Welcome to todays CHBA Net Zero Webinar!

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The CHBA Net Zero Team

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Housekeeping

- **This webinar is being recorded.** CHBA Members can access the Net Zero webinar archive at **www.chba.ca/NZwebinars**. (Recording + slide deck.)
- **You will be in "listen-only" mode** for the duration of the webinar.
- **After the presentation we will have time for questions. Please use the question section of the dashboard** throughout the webinar and they will be relayed to the presenter(s).

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- Building Net Zero Energy/Net Zero Energy Ready Homes
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Lunch & Learn Seminar available on topics such as:

- Principles of Acoustics and new ASTC Code Requirements
- Eliminating Thermal Bridges and Online Design Tools
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Thank you to our NZC Bronze Sponsor Members

Our Next Webinar

July 22 from 10:30-11:30 PT / 1:30-2:30 ET

Ducted vs. Ductless? How We're Settling the HVAC Debate


Presented by:

- Sonny Pirrotta, National Sales Manager- HVAC Solutions, Life and Devices Solutions Division, Panasonic Canada Inc., and
- Greg Hussey, President & Owner, Karwood

Panasonic, in partnership with Karwood Ontario, is undertaking an exciting new project that examines the capital and operating costs of a traditional HVAC ducted system vs. a ductless air-source heat pump (ASHP) installation in a typical single storey home. Two identically designed and constructed houses will be built, the first with a traditional furnace and AC unit, and the other with a ductless ASHP. Capital costs of both installations will be examined, and an energy model will compare the operating costs of both houses over a 10-year period.

In this webinar, you will:

- Learn about this innovative project in more detail
- Understand the advantages of a ductless solution compared to a traditional HVAC system
- Learn more about the Panasonic products involved in the project

Learn more and register at chba.ca/NZwebinars

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Today's Webinar

June 15 from 10:30-11:30 PT / 1:30-2:30 ET

IAQ and the CHBA Net Zero Homes: What do they deliver?

Presented by:

- Brett Cass, Program Coordinator, Net Zero Energy Housing, CHBA,
- Gord Cooke, President, Building Knowledge Canada,
- Doug Tarry, President, Doug Tarry Homes, and
- Sonny Pirrotta, National Sales Manager- HVAC Solutions, Life and Devices Solutions Division, Panasonic Canada Inc.




Homeowner concerns around home indoor air quality, comfort and energy costs were raised continuously throughout 2020, amplified by the pandemic. Due to this heightened awareness, the Net Zero Technical Committee took a closer look at the aspects in our program that helps to achieve one of our key brand promises: exceptional indoor air quality for healthier living. Join us for this webinar to learn more about why indoor air quality is so important, key control strategies, and how Net Zero Homes are able to deliver better indoor air quality than a code-built home.

Recording & slide deck will be available at chba.ca/NZwebinars

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Poll #1

Builders/Renovators:
Are you finding that homebuyers are more interested in IAQ?

A) Yes
B) No
C) I'm Unsure

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Agenda

- Why is IAQ Important?
- IAQ Control Strategies
- IAQ and the Net Zero Program
- Q & A

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Why is IAQ Important

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HVAC and Ventilation: Indoor Air Quality is Important to our Clients

20% of households have someone with asthma, allergies or respiratory problems

Poor IAQ may cost 10's of billions annually in lost productivity (EPA)

Air cleaners are a $1.2 Billion industry

HVAC and ventilation
IAQ… Why is it a bigger issue than ever?

Change in the
way we build

- Tighter
- More chemicals
- Air conditioning

Change in the
way we live

- 90% of time indoors
- Don't open windows
- More moisture

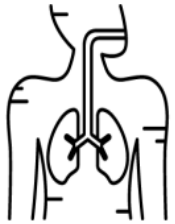
Change in the
products we use

- Carpets & furnishings
- Cleaners & hygiene
- More "stuff" inside

Ventilation: IAQ & Humidity
Relative Humidity & Health

When RH<40%, humans suffer!

Sitting in room air with 20% RH, the average person becomes clinically dehydrated in 8 hours



more infections & asthma attacks

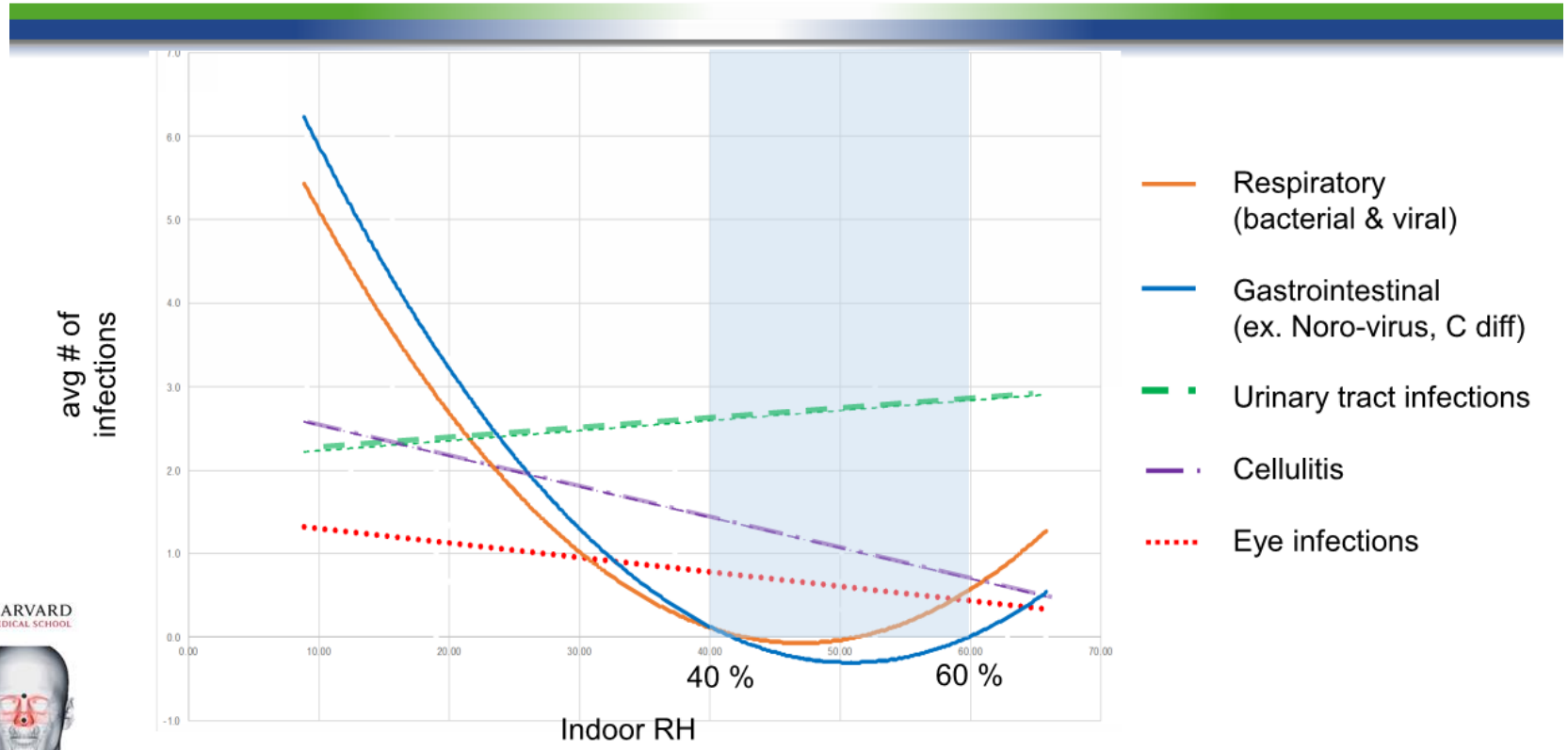
impaired brain function

skin cracking, decreased wound healing

dry eyes, excessive tearing

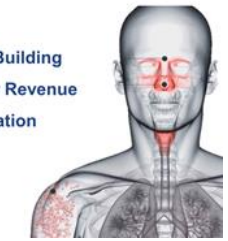
Ventilation: IAQ & Humidity
Relative Humidity & Health

Respiratory & GI infection rates were lowest when indoor RH = 40-60%



HARVARD MEDICAL SCHOOL

Optimize Occupant Health, Building Energy Performance and Your Revenue Through Indoor-Air Hydration



Stephanie Taylor, M.D., M. Arch

Ventilation: IAQ & Humidity
What does humidity do to viruses?

When RH < 40%, pathogen infectivity is high

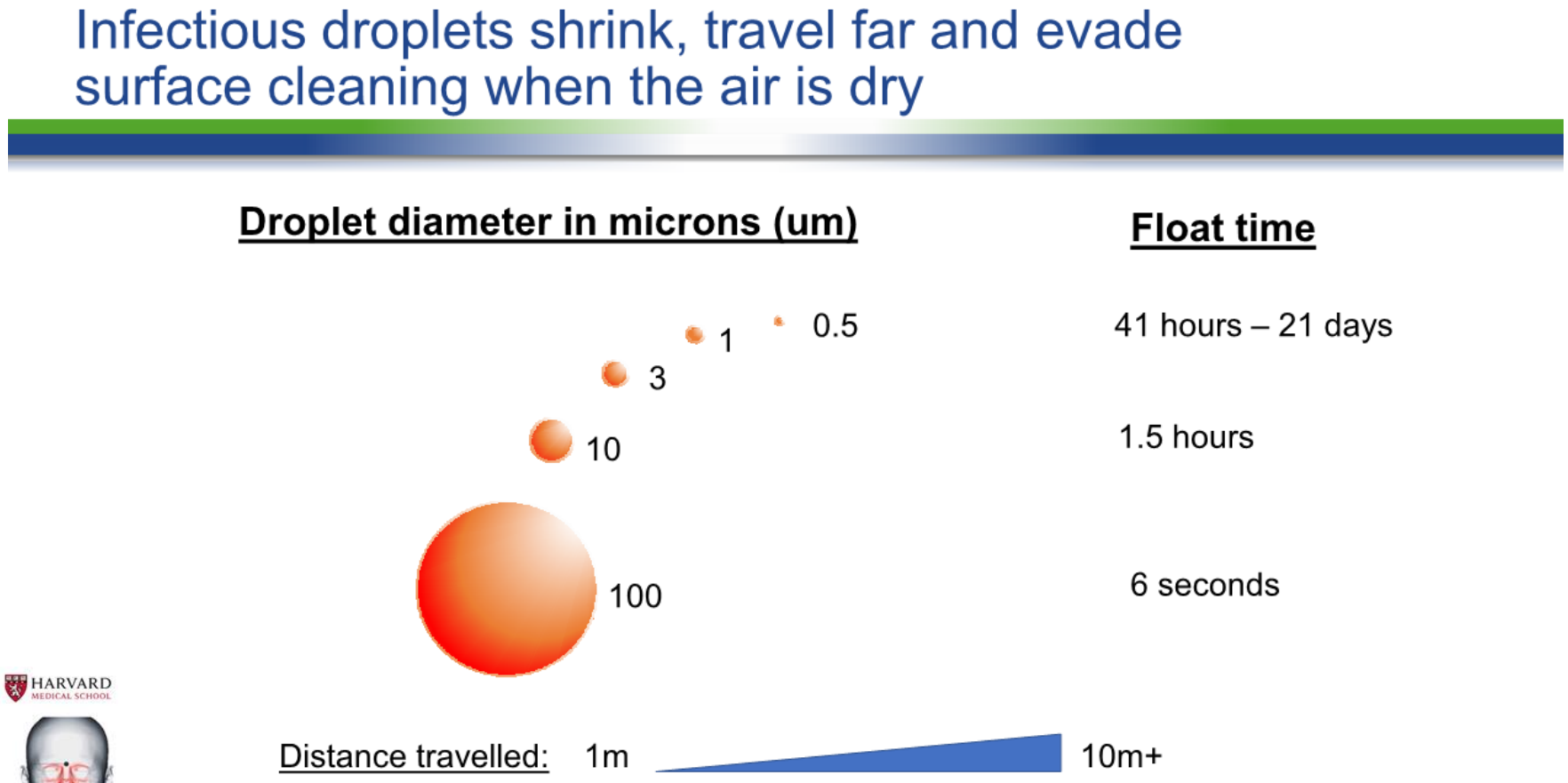
Greater airborne transmission

Evasion from surface cleaning through resuspension

Increased survival and infectivity

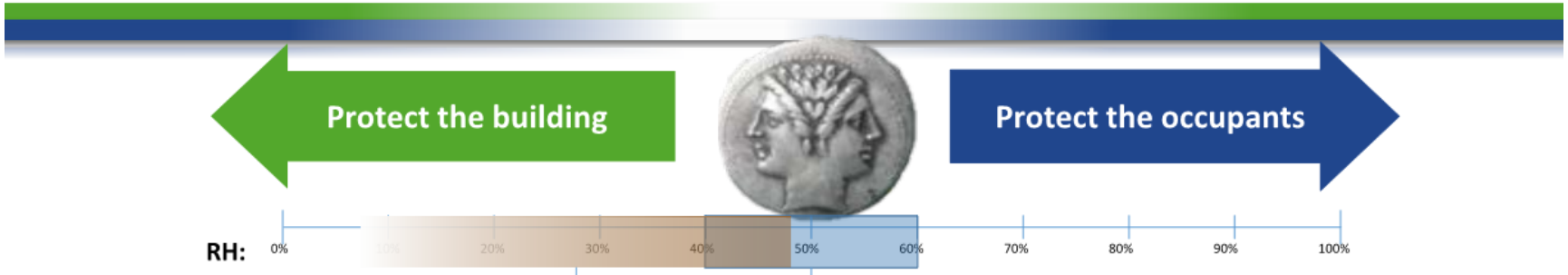
Ventilation: IAQ & Humidity
Humidity affects the size and weight of the virus

Infectious droplets shrink, travel far and evade surface cleaning when the air is dry



Ventilation: IAQ & Humidity
Relative Humidity and Buildings

The great indoor air RH debate!



Buildings don't care about humidity

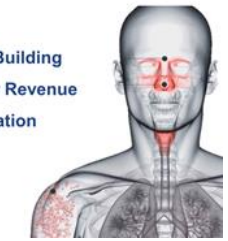
- The drier the air the better
- Easier to dry the air than fix the envelope construction
- Humidification will cost more

Occupants need RH between 40% and 60% for health

- Decreased infections
- Fewer allergies
- Improved hydration
- Improved wound healing
- Increased work performance

HARVARD MEDICAL SCHOOL

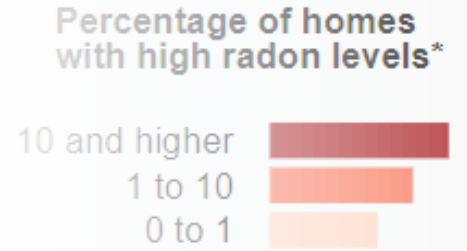
Optimize Occupant Health, Building Energy Performance and Your Revenue Through Indoor-Air Hydration



Stephanie Taylor, M.D., M. Arch

Canadian Home Builders' Association

Radon – The Risk



Radon is a significant health risk to Canadians

- 1 in 5 existing homes tests higher than guideline
- Health Canada has a radon risk map
- Single family homes pose higher risk to residents
- Protection against radon ingress is regulated in building codes

Net Zero Homes are well protected but not immune

- advanced below-ground airtightness offers good resistance against radon
- advanced ventilation solutions is good first-level mitigation technique
- Risk – Net Zero Homes are not immune to radon ingress

Canadian Home Builders' Association

Radon – Considerations

CHBA is

- concerned that new energy code provisions did not consider radon and asked for further investigation
- working with partners to make sure codes and standards solutions minimize risks and to encourage more research

Effective best practice solutions exist and are free to download

Recommendations

- Be aware of the radon risk in the location of each project
- Consider that Net Zero Homes are not immune to radon ingress
- Understand the risk and use best practices
- Let owners know where they can get more information

IAQ vs IEQ

Indoor Air Quality (IAQ) refers to the air quality within and around buildings and structures, especially as it relates to the health and comfort of building occupants. Understanding and controlling common pollutants indoors can help reduce your risk of indoor health concerns. Health effects from indoor air pollutants may be experienced soon after exposure or, possibly, years later. *(Source: US EPA)*

Indoor Environmental Quality (IEQ) is an integrated study of an occupant's response to the built environment. That being one's ability to sense and perceive the quality of air, thermal, sound, light, odors and vibrations. It also includes a study of imperceptible elements such as asbestos, radon or Carbon Monoxide (CO). *(Source: Robert Bean)*

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IAQ Control Strategies

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IAQ Control Strategies: In priority...

1. **Remove Pollutants**
2. **Source control**
   - “Seal” or Isolate
   - If you can’t remove it find a way to isolate or seal it
3. **Ventilate**
   - Dilute pollutants with “fresh” outdoor air
   - Point source removal
4. **Filter**

HVAC and Ventilation: Types of “AIR”

Ventilation air

- To provide the home with outdoor air for breathing.
- To dilute contaminants.
- To assist with some humidity control.

Combustion air

- To provide air required to burn fuel in combustion appliances to help ensure stable burner operation.

Make-up air

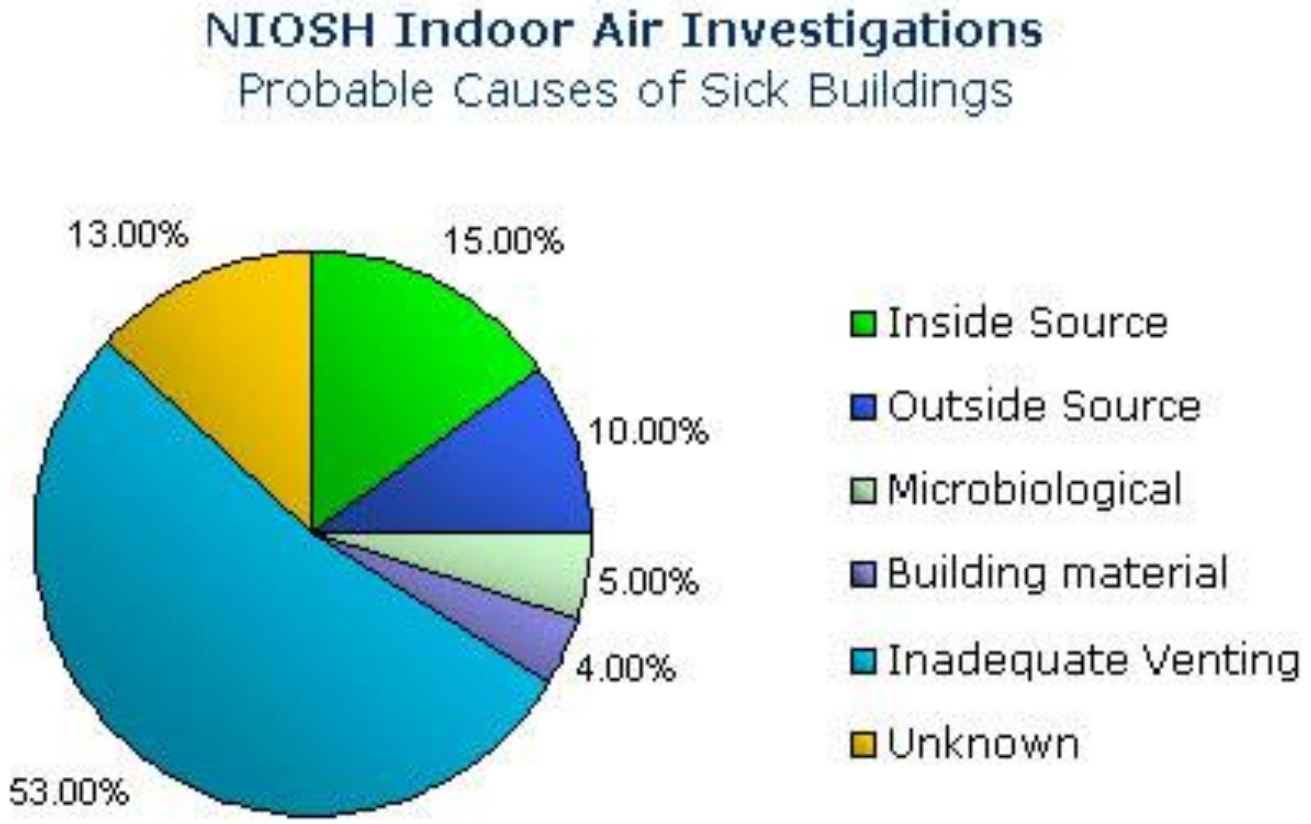
- To replace air exhausted by appliances (e.g. dryer, kitchen fan, central vacuum system) and help prevent backdrafting of exhaust fumes from combustion appliances.

HVAC and Ventilation

Ventilation system considerations

- A ventilation system does NOT provide make-up air.
- A ventilation does NOT provide combustion air.
- Balanced ventilation systems are not affected by opening or closing windows.
- Forced air heating (and cooling) alone does not provide ventilation.

Ventilation: Main Source of GOOD IAQ



HVAC and Ventilation: Why can't I just open a window?

Why natural ventilation is inadequate

- Is minimized by better design and construction practices.
- Will not be provided unless pressure differences are at work.
- Is incapable of removing high moisture and contaminant loads.
- Implies cold drafts and discomfort during the heating season.
- Is not evenly distributed. Some areas may not be ventilated and others possibly over ventilated.

Ventilation Impact on Moisture Control

Ventilation tends to:

- Remove moisture in heating season
- Add moisture in the cooling season
- Ventilation may be helpful in avoiding winter condensation (or make it too dry!)

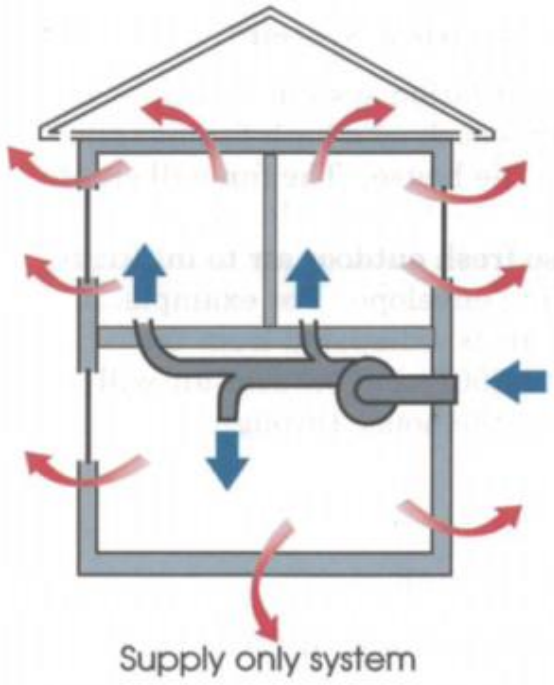
Avoiding Summer Moisture

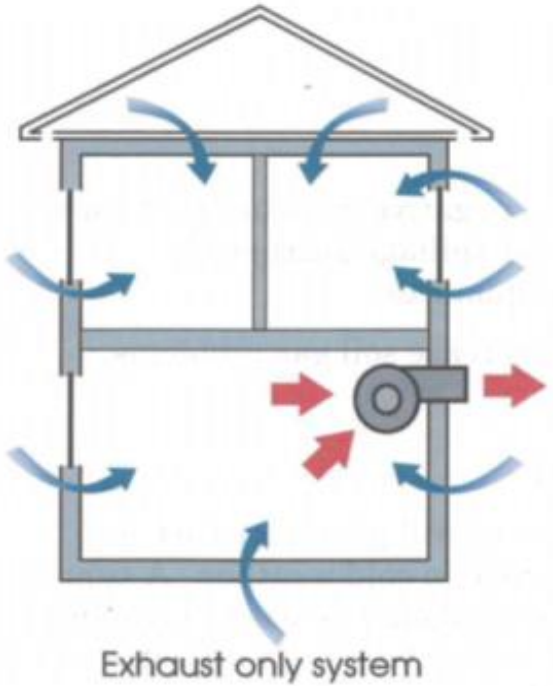
- Provide occupants with smart controls
- Use ERV technology to reject moisture back outside
- Add a dehumidifier/two stage air conditioner

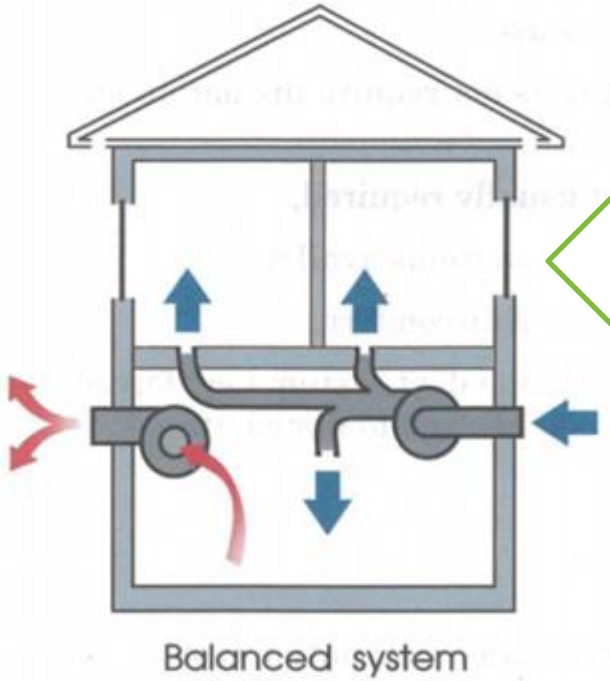
Avoiding Winter Over-drying

- Provide occupants with smart controls
- Use ERV technology to recapture moisture
- Add a humidifier

HVAC and Ventilation: System types



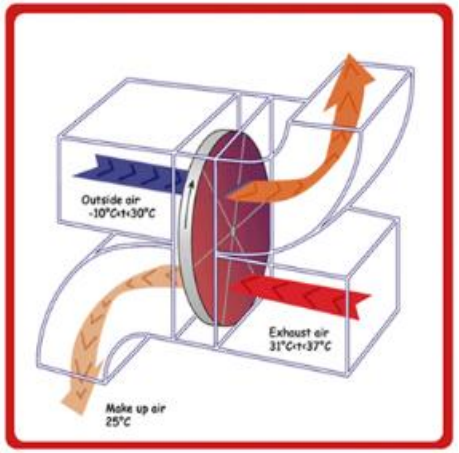




Balanced ventilation: Where we need to be.

Ventilation: What is an ERV?

- Energy Recovery Ventilators (ERVs) transfer both sensible heat and moisture; they are commonly used in climates that have mild winters and high summer cooling requirements.
- ERVs transfer the moisture from the outgoing air back to the incoming air stream, thereby typically keeping relative humidity at more constant values.



Healthy Air Solutions

Passive Air Approach

- Dilution is the Solution – exhaust stale air, introduce fresh filtered air to the space, and continuously filter the air within the room
- Maintain a good temperature and humidity level
- Use an ERV to efficiently recover both heat and humidity from the outgoing stale air

Cold Climate ERV

- Efficient, effective
- Maintain stable relative humidity (Mold, Bacteria)
- Two DC motors with Smart Flow™ for optimum CFM output
- MERV 8 or optional MERV 13 Filter
- Includes static pressure access ports with balancing instructions on the ERV
- Model FV-10VEC2 meets Ontario and ENERGY STAR®* requirements (ASHRAE 62.2)

SMART FLOW™ DC TECHNOLOGY

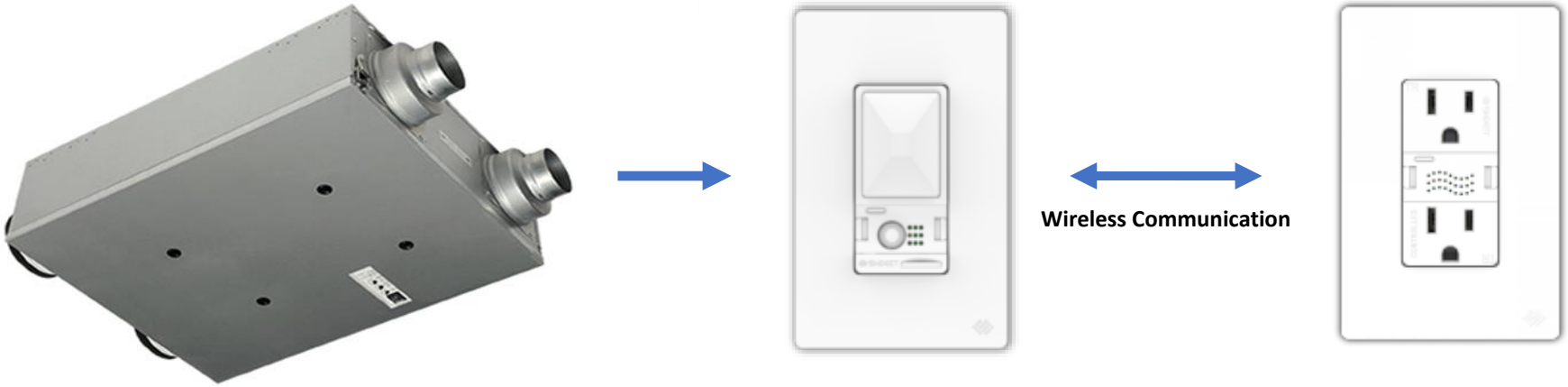
BUILT-IN SELF ADJUSTING AIRFLOW CAPABILITY

ENERGY STAR

BEST OF IBS AWARDS WINNER 2017 BEST ENERGY EFFICIENT PRODUCT

Panasonic

ERV and Sensor Controls



- **Complies with ASHRAE 62.2** when used with an ASHRAE 62.2 compliant fan/ERV.
- Real-time information allows for efficient use of energy as well as the most optimal air quality.
- Wireless controls allow you to capture various data points from the common spaces and control your ventilation eco-system based on:

  - Motion (Occupancy / Vacancy)
  - Temperature / Humidity
  - Indoor Air Quality

Panasonic

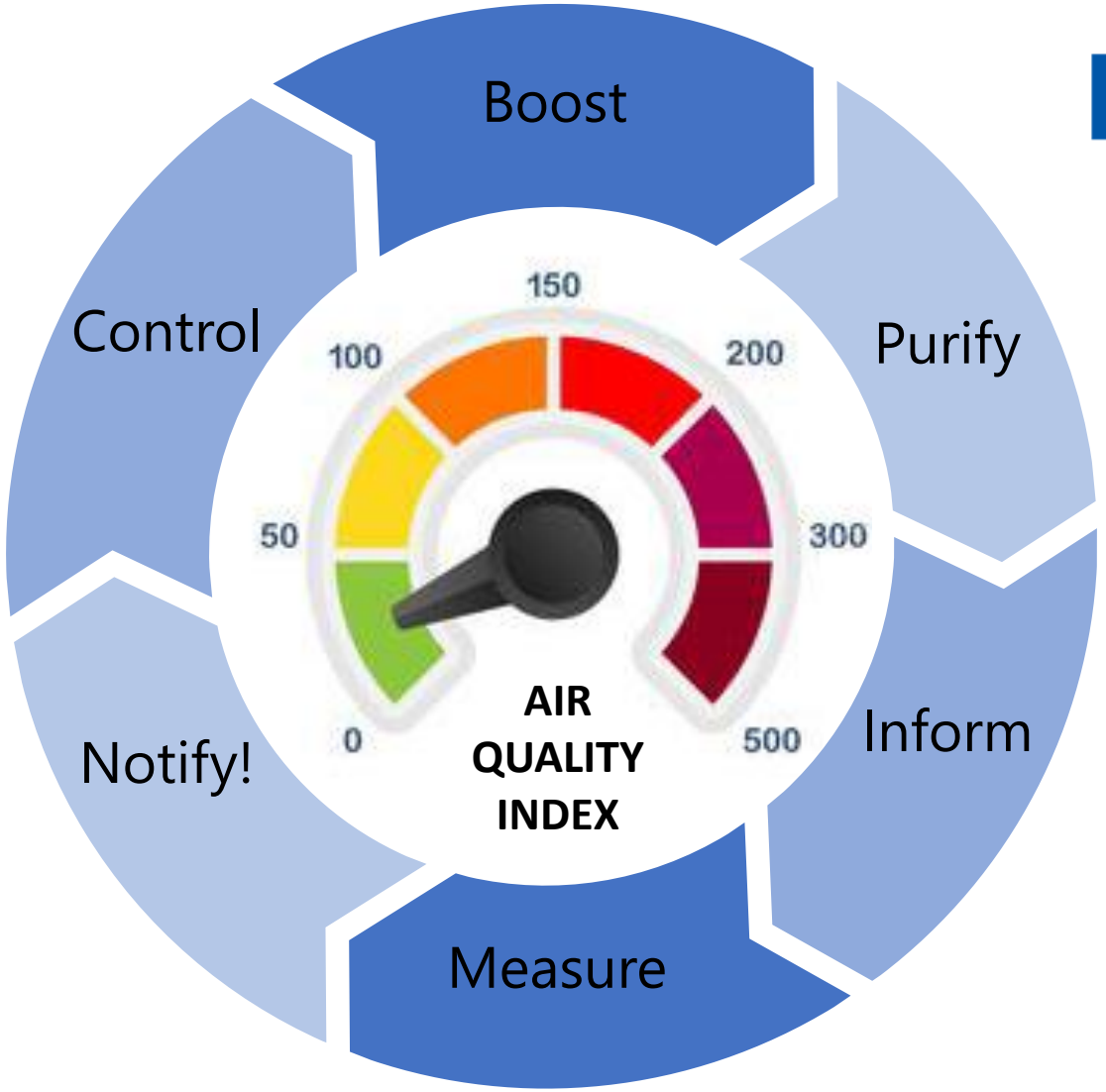
Partnership for Improving Indoor Air Quality

Temperature, Humidity & Motion

IAQ, Temperature & Humidity

Motion

Temperature & Humidity



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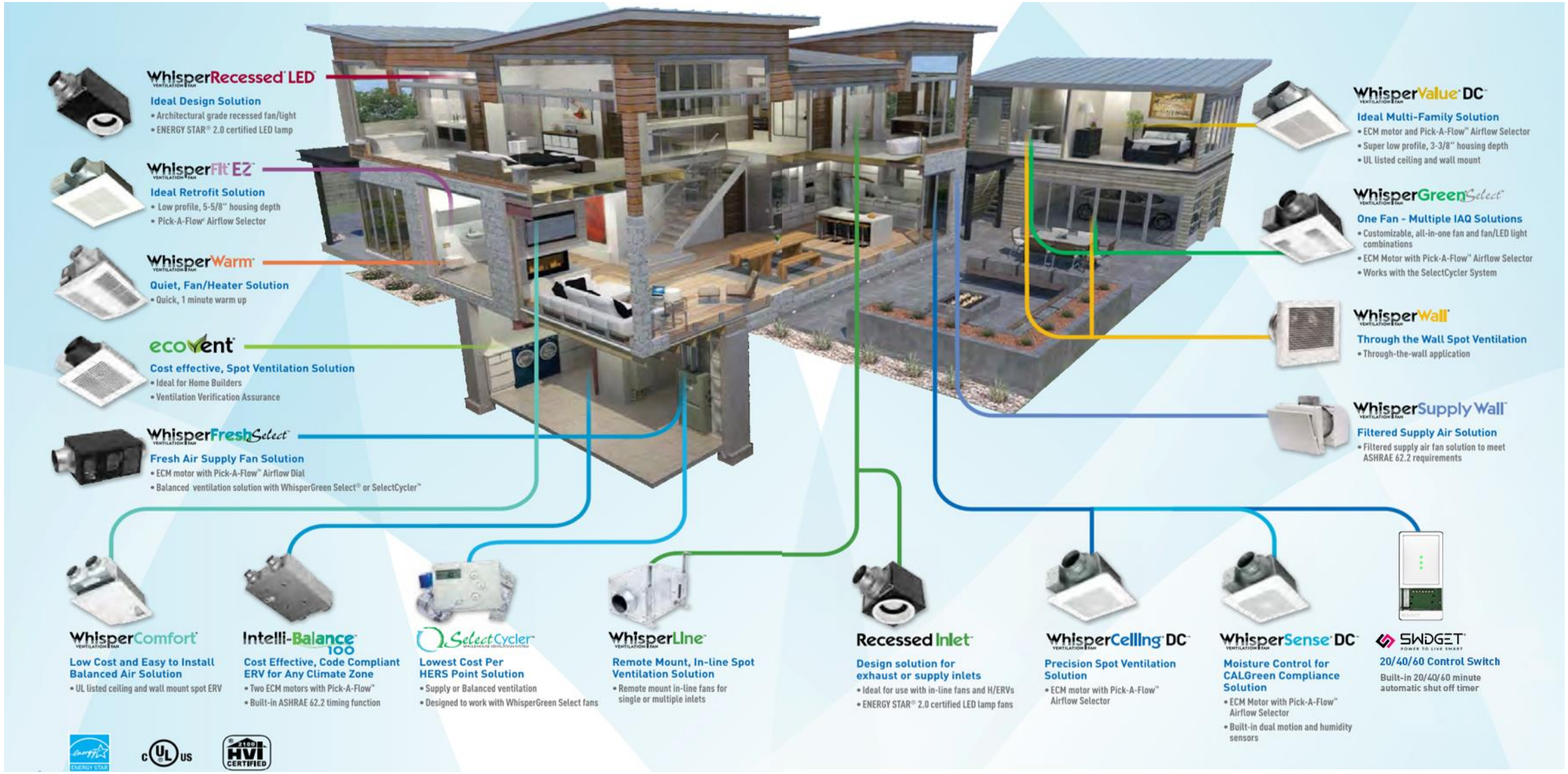
INDOOR AIR QUALITY

SWDGET
POWER TO LIVE SMART


WhisperRecessed LED
Ideal Design Solution
• Architectural grade recessed fan/light
• ENERGY STAR® 2.0 certified LED lamp
WhisperFlit EZ
Ideal Retrofit Solution
• Low profile, 5-5/8" housing depth
• Pick-A-Flow Airflow Selector
WhisperWarm
Quiet, Fan/Heater Solution
• Quick, 1 minute warm up
ecoVent
Cost effective, Spot Ventilation Solution
• Ideal for Home Builders
• Ventilation Verification Assurance
WhisperFreshSelect
Fresh Air Supply Fan Solution
• ECM motor with Pick-A-Flow Airflow Dial
• Balanced ventilation solution with WhisperGreen Select® or SelectCycler™
WhisperValue DC
Ideal Multi-Family Solution
• ECM motor and Pick-A-Flow Airflow Selector
• Super low profile, 3-3/8" housing depth
• UL listed ceiling and wall mount
WhisperGreenSelect
One Fan - Multiple IAQ Solutions
• Customizable, all-in-one fan and fan/LED light combinations
• ECM Motor with Pick-A-Flow Airflow Selector
• Works with the SelectCycler System
WhisperWall
Through the Wall Spot Ventilation
• Through-the-wall application
WhisperSupplyWall
Filtered Supply Air Solution
• Filtered supply air fan solution to meet ASHRAE 62.2 requirements
WhisperComfort
Low Cost and Easy to Install Balanced Air Solution
• UL listed ceiling and wall mount spot ERV
Intelli-Balance 100
Cost Effective, Code Compliant ERV for Any Climate Zone
• Two ECM motors with Pick-A-Flow
• Built-in ASHRAE 62.2 timing function
SelectCycler
Lowest Cost Per HERS Point Solution
• Supply or Balanced ventilation
• Designed to work with WhisperGreen Select fans
WhisperLine
Remote Mount, In-line Spot Ventilation Solution
• Remote mount in-line fans for single or multiple inlets
Recessed Inlet
Design solution for exhaust or supply inlets
• Ideal for use with in-line fans and H/ERVs
• ENERGY STAR® 2.0 certified LED lamp fans
WhisperCelling DC
Precision Spot Ventilation Solution
• ECM motor with Pick-A-Flow Airflow Selector
WhisperSense DC
Moisture Control for CALGreen Compliance Solution
• ECM Motor with Pick-A-Flow Airflow Selector
• Built-in dual motion and humidity sensors
SWIDGET
20/40/60 Control Switch
Built-in 20/40/60 minute automatic shut off timer
ENERGY STAR
c UL us
HVI CERTIFIED

Poll #2

Builders/Renovators:
What filtration system(s) are you including in your homes currently?
(Choose all that apply)

a) MERV 8 filters
b) MERV 13 filters
c) ERV
d) HRV
e) Vented range hoods
f) Vented bath fans
g) Dehumidification
h) Other

What is nanoe™?
nano-technology + electric =

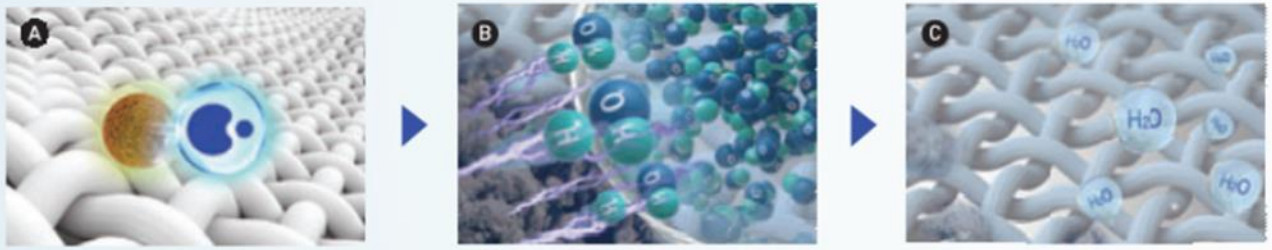
nanoe™ X is nano-sized electrostatic atomized water particles that are rich in OH radicals.

nanoe™ X is the next generation of nanoe™ technology and is generated from moisture in the air that contains highly reactive components known as hydroxyl (OH) radicals, which are effective at suppressing pollutants and odors.

4.8 trillion OH radicals / sec

How nanoe™ works?

Deodorizes Odors



nanoe™ X reaches odor in fabric

OH radicals break down odor-causing substances

Deodorizes smells in fabric

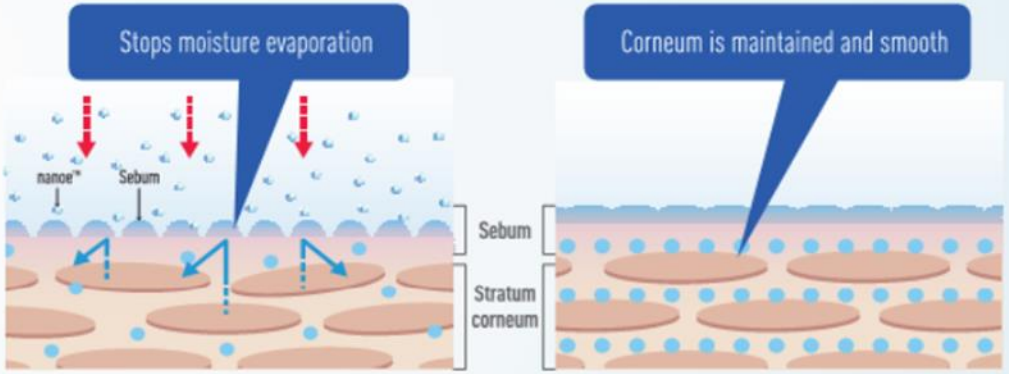
Inhibits Airborne and Adhered Pollutants

nanoe™ X reaches pollutants in fabrics

OH radicals take hydrogen away from pollutants

OH radicals transform hydrogen to inhibit the activity of pollutants

Helps maintain skin moisture



Using existing moisture already in the air, nanoe™ X hydrates the sebum (produced by sebaceous glands to lubricate the skin) on the skin to help prevent loss of moisture.

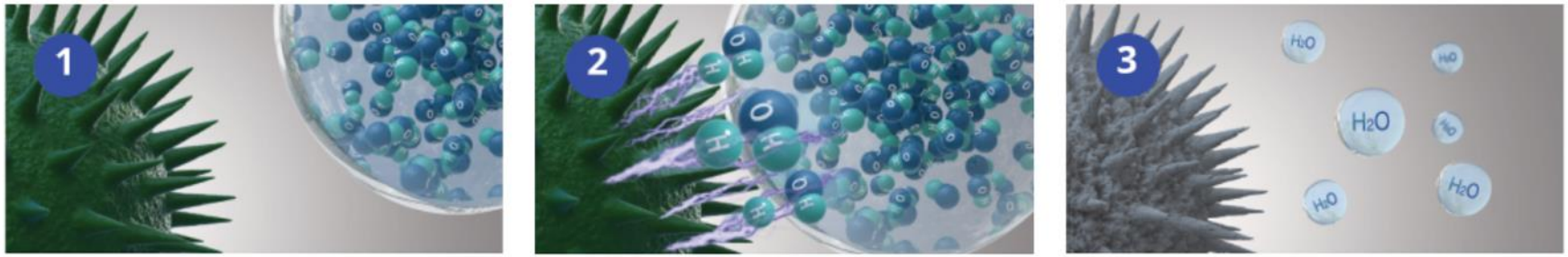
[28 days later] Leads to smoother, well hydrated skin.*

*Test Laboratory: FCG Research Institute Inc. Report no. 19104

Panasonic nanoe™ X Technology

The nanoe™ X generates nano-sized electrostatic atomized water particles that are rich in OH radicals. These radicals are effective at suppressing hazardous substances, pollutants, odours, pollen, etc. by taking a hydrogen atom from them.

How nanoe™ X Works



nanoe™ X reliably reaches allergens.

OH radicals denature allergen proteins.

Allergen is inhibited.*19

Safety Verification:

CALIFORNIA AIR RESOURCES BOARD

SENSITIVE CHOICE nanoe™ X

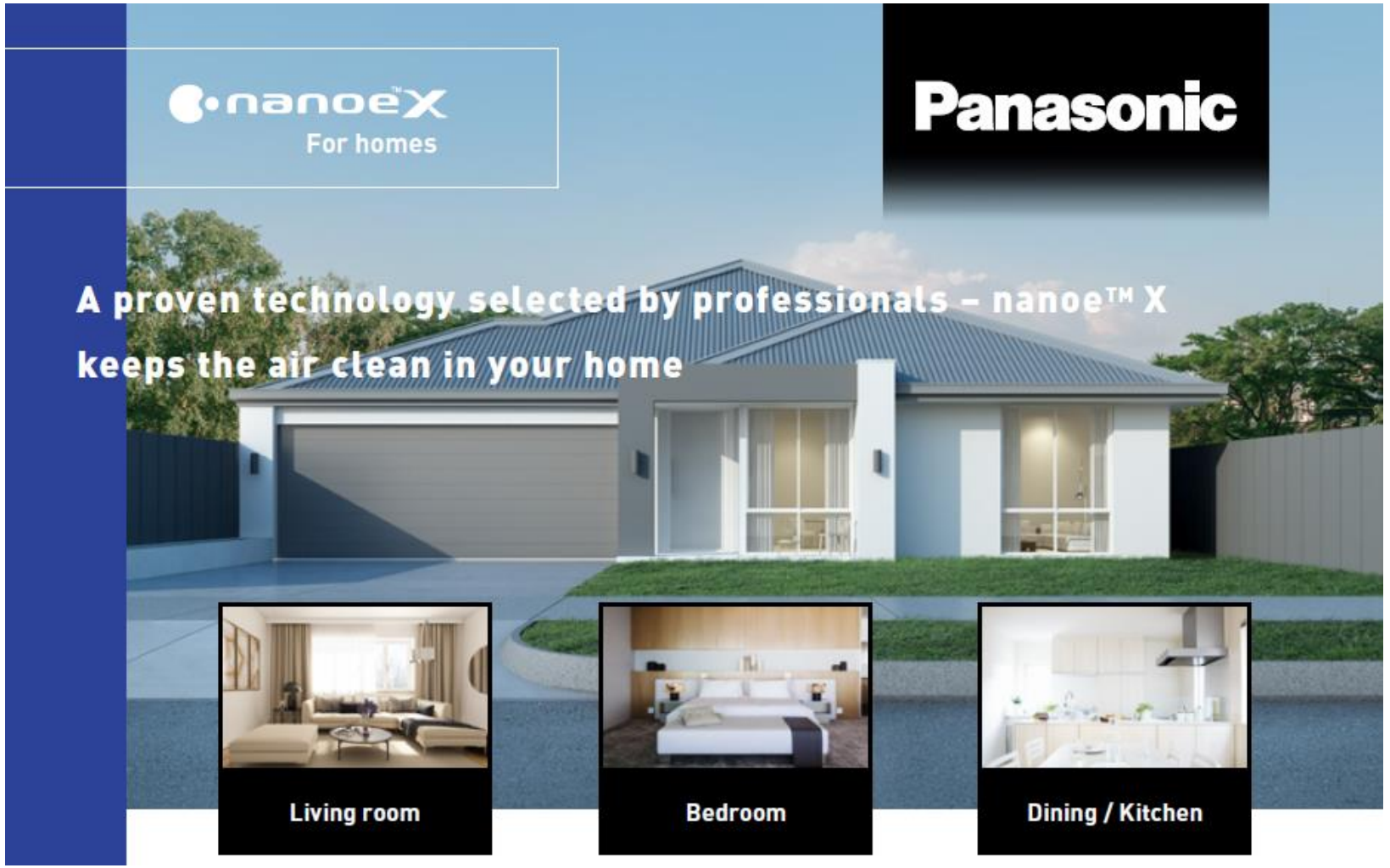
intertek Zero Ozone Verified meets emission concentration limits of .005 ppm or below

nanoe™ X SEAL OF RECOMMENDATION

Endorsement Number S1709700A

Panasonic

Nanoe™ For Homes



Issue 1

Air is likely to be dirty
where babies are most active.

Issue 2

Pets are members of the family,
so what can we do about their allergens?

Issue 3

Tobacco and cooking odours cling
to the curtains and furniture.
What can be done?

Issue 4

We want to protect our favorite
clothing items and handbags from mould.

Issue 5

When pollen and other harmful substances
cling to our clothing and hair,
we don't want to bring them into the house.

Issue 6

We want to stay beautiful
while leading a busy lifestyle.

Panasonic

Nanoe™ For Homes

Solution 1 Creating an environment that's clean and safe for babies

The carpets where babies spend much of their time conceal a great deal of mould, bacteria, viruses and allergens deep in their fibres. nanoe™ X ions inhibit these pollutants, helping make them cleaner and safer for babies.

Solution 2 Making homes with pets comfortable and healthy

Mites and dander from pets are a major cause of allergies in the home. nanoe™ X ions not only effectively inhibit these allergens but also eliminate odours that have permeated mattresses, blankets and more.

Solution 3 Keeping the living room fresh and inviting

The smell of tobacco and other unpleasant odours tend to permeate furniture and curtains over time. nanoe™ X ions inhibit stubborn odours, leaving the air in your living room fresh and inviting.

Solution 4 Protecting your valued clothing and handbags from mould

Air tends to get stale and humid inside closets, encouraging the growth of mould. nanoe™ X ions inhibit the growth of mould to help protect your favorite clothes.

Solution 5 Inhibiting harmful substances brought in from outside

Harmful substances and pollen that are thought to cause asthma, bronchitis and other health issues, tend to cling to your clothing and hair when you come in from outside. nanoe™ X ions break down and inhibit these substances.

Solution 6 For a little extra self-care

nanoe™ X ions are here to help keep your hair and skin moisturised while you sleep or spend time with your family.

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IAQ and the Net Zero Program

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Panel Discussion: IAQ/IEQ in Net Zero Homes

Common IAQ & IEQ Concerns/Complaints from occupants:

- Humidity & temperature
- Drafts & hot/cold spots
- Dust & odours (quality of air)
- Sound & light
- Vibrations
- Asbestos, radon & Carbon Monoxide (CO)

Best Practices

- Humidity & Temp = Easier to control with airtight home & high performing mechanicals
- Odours = Ventilation
- Drafts = Building Envelope
- These are all addressed by the NZHLP

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Poll #3

Builders/Renovators:
Are you finding that your homeowners are having issues that could be addressed by improving IAQ/IEQ?

A) Yes
B) No
C) I'm Unsure

IAQ in Net Zero Homes

How does the CHBA Net Zero Home Labelling Program address the Control Strategies?

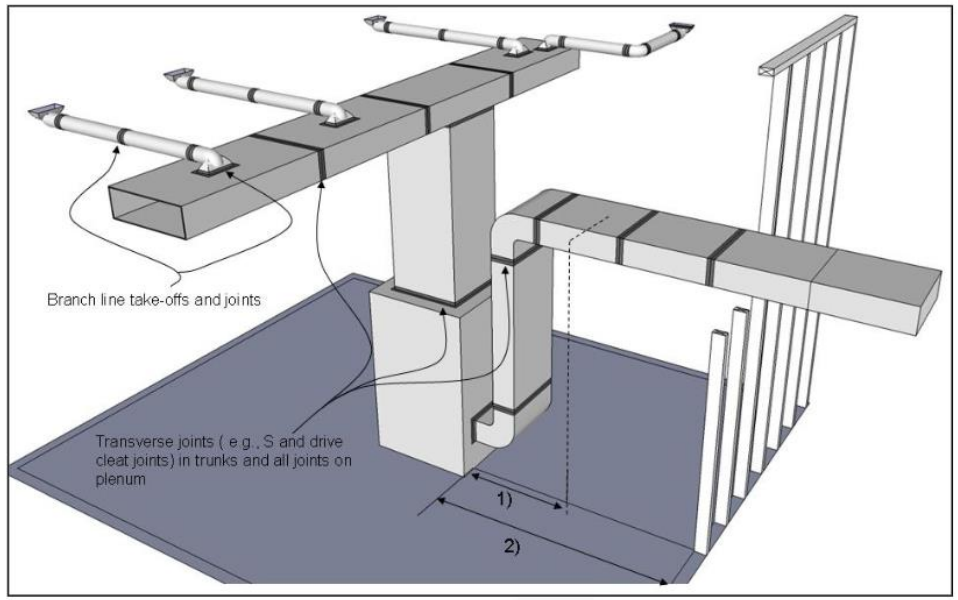
Source Control (Seal):

- Airtightness
  – building envelope is tight. < 1.5 ACH@50

- Air Distribution System
  – ducts are sealed and insulated

Ventilate:

- HRV / ERV requirement



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IAQ Concerns in Net Zero MURBs

Compartmentalization

- **Health concerns:** Pollutants & allergens.
- **Comfort concerns:** Smells & sounds.
- **Life safety concern:** Smoke kills faster than fire.
- **Energy savings:** Air leakage between suites reduces overall performance.
- **System control:** In suite climate control.

Ventilation/Mechanical Sizing

- Mechanical contractor knowledge/training.
- Systems are typically grossly oversized.
- Low solar glass extremely important.
- Make up air should not come from common hallway.

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IAQ Concerns in Net Zero Renovations

Combustion / Back Drafting / Make Up Air

- Tightened envelope requires, high efficiency furnace / water heater.
- Naturally aspirating appliances, poor performance / safety risk.
- Tightened envelope will require balanced ventilation (HRV / ERV).

Ducting / Air Distribution

- Existing ducts will be oversized and leaky.
- May be hidden, difficult to seal. Failure to tighten ducts may lead to performance issues.

Toxic Pollutants

- Asbestos / flooring underlay, old insulation. Abatement contractor required.
- Mold / in existing walls that are not replaced.

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Voluntary IAQ/IEQ Programs

US EPA Indoor airPLUS

www.epa.gov/indoorairplus

EPA created Indoor airPLUS to help builders meet the growing consumer preference for homes with improved indoor air quality. Indoor airPLUS builds on the foundation of EPA's ENERGY STAR requirements for new homes and provides additional construction specifications to provide comprehensive indoor air quality protections in new homes. Construction specifications include the careful selection and installation of:

- moisture control systems
- heating, ventilating and air-conditioning systems
- combustion-venting systems
- radon resistant construction
- low-emitting building materials

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Voluntary IAQ/IEQ Programs

EEBA Healthier Homes Certified Building Professional

For Staff Working in Residential Construction

www.eeba.org/designations/healthier-homes

Having certified asthma & allergy friendly products is a great way of demonstrating that your business cares about the welfare of the customer. The challenge that the customer faces is understanding the difference between certified and uncertified products.

This course is being developed by asthma and allergy science experts at Allergy Standards. The same company behind the world-famous asthma & allergy friendly® Certification. The course provides background on FDA, EPA and other relevant regulations.

EEBA
Energy & Environmental Building Alliance

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Voluntary IAQ/IEQ Programs

UL GREENGUARD Certification Program

https://www.ul.com/resources/ul-greenguard-certification-program

Products that have achieved GREENGUARD Certification are scientifically proven to meet some of the world's most rigorous third-party chemical emissions standards, helping to reduce indoor air pollution and the risk of chemical exposure.

UL's GREENGUARD Certification program is recognized and referenced in numerous building programs, standards and specifications around the world. Products with GREENGUARD Certification or GREENGUARD Gold Certification can contribute to the achievement of points in established green building rating systems, such as LEED, BREEAM, Fitwel and others, and satisfy code or ordinance criteria and meet indoor air quality specific request for proposal (RFP) requirements.

Voluntary IAQ/IEQ Programs

WELL Certification

www.wellcertified.com

WELL is the leading tool for advancing health and well-being in buildings globally. Register your office, building or other space to leverage WELL's flexible framework for improving health and human experience through design.

They may be developing "WELL for Homes" & bring it to Canada.

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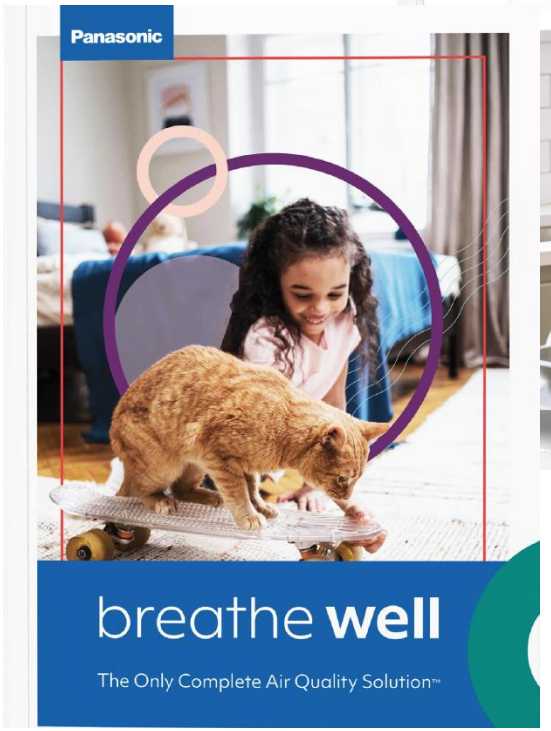
Indoor Air Quality Campaign

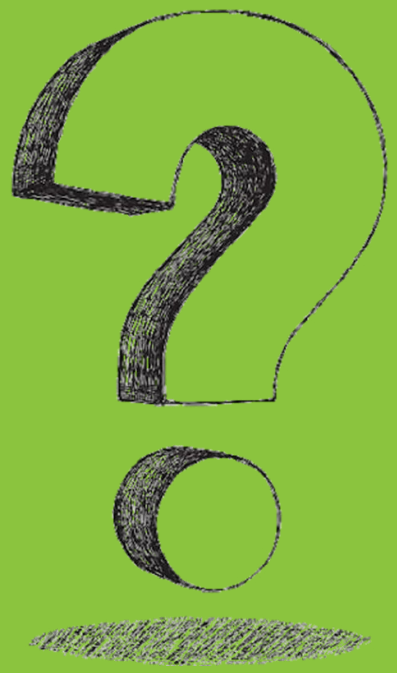
breathe **well**

The Only Complete Air Quality Solution™



Panasonic

Questions



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