SRE: 75 %

NMT: 60 %

FAN: .8 w/cfm



Optimized Airflow and SRE:

60 CFM/unit

SRE: 81 %

NMT: 60 %

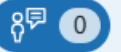
FAN: .8 w/cfm

Over the last few years, Build Zero Consulting has asked more than 2,000 architects whether they monitor indoor air quality in any of their own homes or buildings. Only about 1% say yes. Why?

Question 12

Respond using QR code or
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Over the last few years, Build Zero Consulting has asked more than 2,000 architects whether they monitor indoor air quality in any of their own homes or buildings. Only about 1% say yes. Why?



Awaiting first audience response ...

Edit

☒ Results

☐ Lock

What would make routine IAQ monitoring more common?

Question 13

Respond using QR code or
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What would make routine IAQ monitoring more common?
Which of these would make the biggest difference?



Make monitoring part of commissioning and post-occupancy evaluation

Make inexpensive sensors a standard part of the building

Establish clearer metrics for what good indoor air quality actually looks like



☒ Choices

☒ Results

☐ Lock

☐ Correctness

For a multifamily building, what is the biggest tradeoff between unit-by-unit systems (such as PTHPs + individual ERVs) and a centralized ducted HVAC system?

Question 14

Respond using QR code or
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For a multifamily building, what is the biggest tradeoff between unit-by-unit systems (such as PTHPs + individual ERVs) and a centralized ducted HVAC system?

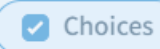


Unit-by-unit systems simplify distribution and compartmentalization, but create more individual pieces of equipment, penetrations, and maintenance points.

Centralized systems reduce the amount of equipment in the apartments, but require more distribution space, shafts, balancing, and coordination

Unit-by-unit systems can provide simple zoning and redundancy, while centralized systems can offer operational and efficiency advantages at larger scale.

All of the above



You have a Phius home modeled in WUFI Passive and now want to size the PV system to achieve net zero based on actual energy use. What should you scrutinize before relying on the modeled annual energy use?

Question 15

Respond using QR code or
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You have a Phius home modeled in WUFI Passive and now want to size the PV system to achieve net zero based on actual energy use. What should you scrutinize before relying on the modeled annual energy use?



The modeled/default occupancy compared with the number of people who will actually live in the house and how they use it

Loads that may sit outside the normal building model, such as EV charging, pools, spas, wells, irrigation, exterior loads, or detached buildings

Plug loads, appliances, equipment, and other uses that may be significantly different from the assumptions in the model

All of the above



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

Now take the same house completely off-grid. What becomes more important than simply matching annual energy use with annual renewable generation?

Question 16

Respond using QR code or
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Now take the same house completely off-grid. What becomes more important than simply matching annual energy use with annual renewable generation?



The building's hourly and daily peak loads

Seasonal mismatch between energy use and renewable production

Standby loads and equipment that runs continuously

Loads that occur during long periods of poor solar production

All of the above



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

An off-grid project produces far more solar energy than it can use during the summer but still needs generator support during the winter. Which PV strategy might make more sense than simply maximizing annual PV production?

Question 17

Respond using QR code or
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An off-grid project produces far more solar energy than it can use during the summer but still needs generator support during the winter.
Which PV strategy might make more sense than simply maximizing annual PV production?

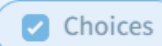


Use the tilt and orientation that produces the greatest annual kWh

Use a steeper, winter-biased tilt that produces less energy annually but more energy during the months when the building actually needs it

Split the array evenly between east and west to extend daily production.

Keep the PV array unchanged and solve the seasonal mismatch with batteries, a generator, or other methods.



An off-grid home produces enough renewable energy annually, but a few cold winter periods drive the size and runtime of the backup generator. Before adding more PV, batteries, or generator capacity, what should you investigate?

Question 18

Respond using QR code or
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An off-grid home produces enough renewable energy annually, but a few cold winter periods drive the size and runtime of the backup generator. Before adding more PV, batteries, or generator capacity, what should you investigate?



Whether the winter peak can be reduced or shifted through envelope improvements, winter solar gain, thermal storage, and load scheduling

Whether the heating system should be upsized so the house can recover more quickly during the coldest periods

Whether annual plug and appliance loads can be reduced enough to improve the overall energy balance

Whether the battery reserve setting can be lowered so more stored energy is used before the generator starts



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

You are working on a high-performance building, but the architect, builder, and mechanical contractor have little or no experience with Phius. What is the best way to keep the project on track?

Question 19

Respond using QR code or
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You are working on a high-performance building, but the architect, builder, and mechanical contractor have little or no experience with Phius. What is the best way to keep the project on track?



Give each discipline clear Phius requirements and let them develop their portion of the project independently.

Have the CPHC review the project at major milestones and identify anything that affects certification.

Get the team together early, establish the performance goals and responsibilities, and explain why the critical requirements matter.

Develop the high-performance details yourself and issue them to the team once the design is far enough along.



☒ Choices

☒ Results

☐ Lock

☐ Correctness

**The project has received Phius Design Certification.
During construction, the contractor proposes a product substitution
that saves cost and simplifies installation.
What should happen before the change is accepted?**

Question 20

Respond using QR code or
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The project has received Phius Design Certification. During construction, the contractor proposes a product substitution that saves cost and simplifies installation. What should happen before the change is accepted?



Accept it if the contractor can document equal or better stated product performance.

Have the architect approve it through the normal submittal/RFI process.

Review the change with the CPHC for impacts to the enclosure, mechanical design, energy model, and certification before it is purchased or installed.

Reject it because the Design Certified documents should no longer be changed.



☒ Choices

☒ Results

☐ Lock

☐ Correctness

Flashing tape and window install in hot humid climates

Untitled question



No image set

Upload an image before the audience can respond.

Choose File No file chosen



Edit

☒ Choices

☒ Results

☐ Lock

☐ Correctness

You want to optimize a project in WUFI Passive for overall performance, including heating demand, cooling demand, peak loads, and especially site energy. What is the best approach?

Question 22

Respond using QR code or
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You want to optimize a project in WUFI Passive for overall performance, including heating demand, cooling demand, peak loads, and especially site energy. What is the best approach?



Focus on whichever certification metric is closest to its limit

Improve the envelope as much as possible before looking at the mechanical systems

Run sensitivity studies on the major design variables and compare how each change affects all of the project's performance metrics

Minimize heating and cooling demand first; site energy will generally follow



☒ Choices

☒ Results

☐ Lock

☐ Correctness

What will you pay more attention to on your next high-performance project?

Question 23

Respond using QR code or
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What will you pay more attention to on your next high-performance project?



Awaiting first audience response ..

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Questions

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stefan@buildzeroconsulting.com





AO

Recommended

Multiple choice

Open ended

Other



Bar



Word cloud



Clickable image



Q&A



Competition

My polls

Trash

Start with AI

+ New poll

Add folder

Import

Search polls and folders

☐	TITLE	AUDIENCE SIZE	DATE CREATED	LAST RESPONSE	↑↓
☐	What would make routine IAQ...	0	Oct 3, 2026 at 12:33pm	No responses	⋮
☐	For a multifamily building, what is the...	0	Oct 1, 2026 at 12:17pm	No responses	⋮
☐	You have a Phius home modeled in W...	0	Oct 1, 2026 at 12:16pm	No responses	⋮
☐	What most often undermines high...	0	Oct 1, 2026 at 11:42am	No responses	⋮
☐	An off-grid home produces enough...	0	Oct 1, 2026 at 9:05am	No responses	⋮
☐	You are working on a high-performanc...	0	Oct 1, 2026 at 9:05am	No responses	⋮