

ENVIRONMENTAL PRODUCT DECLARATION

Insulated Vinyl Siding

Industry Averaged Insulated Vinyl Siding



What You Will Find in This EPD



ADVANTAGES TO INSULATED VINYL SIDING

1



CARBON FOOTPRINT

2



ENERGY EFFICIENCY

3



LONGEVITY

4



MATERIALS SUSTAINABILITY

5



NATIONAL GREEN BUILDING PROGRAMS

6



RECYCLABILITY

7



INSULATED VINYL SIDING ENVIRONMENTAL DATA

8



VERIFICATION AND AUTHORIZATION OF THE
DECLARATION

16



ABOUT VSI AND THIS EPD

17





Advantages of Insulated Vinyl Siding

- ✓ Increases energy efficiency
- ✓ Has low impact on global warming
- ✓ Little water is used to manufacture
- ✓ Less than 1% waste in manufacturing
- ✓ Many design options
- ✓ Reduces carbon footprint
- ✓ Lightweight and resource efficient
- ✓ Retains colors
- ✓ Virtually no maintenance is required
- ✓ Long life span
- ✓ Resilient in all climates
- ✓ Wood like architectural designs





Carbon Footprint

To understand the measurement of the numbers below check out the [BEES \(Building for Environmental and Economic Sustainability software\)](#) tool online. A tool developed by the NIST (National Institute of Standards and Technology) that measures the life cycles of different types of cladding.



Insulated vinyl siding manufacturing is an extremely efficient process that require few raw materials. There are relatively low inputs of energy during the extraction, transport and manufacturing process.

6.05
kg CO2 Eq.



The transport of insulated vinyl siding from packaging to construction takes little energy because it weighs less than other typical construction building materials.

0.21
kg CO2 Eq.



The installation of siding is done primarily by manual labor. Nails or screws can be used to install the siding. The energy required to operate compressors to power air guns is quite small.

0.55
kg CO2 Eq.



No routine maintenance is required to prolong the lifetime of insulated vinyl siding, although cleaning is recommended to maintain appearance. Cleaning would normally be done with water and household cleaners.

0.14
kg CO2 Eq.



Replacement is not common. As the lifetime of a building is assumed to be 75 years, a replacement factor of 0.5 is assumed.

3.9
kg CO2 Eq.



The transport of insulated vinyl siding from demolition to waste processing takes little energy because vinyl siding weighs less than other typical construction building materials.

0.02
kg CO2 Eq.



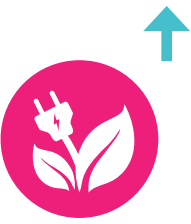
Waste processing of vinyl is limited. Recycling opportunities for insulated vinyl siding are available; there are pilot programs in operation to improve the recycling infrastructure.

0.00
kg CO2 Eq.



Insulated vinyl siding is most commonly disposed of in municipal solid waste streams at the end of the product's service life. This study assumes that 20% of the products get incinerated in waste-to-heat energy recovery facilities and the remaining 80% are landfilled.

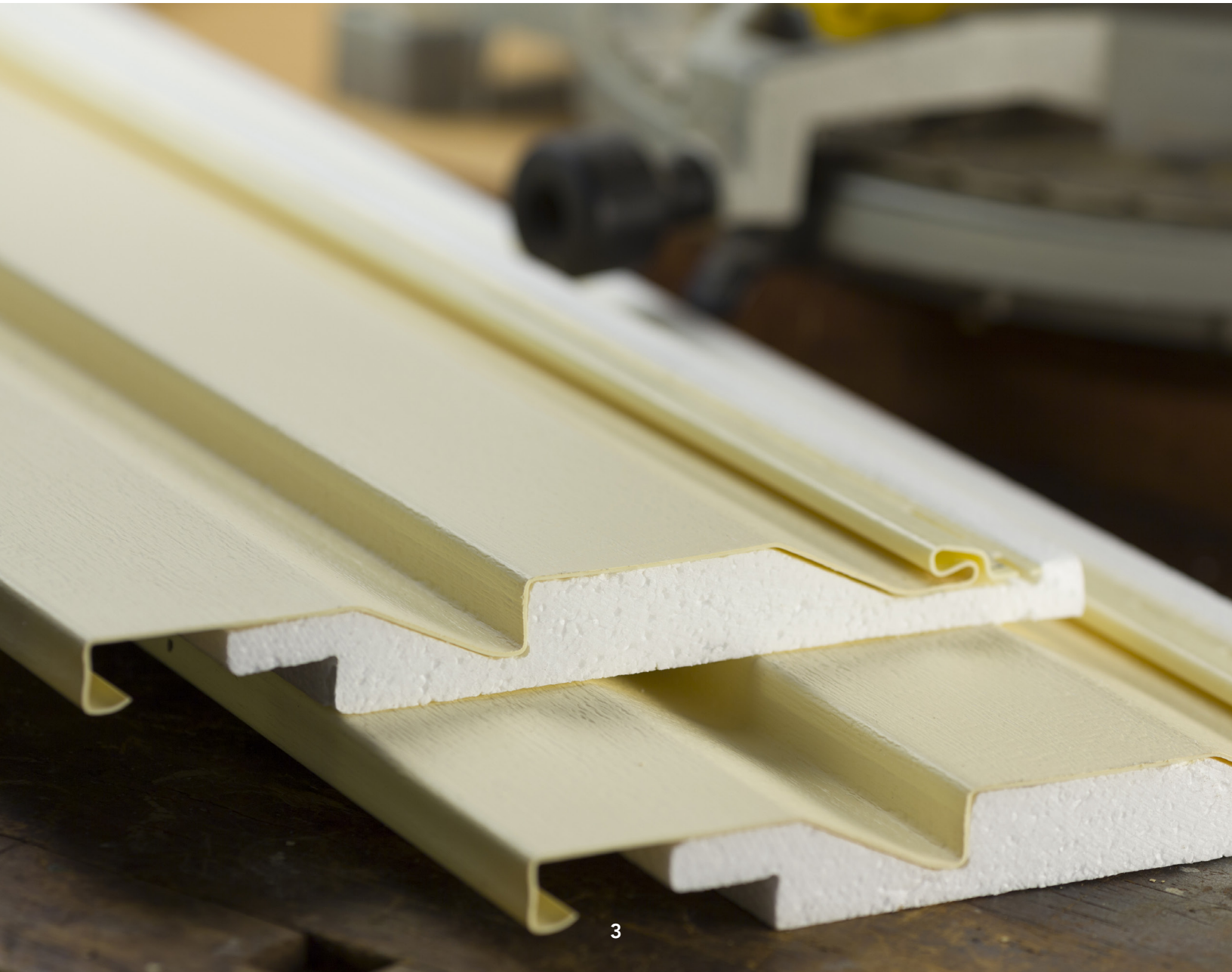
1.02
kg CO2 Eq.



Energy Efficiency

Insulated vinyl siding, commonly referred to as insulated siding, is engineered to incorporate a substantial thickness of insulation. More specifically, insulated vinyl siding is a vinyl cladding with manufacturer-installed rigid foam plastic insulation that is laminated or otherwise permanently attached to the cladding product.

The International Energy Conservation Code (energy code) is the major regulatory tool for energy-efficient residential construction. Insulated siding is listed in the energy code among the building materials that can be used as continuous insulation outside of the building framing to provide the required total wall R-value for buildings in the coldest climate zones. Generally speaking, builders and remodeling contractors are able to use insulated siding to meet the continuous insulation requirements of the energy code IECC. Over the past few years, the energy code, especially in northern climates, now requires continuous insulation on residential structures – insulated siding is one of the only cladding/insulation options to help meet both building code and energy code requirements.





Longevity

Insulated vinyl siding is engineered with purpose — to deliver maximum protection and beauty with minimum hassle and maintenance for years to come. Insulated vinyl siding has a useful life of 50 years or more, as many manufacturers provide warranties of 50 years or longer. In this life span, insulated vinyl siding is durable and prevails to the outside elements such as extreme weather, mold and unwanted pesky critters. Vinyl also requires very little upkeep throughout the 50 year life span.

For a more thorough analysis of the life span of insulated vinyl siding, please see the life cycle assessment data on pages 10-11.





Materials Sustainability

Insulated vinyl siding products require minimal raw material and produce virtually no waste.

Vinyl, also known as PVC or polyvinyl chloride, starts with two simple building blocks: chlorine (57%) from common salt, one of the Earth's most common compounds, and ethylene (43%), which is produced from natural gas. Chlorine is manufactured from salt predominately through diaphragm/membrane cell electrolysis. The use of this technology, compared to previous mercury cell process technology, significantly reduces energy consumption and emissions, and significantly reduces hazardous waste. In the U.S. and Canada, over 99% of PVC resin is produced from vinyl chloride monomer that is manufactured using diaphragm/membrane cell electrolysis.

*Did you know,
the main ingredient in
vinyl/PVC is 57% salt?*





National Green Building Programs

Why get a National Green Building Certification? There are many reasons: increase in property value, qualify for tax credits, but most importantly, a building or community with a NGBS certification recognizes green construction and adds a cost saving benefit from the amount of energy that will be saved over the lifespan of the structure, which will promote better occupancy rates.

Insulated Vinyl Siding Green Credits through Nationally Recognized Programs

LEED (Leadership in Energy and Economic Design)

NGBS (National Green Building Standard)

CalGreen (California Green Building Code)

*Did you know,
that there are over
350,000 homes certified
to the National Green
Building Standard?*

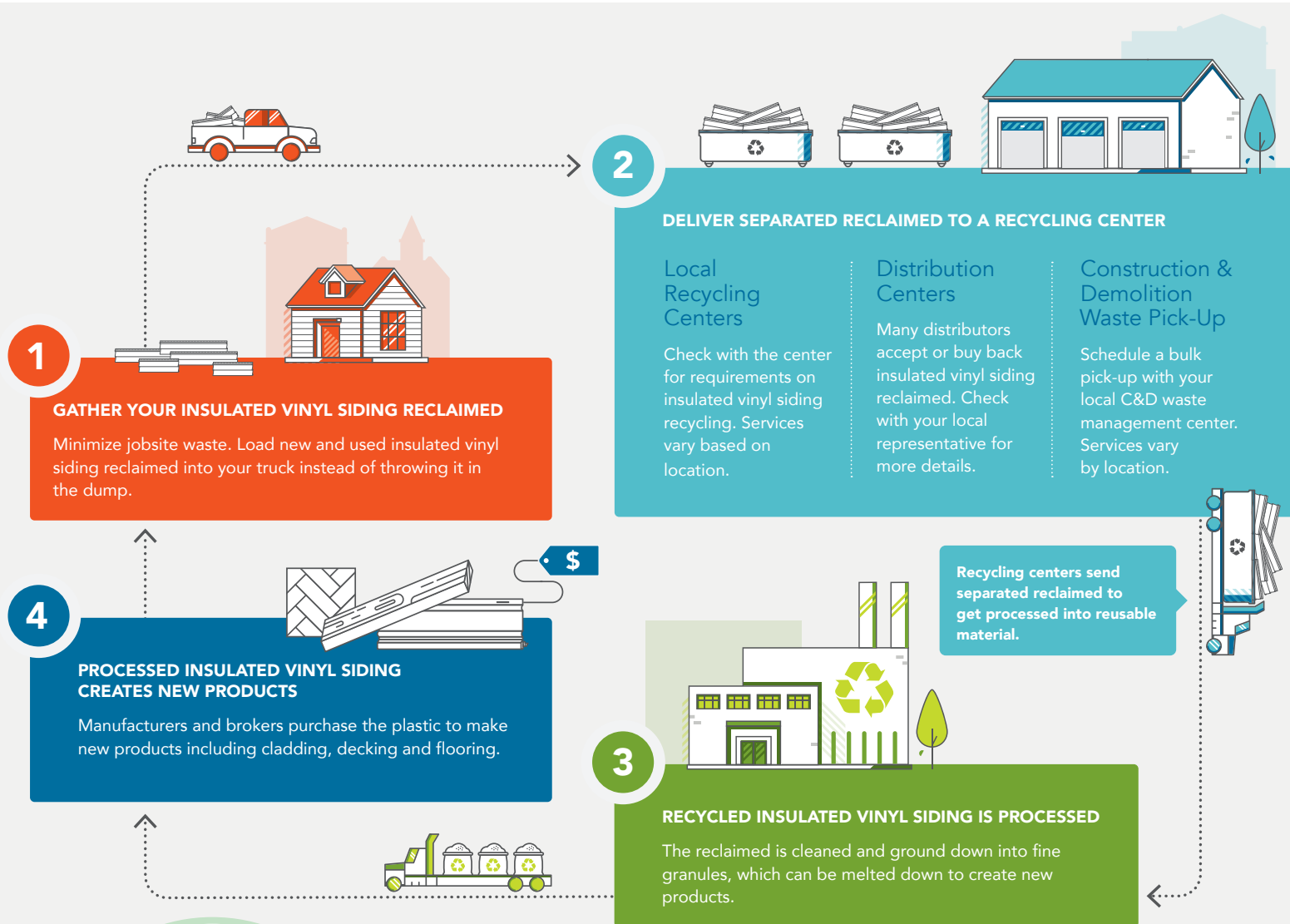




Recyclability

After dismantling the foam from the vinyl, insulated vinyl siding is recyclable. Polystyrene is recyclable as it is a thermoplastic; however, the infrastructure and logistics to recycle insulated vinyl siding may be limited in certain regions of the U.S. and Canada. The products analyzed in this declaration did not contain recycled content; however, some VSI manufacturers do offer vinyl siding options that integrate pre- and post-consumer recycled content into their products to increase resource efficiency manufacturing practices up and down the life cycle of the product.

Here is how it works!



*Did you know,
insulated vinyl siding
can be recycled after
the foam is separated
from the vinyl?*



Insulated Vinyl Siding Environmental Data

Product Description

In this declaration, an industry-wide average of horizontal insulated vinyl siding using a 0.04" thickness and rigid foam insulation adhered to the cladding back, with an R-2 insulation value is documented. A 50/50 ratio of PVC/ASA capstock for the insulated vinyl siding is assumed. Based on participation, this study represents over 90% of vinyl siding and polypropylene manufacturers in the US and Canada. The following manufacturers have participated in this study.

Associated Materials, Inc. – Burlington, Ontario, Canada • Ennis, Texas, USA

CertainTeed Corporation – Jackson, Michigan, USA • Hagerstown, Maryland, USA

Cornerstone Building Brands – Paris, Ontario, Canada

Progressive Foam – Beach City, Ohio, USA

ProVia Products – Booneville, Mississippi, USA

Westlake Royal Building Products – Columbus, Ohio, USA

The results in this declaration are representative for the U.S. and Canada. The functional unit for this study is 1 meter squared of installed insulated vinyl siding with a weight of 5.56 pounds or 2.53 kilograms, and an R-3.2 value of rigid foam insulation. As the lifetime of a building is assumed to be 75 years, a replacement factor of 0.5 is assumed, resulting in the combined impacts being multiplied by a factor of 1.5 (the estimated service life of the building divided by the reference service life of the product).

Insulated vinyl siding is an exterior cladding product offered in a diverse selection of profiles and colors to assist remodelers, builders, designers and architects in customizing their new construction and renovation designs while providing thermal optimization.

Insulated vinyl siding produced by VSI member companies are produced according to ASTM D7793 Standard Specification for Insulated Vinyl Siding.

Table 1 - Insulated Vinyl Siding Technical Information

| Name | Value | Unit |
|---|---------------------------------------|----------------------------|
| Length | 3.66 | m |
| Width | 0.229 | m |
| Thickness | 38.1 | mm |
| Density | 1,430 (vinyl siding) 16 (EPS foam) | kg/m ³ |
| U-value of assembly including interruptions to insulation | 0.31 | BTU/(h F ft ²) |
| R value of typical material where continuous | 3.2 | ft ² *F*hr/BTU |
| Functional Unit | 1 | m ² |
| Panels per Functional Unit | 1.19 panels | |
| Functional Unit Weight | 2.53 | kg |
| CSI MasterFormat | 07 46 33 | |
| UNSPSC codes | 30151802 | |
| Lifetime | 50 | years |
| Standards ASTM D7793 | | |



Product Description (continued)

Table 2 - Insulated Vinyl Siding Formulation

| Component | Weight (kg/m ²) | % of product |
|-------------------|-------------------------------|-------------------------------|
| Vinyl Siding | 2.07 | 87% |
| Foam Insulation | 0.30 | 11% |
| Glue | 0.04 | 1% |
| Constituent | % in Siding with PVC Capstock | % in Siding with ASA Capstock |
| PVC | 78% | 73% |
| ASA | — | 7.6% |
| Calcium Carbonate | 11% | 12% |
| Impact Modifier | 2% | 3% |
| Titanium Dioxide | 4% | 0.3% |
| Tin Stabilizer | 0.6% | 0.6% |
| Process Aid | 0% | 0.1% |
| Calcium Stearate | 1.2% | 0.5% |
| Pigments | 1% | 0.4% |
| Wax | 1.5% | 1.6% |

Manufacturing

Insulated vinyl siding manufacturing is an extremely efficient extrusion process requiring relatively low inputs of energy and water and, the ability to immediately return scrap and off-specification materials (regrind) directly into the manufacturing process results in virtually no manufacturing waste.

Environmental and Health Considerations during Manufacturing

In recent years, many insulated vinyl siding manufacturers have integrated closed loop water systems which save millions of gallons of water each year per facility. Additionally, emissions controls have been in place to reduce emissions during manufacturing of PVC resin at supplier facilities.

Packaging

Insulated vinyl siding is commonly packaged using wood pallets to protect the siding in transport. Some industry-members use cardboard cartons to protect the siding until installation. Cardboard is recyclable in most infrastructure recycling networks throughout North America.

Distribution

Based on the functional unit of 1 m², the following data describes the distribution of the product:

Table 3 - Distribution Formulation

| Name | Value | Unit |
|---------------------------------------|-------------------------|-------------------|
| Fuel type | Diesel | |
| Liters of fuel | 9.91 x 10 ⁻³ | l/100km |
| Vehicle type | Truck | |
| Transport distance | 940.68 | km |
| Capacity utilization | 90 | % |
| Gross density of products transported | 1,430 | kg/m ³ |



Product Installation

The energy required to operate compressors to power air guns is assumed to be small and is not included in the analysis. Installation is modeled for nails placed 41 cm (16 in) on center; nail use is 0.026 kg (0.057 lb) per 1 m² (per 10.76 ft²) of siding. Installation waste with a mass fraction of 5% is assumed, and this waste is assumed to go to a landfill. It is assumed that no electricity is used for the installation of the product.

VSI has developed a certification program for insulated vinyl siding installers. VSI Certified Installers have at least two years of installation experience and have demonstrated knowledge of proper installation techniques. This program follows the ASTM D4756 standard for the Standard Practice for Installation of Rigid Poly (Vinyl Chloride) (PVC) Siding and Soffit.

Table 4 - Installation Formulation

| Name | Value | Unit |
|---|---|--------------------|
| Ancillary materials | 0.026 | kg |
| Net freshwater consumption specified by water source and fate (amount evaporated, amount disposed to sewer) | - | m ³ |
| Other resources | - | kg |
| Electricity consumption | - | kWg |
| Other energy carriers | - | MJ |
| Product loss per functional unit | 0.10 | kg |
| Waste materials at the construction site before waste processing, generated by product installation | 0.34 | kg |
| Output materials resulting from on-site waste processing | Construction & Demolition Waste: 0.10 Packaging: 0.19 | kg |
| Biogenic carbon contained in packaging | 4.05E-02 | kg CO ₂ |
| Direct emissions to ambient air, soil and water | - | kg |
| VOC content | n/a | ug/m ³ |

Use Considerations

No routine maintenance is required to prolong the lifetime of the product, although cleaning is recommended to maintain appearance. Cleaning would normally be done with water and household cleaners. As the lifetime of a building is assumed to be 75 years, a replacement factor of 0.5 is assumed.

Table 5 - Use Considerations

| Name | Value | Unit |
|---|--|-------|
| RSL | 50 | years |
| Declared product properties and finishes, etc. | See Certified Vinyl Siding Installers program for more details | |
| Design application | | |
| An assumed quality of work, when installed in accordance with the manufacturer's instructions | | |
| Use conditions | | |
| Outdoor environment | | |
| Indoor environment | n/a | |
| Maintenance | Clean with water and household cleaners | |



Use Considerations (continued)

The International Code Council's (ICC) International Energy Conservation Code (IECC) serves as the major regulatory tool for energy-efficient residential construction. Insulated siding is listed in the 2012 and 2015 IECC among the building materials that can be used as continuous insulation outside of the building framing to provide the required total wall R-value for buildings in the coldest climate zones.

Table 6 - Expected Heating and Cooling Improvements Over the 2012 IECC that can be Achieved with Insulated Siding

| Climate Zone | City | 2012 IECC Minimum Home Wall U-factor | 2012 IECC Minimum Home + R-2.0 Insulated Siding | | 2012 IECC Minimum Home + R-2.5 Insulated Siding | | 2012 IECC Minimum Home + R-3.0 Insulated Siding | |
|--------------|------------|--------------------------------------|---|---|---|---|---|---|
| | | | Wall U-factor | Percent Heating and Cooling Energy Savings Improvement over 2012 IECC | Wall U-factor | Percent Heating and Cooling Energy Savings Improvement over 2012 IECC | Wall U-factor | Percent Heating and Cooling Energy Savings Improvement over 2012 IECC |
| 1 | Miami | 0.082 | 0.073 | 2% | 0.070 | 3% | 0.067 | 4% |
| 2 | Phoenix | 0.082 | 0.073 | 3% | 0.070 | 4% | 0.067 | 5% |
| 3 | Dallas | 0.059 | 0.054 | 2% | 0.052 | 3% | 0.050 | 4% |
| 4 | Baltimore | 0.059 | 0.054 | 1% | 0.052 | 4% | 0.050 | 5% |
| 5 | Denver | 0.059 | 0.054 | 4% | 0.052 | 5% | 0.050 | 6% |
| 6 | Burlington | 0.044 | 0.041 | 2% | 0.040 | 2% | 0.039 | 3% |
| 7 | Duluth | 0.044 | 0.041 | 2% | 0.040 | 3% | 0.039 | 3% |
| 8 | Fairbanks | 0.044 | 0.041 | 1% | 0.040 | 2% | 0.039 | 3% |

Additionally, Newport Ventures has conducted the *Insulated Siding Energy Performance Study*. The study examined the energy performance of insulated siding in five home re-siding projects in four different climate zones of the country, including one project funded in part by DOE's Building America program. As part of this retrofit study, which took place from fall 2010 through spring 2013, Newport Ventures examined air tightness, modeled the homes' Home Energy Rating System (HERS) Index, and analyzed utility bills for two years prior and two years following the installation of insulated siding. Findings show:

- An average air tightness improvement of 11 percent across the five homes after the insulated siding was installed.
- Energy savings at all five sites, with an average savings of 5.5 percent, based on analysis of pre- and post-retrofit utility bill data.

Environmental and Health Considerations During Use

Insulated vinyl siding does not require painting, staining nor caulking during installation or during the use of the product. Consumption of materials and energy for the use phase can be found in the LCA results section below.

Service Life

This product is assumed to have a useful life of 50 years as many manufacturers provide warranties of 50 years or longer. As the lifetime of a building is assumed to be 75 years, a replacement factor of 0.5 is assumed, resulting in the combined impacts being multiplied by a factor of 1.5 (the estimated service life of the building divided by the reference service life of the product).

Table 7 - Service Life Formulation

| Name | Value | Unit |
|-------------------------------------|-----------------|----------------|
| Reference service life | 50 | years |
| Replacement cycle | 0.5 | ESL/ RSL - 1 |
| Energy input, specified by activity | - | kWh |
| Net freshwater consumption | - | m ³ |
| Ancillary materials | Fasteners: 0.13 | kg |
| Replacement of worn parts | Siding: 1.27 | kg |
| Direct emissions | n/a | kg |



Disposal

Table 8 - Disposal Formulation

| Name | | Value | Unit |
|---|--|--|--------------------|
| Assumptions for scenario development | | Products are manually removed and combined with construction and demolition waste. | |
| Collection process | Collected separately | - | kg |
| | Collected with mixed construction waste | 2.53 | kg |
| Recovery (specified by type) | Reuse | - | kg |
| | Recycling | - | kg |
| | Landfill | 2.02 | kg |
| | Incineration | 0.51 | kg |
| | Incineration with energy recovery | - | kg |
| | Energy conversion efficiency rate | - | |
| Disposal (specified by type) | Product or material for final deposition | Vinyl Siding: 2.53 | kg |
| Removals of biogenic carbon (excluding packaging) | | | kg CO ₂ |

Life Cycle Assessment Study

The declared unit of this product is 1 square meter of a 1.016 mm thick vinyl external cladding with a double 114.3 mm profile with an R-3 value rigid foam layer adhered to the profile.

The system boundary is cradle-to-grave with all life cycle stages through Modules A to C have been considered.

Table 9 - Life Cycle Assessment Study

| Product | | | Construction Installation | | Use | | | | | | | End-of-Life | | | | Benefits of Loads Beyond the System Boundary | | |
|--|-----------|---------------|---------------------------|----------------------------|-----|-------------|--------|-------------|---------------|------------------------|-----------------------|-----------------------------|-----------|------------------|----------|--|----------|-----------|
| Raw Material Extraction and Processing | Transport | Manufacturing | Transport | Construction/ Installation | Use | Maintenance | Repair | Replacement | Refurbishment | Operational Energy Use | Operational Water Use | De-Construction/ Demolition | Transport | Waste Processing | Disposal | Reuse | Recovery | Recycling |
| A1 | A2 | A3 | A4 | A5 | B1 | B2 | B3 | B4 | B5 | B6 | B7 | C1 | C2 | C3 | C4 | D | D | D |
| X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | X | MND | MND | MND |

Allocation: Per production mass at each facility; a weighted average based on production totals between manufacturers was conducted.

Cut-Off Rules: No components and materials were knowingly omitted from the LCA.

Data Sources: ecoinvent v3.7 and US LCI

Data Quality:

- Primary Data: 2020 calendar year
- Secondary Data: Representative of North America, based on ecoinvent and US LCI datasets developed or updated within 10 years.
 - Vinyl resin data was leveraged from the 2021 published LCA study by Franklin Associates (a division of ERM).



Life Cycle Assessment Study (continued)

Software: SimaPro v9.2

Period Under Review: Data from 2020 was collected and average based on production from each participating facility

Estimates and Assumptions:

- Products are assumed to travel 500 miles in a diesel-powered truck to the buliding site
- Manual installation occurs with a 5% scrap rate
- Products are assumed to travel 100km in a diesel-powered truck from the buliding site to the waste processor
- 20% of products are incinerated at the end of life; the remainder are landfilled.

These six impact categories are globally deemed mature enough to be included in Type III environmental declarations. Other categories are being developed and defined, and LCA should continue making advances in their development. However, the EPD users shall not use additional measures for comparative purposes. LCIA results are relative expressions and do not predict impacts on category endpoints, the exceeding of thresholds, safety margins or risks.

Table 10 - Life Cycle Impact Assessment Results

| TRACI 2.1 | | Unit | A1-A3 | A4 | A5 | B2 | B4 | C2 | C3 | C4 |
|-----------|--|-------------------------------------|----------|----------|----------|----------|----------|----------|----------|----------|
| GWP | Global Warming Potential | kg CO ₂ eq | 6.05E+00 | 2.10E-01 | 5.49E-01 | 1.42E-01 | 3.93E+00 | 1.79E-02 | 0.00E+00 | 1.02E+00 |
| ODP | Depletion potential of the stratospheric ozone layer | kg CFC-11 eq | 6.79E-07 | 8.01E-12 | 4.62E-08 | 9.00E-09 | 3.82E-07 | 6.81E-13 | 0.00E+00 | 3.87E-08 |
| AP | Acidification potential | kg SO ₂ eq | 3.96E-02 | 1.25E-03 | 2.88E-03 | 4.91E-04 | 2.23E-02 | 1.07E-04 | 0.00E+00 | 8.37E-04 |
| EP | Eutrophication potential | kg N eq | 7.26E-03 | 6.99E-05 | 9.74E-04 | 5.00E-03 | 4.45E-03 | 5.95E-06 | 0.00E+00 | 6.00E-04 |
| POCP | Photochemical ozone creation potential | kg O ₃ eq | 2.88E-01 | 3.43E-02 | 2.76E-02 | 5.94E-03 | 1.83E-01 | 2.92E-03 | 0.00E+00 | 1.33E-02 |
| FFD | Fossil Fuel Depletion | MJ surplus | 2.16E+01 | 4.03E-01 | 1.26E+00 | 5.11E-02 | 1.18E+01 | 3.42E-02 | 0.00E+00 | 2.09E-01 |
| CML | | Unit | A1-A3 | A4 | A5 | B2 | B4 | C2 | C3 | C4 |
| GWP | Global Warming Potential | kg CO ₂ eq | 6.15E+00 | 7.94E-12 | 5.45E-01 | 1.43E-01 | 3.87E+00 | 1.79E-02 | 0.00E+00 | 1.02E+00 |
| ODP | Depletion potential of the stratospheric ozone layer | kg CFC-11 eq | 2.73E-07 | 1.03E-03 | 5.18E-05 | 8.03E-09 | 5.44E-04 | 6.75E-13 | 0.00E+00 | 3.37E-08 |
| AP | Acidification potential | kg SO ₂ eq | 4.28E-02 | 1.83E-04 | 2.95E-03 | 4.36E-04 | 2.33E-02 | 8.80E-05 | 0.00E+00 | 6.60E-04 |
| EP | Eutrophication potential | kg PO ₄ eq | 4.22E-03 | 4.77E-05 | 5.14E-04 | 2.17E-03 | 2.55E-03 | 1.56E-05 | 0.00E+00 | 2.97E-04 |
| POCP | Photochemical ozone creation potential | kg C ₂ H ₄ eq | 6.11E-03 | 0.00E+00 | 3.44E-04 | 7.43E-05 | 3.25E-03 | 4.06E-06 | 0.00E+00 | 4.19E-05 |
| ADPE | Abiotic depletion (non-fossil) | kg Sb eq | 4.29E-05 | 0.00E+00 | 6.47E-06 | 1.12E-06 | 2.52E-05 | 0.00E+00 | 0.00E+00 | 9.66E-07 |
| ADPF | Abiotic depletion (fossil) | MJ | 1.53E+02 | 2.70E+00 | 9.54E+00 | 5.09E-01 | 8.35E+01 | 2.30E-01 | 0.00E+00 | 1.75E+00 |

Modules B1, B3, B5-B7, and C1 are null.



Table 11 - Use of Resources

| Resource Use | | Unit | A1-A3 | A4 | A5 | B2 | B4 | C2 | C3 | C4 |
|--------------|--|------|----------|----------|----------|----------|----------|----------|----------|----------|
| NR-PRE | Non-renewable primary resources used as an energy carrier | MJ | 9.61E+01 | 2.70E+00 | 6.49E+00 | 6.73E-01 | 4.96E+01 | 2.30E-01 | 0.00E+00 | 1.87E+00 |
| RPRE | Renewable primary resources used as an energy carrier | MJ | 4.36E+00 | 0.00E+00 | 6.37E-01 | 8.02E-01 | 2.43E+00 | 0.00E+00 | 0.00E+00 | 1.46E-01 |
| NR-PRM | Non-renewable primary resources with energy content used as a material | MJ | 7.13E+01 | 0.00E+00 | 3.57E+00 | 0.00E+00 | 3.74E+01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RPRM | Renewable primary resources with energy content used as a material | MJ | 7.45E-01 | 0.00E+00 | 3.73E-02 | 0.00E+00 | 3.91E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| SM | Use of Secondary Materials | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| RSF | Renewable secondary Fuels | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NRSF | Use of Non-Renewable secondary fuels | m3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| FW | Fresh Water consumption | m3 | 4.04E-02 | 0.00E+00 | 5.41E-03 | 1.07E-02 | 4.44E-02 | 0.00E+00 | 0.00E+00 | 4.49E-02 |

Modules B1, B3, B5-B7, and C1 are null.

Table 12 - Output Flows and Wastes

| Output Flows | | Unit | A1-A3 | A4 | A5 | B2 | B4 | C2 | C3 | C4 |
|--------------|--|------|----------|----------|-----------|----------|----------|----------|----------|----------|
| HWD | Disposed-of-hazardous WASTE | kg | 4.13E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.07E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NHWD | Disposed-of non-hazardous WASTE | kg | 3.70E-03 | 0.00E+00 | 3.40E-01 | 0.00E+00 | 1.44E+00 | 0.00E+00 | 0.00E+00 | 2.53E+00 |
| RWD | Disposed-of Radioactive WASTE | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| CRU | Components for reuse | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MFR | Materials for recycling | kg | 2.43E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.22E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| MET | Materials for energy recovery | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EEE | Exported electrical energy (waste to energy) | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| EET | Exported thermal energy (waste to energy) | MJ | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BBPr | Bio-Based Products | kg | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| BBPk | Bio-Based Packaging | kg | 4.05E-02 | 0.00E+00 | -4.05E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

Modules B1, B3, B5-B7, and C1 are null.



The production stage (raw materials through manufacturing) is the largest driver of the life cycle of insulated vinyl siding. The raw materials stage is the primary driver of the production stage. Maintenance and end-of-life stages of insulated vinyl siding have very minimal influences on the overall life cycle.

The testing for products containing no lead stabilizers is conducted to the standard ASTM E1753, *Standard Practice for Use of Qualitative Chemical Spot Test Kits for Detection of Lead in Dry Paint Films* and detects substances down to the 5,000 ppm limit.

References

- ISO 21930: Sustainability in buildings and civil engineering works - Core rules for environmental product declarations of construction products and services
- EPA, Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI)
- FTC Part 260, Green guides
- (ILCD, 2010) Joint Research Commission, 2010, ILCD Handbook: General Guide for Life Cycle Assessment
- Intergovernmental Panel on Climate Change (IPCC)
- ISO 14025:2006 *Environmental labels and declarations – Type III environmental declarations – Principles and procedures*
- ISO 14040/Amd1:2020 *Environmental management - Life cycle assessment – Principles and framework*
- ISO 14044:2006/Amd1:2017/Amd2:2020 *Environmental management - Life cycle assessment – Requirements and guidelines*
- ASTM C1363 *Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus*. 2005
- ASTM C1363 *Standard Test Method for Thermal Performance of Building Materials and Envelope Assemblies by Means of a Hot Box Apparatus*.
- ASTM D7856 *Standard Specification for Color and Appearance Retention of Solid and Variegated Color Plastic Siding Products using CIE Lab Color Space*. 2015 (optional)
- ASTM D4756 *Standard Practice for Installation of Rigid Poly(Vinyl Chloride) (PVC) Siding and Soffit*.
- ASTM D7793 *Standard Specification for Insulated Vinyl Siding*
- Vinyl Siding Institute. *Insulated Siding as Home Insulation: Guide for Users and Energy Raters*. January 2014.
- Newport Ventures, Inc. *Insulated Siding Energy Performance Study*. June 2013
- International Code Council. *2012 International Energy Conservation Code*. May 2011.
- ASTM Program Operator Rules. Version 8.0, Revised 04/29/20

LCA Development


This EPD and corresponding LCA were prepared by Sustainable Solutions Corporation of Royersford, Pennsylvania.



Verification and Authorization of the Declaration

This declaration is an environmental product declaration (EPD) in accordance with ISO 14025 and ISO 21930. Please note that environmental declarations from different programs (based upon differing PCRs) may not be comparable. Comparison of the environmental performance of construction works and construction products using EPD information shall be based on the product's use and impacts at the construction works level. In general, EPDs may not be used for comparability purposes when not considered in a construction works context. Given this PCR ensures products meet the same functional requirements, comparability is permissible provided the information given for such comparison is transparent and the limitations of comparability explained. When comparing EPDs created using the PCR, variations and deviations are possible. Examples of variations: different LCA software and background LCI datasets may lead to different results for upstream or downstream of the life cycle stages declared.

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|--|---|
| Program Operator | ASTM, 1100 Barr Harbor Drive, PO Box C700 West Conshohocken, PA 19428-2959, USA tel +1.610.832.9729 www.astm.org |
| Declaration Holder | Vinyl Siding Institute |
| Declaration Number | EPD 326 |
| Declared Product | Industry Averaged Insulated Vinyl Siding |
| Markets of Applicability | Residential |
| Reference PCR | ISO 21930:2017 serves as the core PCR and UL Part A. Sub-category Part B: Cladding Product Systems EPD Requirements. Second Edition, 2021 |
| EPD Scope | Cradle to Grave |
| Date of Issue | 7/14/2022 |
| Expiration Day | 7/15/2022 |
| Period of Validity | 5 years |
| Software | SimaPro 9.2.0.2 |
| Life Cycle Impact Assessment Methodology | TRACI 2.1, 2012 CML Baseline 2001, Cumulative Energy Demand (LHV) v1.1 |

| | |
|--|--|
| The PCR Panel Chair: | Jim Mellentine, Thrive ESG, Jim@ThriveESG.com thriveesg.com |
| This declaration was independently verified in accordance with ISO 21930:2017, UL Part A, and ISO 14025:2006 by ASTM <input type="checkbox"/> Internal <input checked="" type="checkbox"/> External | |
| Third-party verifier: | |
|  | Lindita Bushi, Ph.D, LEED Green Associate, Senior Research Associate, Athena Sustainable Materials Institute, lindita.bushi@athenaasmi.org |

About VSI and this EPD

The Vinyl Siding Institute

The Vinyl Siding Institute, Inc. (VSI) is the trade association for manufacturers of vinyl, other polymeric siding and suppliers to the industry.

VSI focuses on science-driven data that clarifies the Life Cycle of vinyl and polymeric siding.

VSI is 100% committed to educating building professionals about how vinyl and polymeric sidings are high performing sustainable building material.

For more information, please visit www.vinylsiding.org or contact the Vinyl Siding Institute at hello@vinylsiding.org.

Participating Members

