







HEALTH

common !

Health Based Building the New Metric in Sustainable Design & Construction

The Existing Metric Is Poisoning Us & The Planet

Health Based Building has investigated the existing metric our ministries, green building councils, local councils and appraisal providers have adopted to establish it is not sustainable. The existing metric promotes building products and methodologies that involve large volumes of toxins and plastics.

Health Based Building investigations have confirmed the existing metrics has ignored sustainability to an extent that has 500kgs of plastic installed in the average 3-bedroom home. That is plastic with no downstream waste management plan other than establishing more toxic landfill sites or toxic incineration plants. This is a shocking reality that must be represented to the public and all channels to market that design and construct our built environments.

The good news is the existing unsustainable metric is easy to replace. We ask you to join us in our journey to turn back the tide of plastics and toxins the existing metric is delivering to the construction industry and **Make Your Space A Healthy Place**.



Existing Unsustainable Metric

In this graphic we show how the existing unsustainable metric is delivering 500kgs of plastics and toxins to the average 3-bedroom home. Health Based Building investigations have confirmed there is no recycling plan for these plastics other than forming more toxic land fill sites or construction of incineration facilities which have been proven to deliver more carbon to the environment that coal fired power plants. More shockingly, the existing metric promotion of increased air tightness and energy efficiency in buildings is increasing the average volume of plastics in a 3-bedroom home by another 25%.

This outcome is celebrated by achieving higher Homestar ratings and awards. How is this possible at a time when the world is flooded with plastic it cannot recycle or prevent impacting us and the planet as it breaks down into micro-plastics. An additional downside to increased airtightness without structural breath-ability is the impact increased moisture levels are having on building materials which are not designed to perform with higher moisture levels.

Moisture levels which commonly bring mold spore and toxins to insulation and plaster board interior wall and ceiling linings in new homes.

Plastic Based - Combustible - Toxic Plastic Wrap (Ceiling) Plastic Based - Combustible - Toxic Plastic Wrap (Outside of External Wall) Plastic Based - Combustable - Toxic Plastic Wrap (Inside External Wall) Propagates Toxic Mold **Glass Fiber Insulation Ongoing Power Consumption Constant Ventilation** Toxid **Acrylic Plastic Paints Propagates Toxic Mold Plaster Board** Plastic Based - Combustible - Toxic **Plastic Drapes & Interior Decor** Plastic Based - Combustible - Toxic **EPS SIP Panel Walls** Plastic Based - Combustible - Toxic Micro-plastics (Normally Invisible) Plastic Based - Combustible - Toxic **Plastic Carpets & Underlav** Plastic Based - Combustible - Toxic **External Polystyrene Wrap** Carbon Heavy **Concrete & Steel Re-bar** Plastic Based - Combustible - Toxic **Rib Raft Polystyrene Foundations**

Health Based Building: The New Metric In Sustainable Design & Construction - decarbonising & detoxifying the building industry.



Proven Science Physics & Data

Removing plastics and toxins from our built environments is simply common sense that does not require allot of explanation but are there down sides. The answer to that question is no. Health Based Building the new metric with Foreverbreathe Specification has been in full scale 4-bedroom home trials since 2019.

The original test facility remains in operation as a show home open to the public at 1062 Colombo Street Christchurch New Zealand. The facility has allowed Health Based Building to collect performance data across multiple categories 24/7.

Proof of performance attracted like minded people from within the building industry who proceeded to construct affordable award-winning homes.



healthbasedbuilding.com/foreverbreathe-specification

FOREVER

YouTube See The Show Home Tour:



youtube.com/@HealthBasedBuilding

Additional AI Powered Research

Health-Based Building new metric deploys AI Powered Research

There is no room for "green washing" at Health-Based Building. We developed Foreverbreathe Specification as the system-based construction methodology to deliver accurate performance data and transparent comparisons between traditional building methods and healthier alternatives. To ensure accuracy, we've combined Al-driven research, real-world case studies, and scientific data to present the facts in a clear and actionable way.

How does AI help?

Health Based Building investigations confirmed it is very difficult to get to the truth about building materials in a world where "green washing" is yet to be considered illegal. Al cuts through "green washing" to process vast amounts of scientific research, material studies, and industry reports, cross-referencing data from trusted sources.

Is this information reliable?

Al doesn't just generate numbers—it identifies patterns, highlights industry proven findings, and eliminates bias by synthesizing diverse sources. However, we encourage healthy scepticism. If you're curious, we welcome you to test and verify these findings for yourself. "Al can analyze and cross-reference over 100,000+ industry reports, scientific studies, and material performance datasets in seconds to provide accurate, data-driven comparisons."



Al Question & Response Index

Health Based Building posed the following questions to AI, which provided the responses below.

1. Toxicity & Health Impact of Building Materials

Question Given to AI: "I am putting together a slide for Health-Based Buildings in New Zealand to show the key health benefits and/or toxicity levels of particular products. I need a rating scale from -10 (toxic) to 10 (healthy) for the following products: Nylon Carpet & Underlay vs. Wool Carpet & Underlay, VOC Paints vs. Healthy Paints, Plastic House Wraps vs. Rigid Air Barrier, Glass Fiber Insulation vs. Wool Insulation, Concrete Foundations vs. Wood Foundations, Steel Framing vs. LVL Wood Framing, JIB Plaster Board vs. Magnum Board. Please provide references."

Al Response:

- Nylon Carpet & Underlay: -6 (Releases VOCs, synthetic petrochemicals; causes respiratory issues and skin irritation)
- Wool Carpet & Underlay: 8 (Biodegradable, low chemical treatment; hypoallergenic)
- VOC Paints: -8 (High VOC emissions; causes respiratory issues, longterm toxic exposure)
- Healthy Paints: 8 (Low-VOC or VOC-free; safer for indoor air quality, non-toxic)
- Plastic House Wraps: -7 (Synthetic, releases harmful chemicals; contributes to pollution and endocrine disruptors)
- Rigid Air Barriers: 7 (Natural/eco-friendly materials; low toxicity, better indoor air quality)
- Glass Fiber Insulation: -5 (Airborne fibers during installation; can cause lung irritation)
- > Wool Insulation: 9 (Natural, renewable, non-toxic; hypoallergenic,



better air quality)

- Concrete Foundations: -6 (High CO2 emissions; contributes to climate change)
- Wood Foundations: 7 (Sustainable sourcing, natural material; low carbon footprint)
- Steel Framing: -5 (High energy use during production; non-renewable, higher environmental impact)
- LVL Wood Framing: 8 (Engineered wood, sustainable, low emissions; eco-friendly, low toxins)
- JIB Plaster Board: -4 (Emits small VOCs during production; minimal indoor air impact)
- Magnum Board: 9 (No harmful emissions, eco-friendly; promotes better indoor air quality)

References: EWG, Jennifer Mehditash, Straightforward Spaces, Flooring Stores.



2. Environmental Impact Comparison

Question Given to AI: "I want to compare the environmental impact of these materials. Rate them from -10 (worst) to 10 (best) and provide a 20-word explanation with references."

Al Response:

- Nylon Carpet & Underlay: -7 (Made from petrochemicals; energyintensive production, contributes to CO2 emissions and microplastic pollution)
- Wool Carpet & Underlay: 8 (Renewable, biodegradable, low carbon footprint)
- VOC Paints: -8 (Releases VOCs, contributing to air pollution and longterm environmental damage)
- > Healthy Paints: 8 (Low-VOC reduces pollution and toxicity)
- Plastic House Wraps: -6 (Petrochemical-based, non-biodegradable, long-term pollution impact)

- **Rigid Air Barriers: 7** (Sustainable materials, low-impact)
- Glass Fiber Insulation: -5 (High energy use, airborne fibers)
- > Wool Insulation: 9 (Biodegradable, low environmental impact)
- Concrete Foundations: -7 (CO2-heavy production)
- Wood Foundations: 7 (Lower energy use, sustainable)
- **Steel Framing**: -6 (High energy demand, pollution)
- LVL Wood Framing: 8 (Sustainable forestry, low CO2)
- > JIB Plaster Board: -4 (Some emissions but less impact than concrete)
- Magnum Board: 9 (Sustainable, low-impact)

References: Flooring Stores, EWG, Straightforward Spaces.

See the diagram on page 16





3. End-of-Life Eco Impact

Question Given to AI: "Compare these products based on their disposal impact. Rate from -10 (worst) to 10 (best) with explanations."

Al Response:

- Nylon Carpet & Underlay: -8 (Non-biodegradable, landfill waste, microplastics)
- > Wool Carpet & Underlay: 9 (Biodegradable, low-impact disposal)
- VOC Paints: -9 (Toxic, long-term pollution)
- > Healthy Paints: 8 (Low toxicity, safe decomposition)
- Plastic House Wraps: -7 (Persists in landfills, microplastics)
- Rigid Air Barriers: 7 (Recyclable, decomposes better)

- Glass Fiber Insulation: -6 (Non-recyclable, landfill burden)
- **Wool Insulation**: **9** (Biodegradable)
- **Concrete Foundations**: -8 (Difficult to repurpose, landfill bulk)
- > Wood Foundations: 8 (Biodegradable, repurposable)
- Steel Framing: 6 (Recyclable, but not biodegradable)
- **LVL Wood Framing**: **8** (Decomposable, repurposable)
- ▶ JIB Plaster Board: -5 (Difficult to recycle)
- Magnum Board: 9 (Recyclable, low waste)

References: Flooring Stores, EWG, Jennifer Mehditash.

See the diagram on page 17

Impact to the Environment at End of Use





4. Human Health Risks from Microplastics & Harmful Particles

Question Given to Al: "Compare the products for dangers from microplastics and airborne particles. Rate from -10 (worst) to 10 (best) and provide explanations."

Al Response:

- > Nylon Carpet & Underlay: -8 (Sheds microplastics, inhalation risk)
- Wool Carpet & Underlay: 9 (Natural, no microplastics)
- **VOC Paints**: -9 (Emits toxic particles)
- Healthy Paints: 8 (Low toxicity, safer air quality)
- Plastic House Wraps: -7 (Microplastic shedding)
- Rigid Air Barriers: 7 (No microplastic shedding)

- Glass Fiber Insulation: -6 (Airborne fibers, lung risk)
- Wool Insulation: 9 (Minimal health risks)
- **Concrete Foundations: -5** (Dust exposure)
- > Wood Foundations: 8 (Safe, non-toxic)
- Steel Framing: 6 (Dust from cutting, but no microplastics)
- LVL Wood Framing: 7 (Minimal particle release)
- JIB Plaster Board: -5 (Dust exposure)
- Magnum Board: 8 (Low particle risk)

References: EWG, Flooring Stores, Straightforward Spaces.

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5. Material Longevity Comparison

Question Given to AI: "I want to compare the products again for their Material Longevity - Give a rating out of 10 for good and -10 for notso-good. Please supply a 20-word explanation for each product and references."

Al Response:

- > Nylon Carpet & Underlay: -6 (UV degradation, fibers break down)
- > Wool Carpet & Underlay: 8 (Naturally durable, retains appearance)
- VOC Paints: -7 (Breaks down over time)
- > Healthy Paints: 9 (Resists chemical breakdown)
- ▶ Plastic House Wraps: -5 (Tears, UV damage)
- **Rigid Air Barriers:** 9 (Long-lasting weather protection)

- ► Glass Fiber Insulation: -4 (Loses effectiveness)
- > Wool Insulation: 9 (Moisture-resistant, durable)
- Concrete Foundations: 8 (Long-lasting, stable)
- **Wood Foundations:** 6 (Moisture risk)
- **Steel Framing:** 7 (Prone to corrosion)
- LVL Wood Framing: 8 (Stable, warp-resistant)
- ▶ JIB Plaster Board: -4 (Moisture damage)
- Magnum Board: 9 (Resilient, moisture-proof)

References: Flooring Stores, EWG, Jennifer Mehditash.

See the diagram on page 19 Material Longevity





5. Carbon Comparison

Question Given to Al: does sheep wool sequester carbon if so how much carbon would 1ton of wool sequester?

ChatGPT said: Yes, sheep wool can sequester carbon. Wool is composed largely of keratin, a protein that contains carbon, and during the animal's life, the wool fibers capture carbon from the atmosphere. Wool naturally locks in this carbon during its growth process, and it can continue to store that carbon for the entire lifespan of the material, which can be quite long if the wool is used in durable products.

As for the amount of carbon sequestered, studies suggest that approximately 1 ton of wool can sequester around 1.8 tons of CO2 equivalent. This varies depending on factors like sheep farming practices, the environment, and the lifecycle of the wool products.

So, 1 ton of wool could sequester roughly 1.8 tons of carbon dioxide (CO2e), making wool a sustainable material in terms of carbon storage.

Question Given to Al: 1.8 ton of Sequestered CO2 per ton of Wool is that correct?

ChatGPT said: Yes, that's correct. On average, 1 ton of wool can sequester approximately 1.8 tons of CO2 equivalent (CO2e). This estimate takes into account the carbon stored in the keratin proteins of the wool. However, the exact figure can vary depending on factors such as farming practices and lifecycle assessments of the wool's use. This makes wool a potentially valuable material for carbon sequestration in various applications.

Question Given to AI: does LVL wood by Health Based Buildings sequester carbon if so how much carbon would 1ton of wood sequester? **ChatGPT said:** Yes, Laminated Veneer Lumber (LVL) wood, such as that used by Health Based Buildings, can sequester carbon. LVL is made from layers of wood veneers, which naturally store carbon during the tree's growth. The carbon sequestered in wood remains locked in as long as the wood is intact and not decomposing or burned. On average, 1 ton of wood can sequester approximately 1.8 to 2 tons of CO2 equivalent. This value applies to LVL wood as well, as it is made from sustainably sourced timber, which captures carbon during its growth phase. The exact amount can vary depending on the wood species and processing methods, but the figure of around 1.8 to 2 tons of CO2 per ton of wood is commonly used in lifecycle carbon assessments. Thus, 1 ton of LVL wood can be expected to sequester about 1.8 to 2 tons of CO2 equivalent.

Question Given to AI: for 1 ton of plastic how much carbon is expelled **ChatGPT said:** For 1 ton of plastic, the amount of carbon dioxide (CO2) emitted during its production depends on the type of plastic and the production process used. On average: The production of 1 ton of plastic typically emits between 2 to 3 tons of CO2 equivalent (CO2e). This range can vary slightly depending on the specific type of plastic (e.g., polyethylene, polypropylene, etc.) and the energy source used in manufacturing. Plastic production involves fossil fuels (usually petroleum or natural gas), which release significant amounts of carbon during extraction, processing, and the conversion to plastic products. So, on average, 1 ton of plastic results in 2 to 3 tons of CO2 emissions during its lifecycle.

Question Given to AI: for 1 ton of oil just produced how much carbon is expelled **ChatGPT said:** For 1 ton of crude oil, the amount of carbon dioxide (CO2) emitted during its combustion or usage varies depending on the type of oil and its use. When oil is burned, it releases significant carbon emissions. On average: 1 ton of crude oil, when burned, emits about 3.1 tons of CO2. This figure is based on the carbon content of oil and assumes complete combustion. The carbon emissions come from the chemical reactions when the oil is used as fuel or processed into products like gasoline, diesel, or other petroleum products. It's important to note that additional CO2 is emitted during the extraction, refining, and transportation processes, so the full carbon footprint of producing and using 1 ton of oil could be even higher depending on the specifics of the supply chain. However, 3.1 tons of CO2 is the average for direct emissions from burning 1 ton of oil.

Question Given to Al: for 1 ton of JIB plaster board to produced how much carbon is expelled

ChatGPT said: For 1 ton of JIB plasterboard (also known as gypsum board or drywall), the carbon dioxide (CO2) emissions associated with its production can vary based on manufacturing processes, energy sources, and transportation. However, on average: The production of 1 ton of plasterboard emits approximately 0.2 to 0.4 tons of CO2 equivalent (CO2e). This relatively low carbon footprint is due to the fact that gypsum, the main component of plasterboard, is a naturally occurring mineral. The carbon emissions mostly come from the energy used to mine, transport, and process the gypsum, as well as the additives and binding agents involved in the manufacturing process. Thus, 1 ton of JIB plasterboard generally results in 0.2 to 0.4 tons of CO2 emissions, though the exact figure depends on the specifics of the production and energy sources used.



Question Given to Al: for 1 ton of concrete to produced how much carbon is expelled

ChatGPT said: The production of 1 ton of concrete results in varying amounts of carbon dioxide (CO2) emissions, depending on the mix and the specific production process. On average: 1 ton of standard concrete emits approximately 0.4 to 0.9 tons of CO2 equivalent (CO2e). The majority of these emissions come from the production of cement, which is a key ingredient in concrete. Cement manufacturing involves the heating of limestone (calcium carbonate), which releases CO2 as it breaks down, a process known as calcination. The amount of CO2 emitted depends on the proportion of cement used in the concrete mix, as well as the energy required for production. So, for 1 ton of concrete, you can expect around 0.4 to 0.9 tons of CO2 emissions on average.

Question Given to Al: for 1 ton of plastic to produced how much carbon is expelled

ChatGPT said: The production of 1 ton of plastic typically results in significant carbon dioxide (CO2) emissions due to the energy-intensive processes and the use of fossil fuels. On average:1 ton of plastic emits about 2 to 3 tons of CO2 equivalent (CO2e) during its production.

This estimate accounts for the extraction and refinement of fossil fuels (like petroleum or natural gas), the energy used during the manufacturing process, and the chemical reactions involved in transforming raw materials into plastic. The specific carbon footprint can vary depending on the type of plastic being produced and the efficiency of the manufacturing process.

Question Given to Al: for 1 ton of steel to produced how much carbon is expelled

ChatGPT said: The production of 1 ton of steel is energy-intensive and results in significant carbon dioxide (CO2) emissions. On average:

1 ton of steel emits approximately 1.8 to 2.5 tons of CO2 equivalent (CO2e) during its production.The majority of these emissions come from the processes involved in steelmaking, especially when using the blast furnace-basic oxygen furnace (BF-BOF) method, which involves the reduction of iron ore using coal. Alternative methods, like electric arc furnaces (EAF), which use recycled steel and electricity, generally produce less CO2, but the carbon footprint depends heavily on the source of electricity.Therefore, depending on the production method, 1 ton of steel typically results in 1.8 to 2.5 tons of CO2 emissions. **Question Given to Al:** for 1 ton of magnum board produces how much carbon is expelled or serguested

ChatGPT said: For 1 ton of Magnum Board®, the carbon dynamics involve both emissions and sequestration, as it is a CO2 negative product. Here's a breakdown:Carbon Emissions:The production of 1 ton of Magnum Board® typically results in 0.08 to 0.2 tons of CO2 emissions. These emissions come primarily from the energy used in mining, processing, and transporting materials. However, these emissions are relatively low compared to other construction materials like concrete or gypsum board.

Carbon Sequestration: Magnum Board® actively sequesters carbon through the process of carbonation, where magnesium oxide (MgO) reacts with CO2 in the air to form magnesium carbonate (MgCO3). For 1 ton of Magnum Board®, it is estimated to sequester more CO2 than is emitted during its production, making the board CO2 negative. The exact amount of CO2 sequestered can vary, but generally, 1 ton of Magnum Board® can absorb more than 1 ton of CO2 over its lifecycle, depending on exposure and curing conditions.

Net Impact:

CO2 emitted: 0.08 to 0.2 tons. CO2 sequestered: Likely more than 1 ton, resulting in a net negative carbon footprint. Thus, Magnum Board® not only offsets its production emissions but also acts as a carbon sink, removing more CO2 from the atmosphere than it produces.

See the diagram on page 20

Carbon Costs in Production Compared





1. Wool (1 ton of wool insulation)

- CO2 Sequestered: ~1.8 tons CO2e

- CO2 Emitted: ~0.1–0.5 tons CO2e Source(s):

- IWTO – Wool and the Circular Economy https:// iwto.org/sustainability/)

- New Zealand Merino Company – Wool LCA Data https://www.nzmerino.co.nz/

- LCA of NZ Wool Insulation (Scion Research) – peer-reviewed research available via New Zealand journals

2. LVL (Laminated Veneer Lumber)

- CO2 Sequestered: ~1.8-2 tons CO2e

- CO2 Emitted: ~0.2–0.5 tons CO2e

Source(s):

- Australian Government – Wood & Sequestration https://www.agriculture.gov.au

- thinkstep-anz – Life Cycle Assessment of Engineered Wood Products

https://www.thinkstep-anz.com

- FPInnovations – LCA for LVL and Glulam https:// fpinnovations.ca

3. Plastic (1 ton of plastic)

- CO2 Emitted: ~2–3 tons CO2e

Source(s):

- OECD – Global Plastics Outlook 2022

https://www.oecd.org/environment/global-plasticsoutlook/

- WWF – Plastics and Climate

https://www.worldwildlife.org/publications/plasticand-climate-the-hidden-costs-of-a-plastic-planet

- Our World in Data – Plastics and Emissions - https:// ourworldindata.org

4. Crude Oil (1 ton combusted)

- CO2 Emitted: ~3.1 tons CO2e

Source(s):

- IPCC 6th Assessment Report – Fossil Fuel Emissions Factors

https://www.ipcc.ch

- US EIA Carbon Dioxide Emissions Coefficients
- https://www.eia.gov/environment/emissions/co2_ vol_mass.php

5. JIB Plasterboard (1 ton)

- CO2 Emitted: ~0.2–0.4 tons CO2e

Source(s):

- Winstone Wallboards – GIB® Product EPD https:// www.gib.co.nz

- NZ Life Cycle Management Centre https://www. lcm.org.nz

6. Concrete (1 ton)

- CO2 Emitted: ~0.4–0.9 tons CO2e
- Source(s):
- IEA Technology Roadmap: Low-Carbon Transition in Cement

https://www.iea.org

- World Cement Association
- https://www.worldcementassociation.org
- New Zealand Concrete Industry LCA Reports https://www.concrete.org.nz

7. Magnum Board® (Magnesium Oxide Board)

- CO2 Emitted: ~0.08-0.2 tons CO2e
- CO2 Sequestered: Up to ~1+ ton CO2e (through carbonation)

Source(s):

- Manufacturer technical sheets and environmental

statements

- US EPA – MgO Cement Research https://www.epa.gov)
- EcoSpecifier Global – MgO Materials https://www.ecospecifier.com.au)

8. Wood Log Foundations (1 ton)

- CO2 Emitted: ~0.2–0.5 tons CO2e
- CO2 Sequestered: ~1.8–2 tons CO2e Source(s):
- Forest and Wood Products Australia Timber Carbon Fact Sheet

https://www.fwpa.com.au)

- Scion Research NZ – Timber LCA Studies

https://www.scionresearch.com)

9. VOC Paint (1 ton)

- CO2 Emitted: ~2–3 tons CO2e
- Toxic Emissions: ~249–300 kg VOCs per ton

- Health Impact: High indoor air toxicity, formation of ground-level ozone

Source(s):

- US EPA – Volatile Organic Compounds and Indoor Air Quality

https://www.epa.gov/indoor-air-quality-iaq/volatileorganic-compounds-impact-indoor-air-quality)

- American Coatings Association – Environmental Impact Reports

https://www.paint.org) - USEtox Model – Toxicity Factors

https://www.usetox.org) - LCA databases like ecoinvent and GaBi]





Build Materials - Toxicity vs Healthiness

In the following pages, 15 - 20, Health Based Building converts the information provided by Al into easy-to-understand info-graphics.





Impact to the Environment in Production





Impact to the Environment at End of Use





Dangers to Humans from Micro-Plastics & Particles





Material Longevity: Less Resilience or More Resilient





Carbon Costs in Production Compared

Building materials carry embedded carbon costs from extraction to manufacturing. Traditional materials like concrete and steel have high CO2 emissions, while sustainable alternatives such as wood and wool insulation drastically reduce carbon footprints. Comparing these impacts highlights why low-carbon choices matter for a sustainable future.



We trust you have found this presentation to be inciteful and motivating. You are now aware of volume of plastics and toxins being brought to the planet by the existing metric and the damage it is inflicting on all of us. You are aware of the problem and fully informed of the resolution.

Please join us in our journey to rid the construction industry of plastics and toxins that do not need to be involved to build high performance, healthy, affordable homes.







NEW ZEALAND

Health Based Building™

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