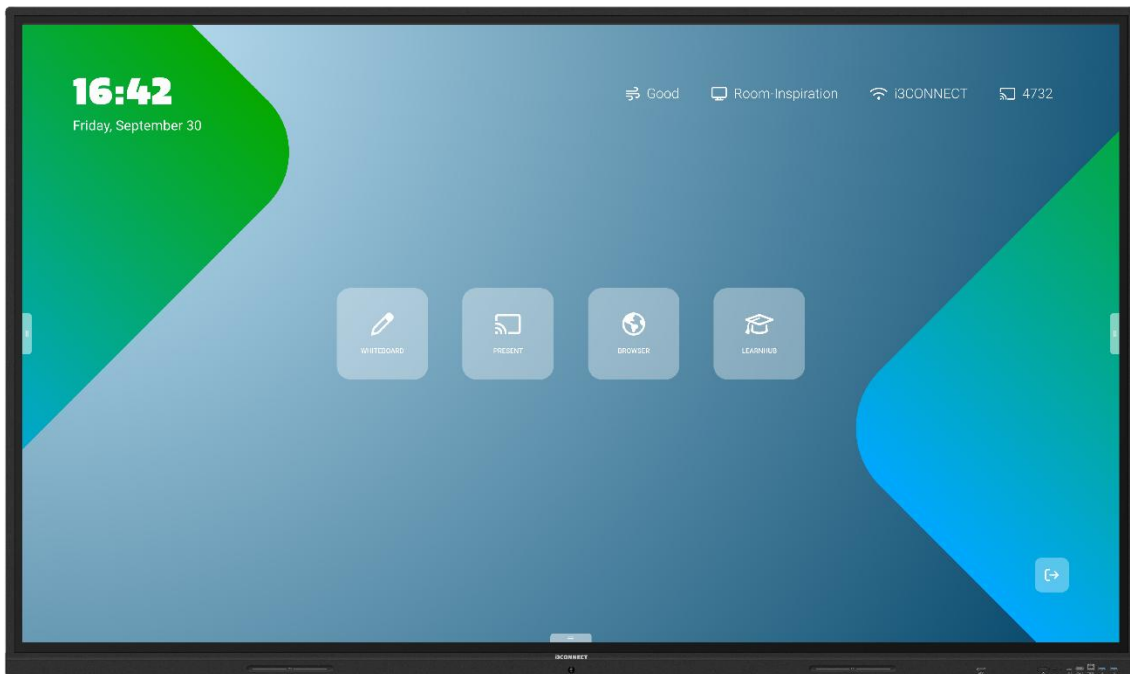


SUSTAINABILITY PASSPORT

Self-Declared Environmental Product Declaration

i3CONNECT Elm 2 (65", 75", and 86")

Based on a Life Cycle Assessment according to ISO 14044 and the Product Category Rules (PCR) for Electronic and Electric Equipment



General Information

Company Information

EPD owner: i3CONNECT

Address: Achtseweg-Zuid, Eindhoven

Contact: Marielle Salh
marielle.salh@ctouch.eu

Website: i3-connect.com

Product Information

Product name: i3CONNECT Elm 2

Functional unit: The manufacturing, packaging, distribution, and end-of-life treatment of a single screen, as well as the use of that screen for the duration of its lifetime.

Reference flow: 1 unit

Product description: The i3CONNECT Elm 2 is an Interactive Flat Panel Display (IFPD). It is a high-performance, touchscreen-enabled display designed to enhance collaboration, communication, and engagement in classrooms, meeting rooms, and other interactive environments. Combining clear visuals with intuitive touch capabilities, it offers a seamless digital experience for presentations, brainstorming sessions, and interactive learning. The IFPD comes in a 65", 75", and 86" display sizes.

Production location: Guangzhou, China

Lifetime: 8.5 years

EPD and LCA information

Study performed by: Edwin van Leth, Vince Evers, Raquel Kuperus from Dispersed

Date of publication: 06/05/2025

LCA standard: ISO14040-44:2006

LCIA method: Environmental Footprint v 3.1

Background data: Ecoinvent v 3.9, allocation, cut-off by classification system model

Product category rules: PCR for Electronic and Electric Equipment

EPD standard: ISO 14021 Type II – Self Declared

Third party review: Not Applicable

System Boundaries: In the LCA study, impacts were assessed from cradle-to-grave.

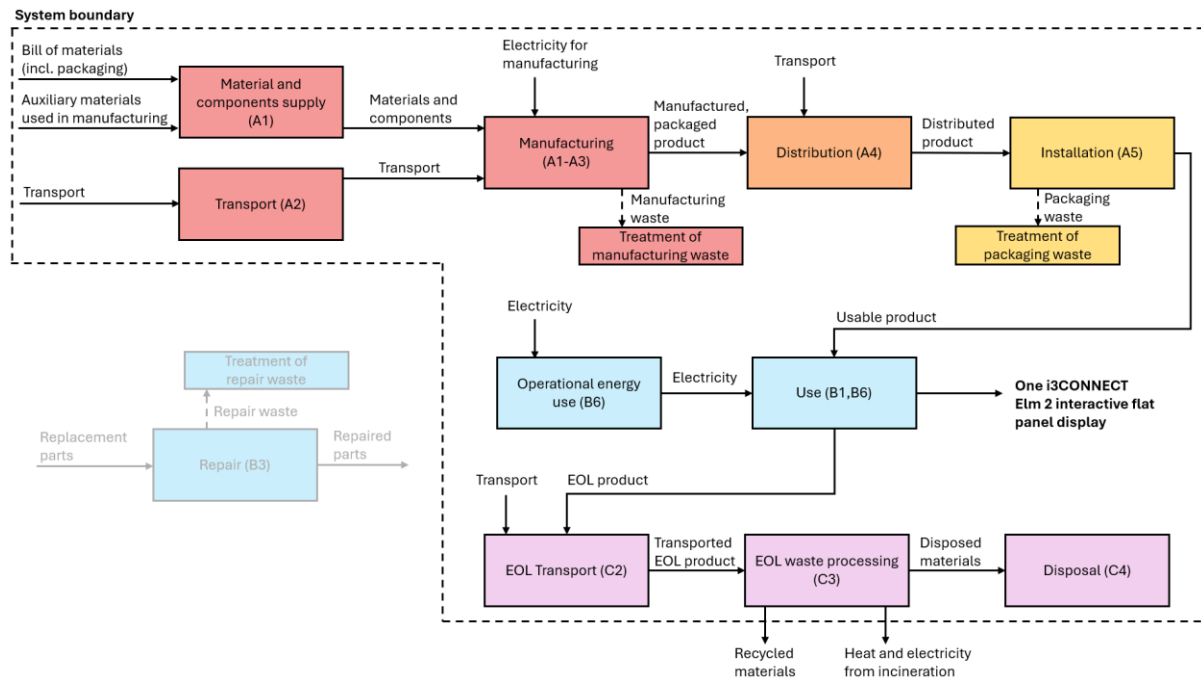
Production			Construction		Usage							End-of-Life				Module D
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	
Raw materials supply	Transport	Manufacturing	Transport	Construction and installation process	Use	Maintenance	Replacement	Repair	Refurbishment	Operational energy use	Operational water use	De-construction	Transport	Waste processing	Disposal	Benefits and loads beyond the system boundary
X	X	X	X	X	ND	ND	ND	ND	ND	X	ND	ND	X	X	X	ND

X: In Scope / ND: Not Declared

Geographical scope: The LCA assumes usage and end-of-life processing in the Netherlands.

Significant Exclusions: The plywood pallets used for packaging and transporting the screens have been excluded, as the pallets are typically reused many times throughout their lifespan and it is unclear how much of the pallet's impact is ultimately attributable to the i3CONNECT Elm 2. Any repairs needed during the use phase of the IFPDs have also been excluded, due to a lack of data regarding repairs and since it is assumed that the majority of the touchscreens do not require any repair during their 8.5 year lifespan.

System diagram:



Data Collection and Life Cycle Inventory

Manufacturing (A1-3)

The impacts of manufacturing the i3CONNECT Elm 2 have been calculated based on data provided by the manufacturing partner. This included the bill of materials for each of the three Elm 2 sizes, a list of auxiliary materials used during manufacturing, and the energy consumption to produce each IFPD. Table 1 presents the total unpacked and packed mass of the three sizes of the Elm 2.

Table 1. Mass of the i3CONNECT Elm 2 IFPDs.

IFPD size	Total mass unpacked (kg)	Total mass packed (kg)
65 inch	35.63	42.84
75 inch	50.90	60.77
86 inch	58.56	74.09

An overview of the mass composition of each touchscreen can be seen in the following figures:

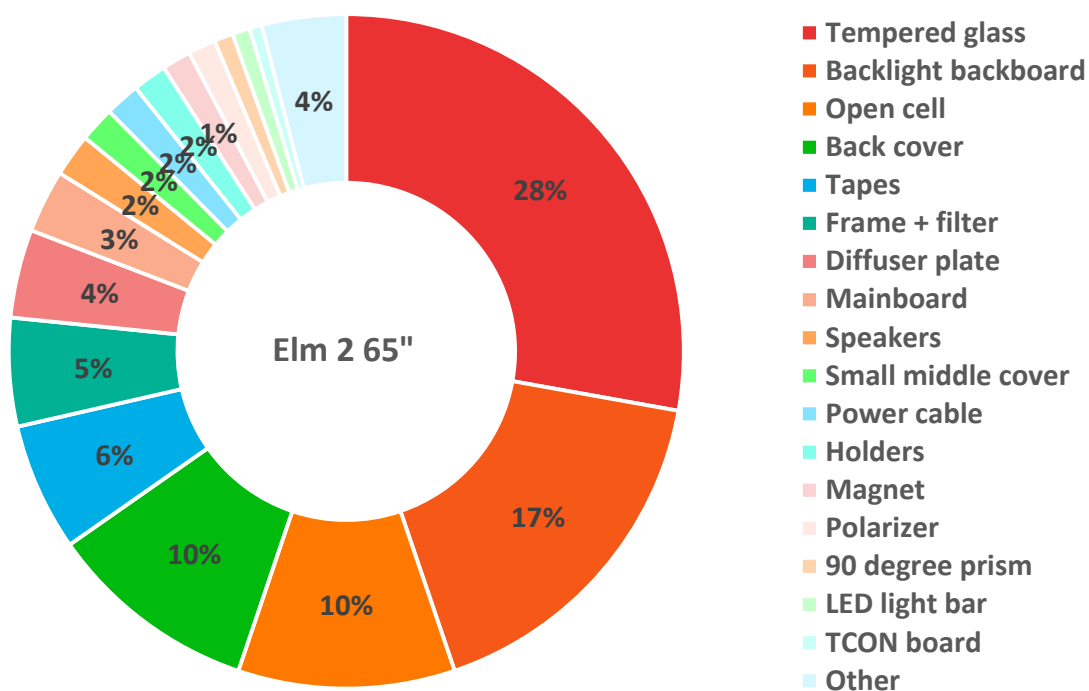


Figure 1. Mass composition of the i3CONNECT Elm 2 65".

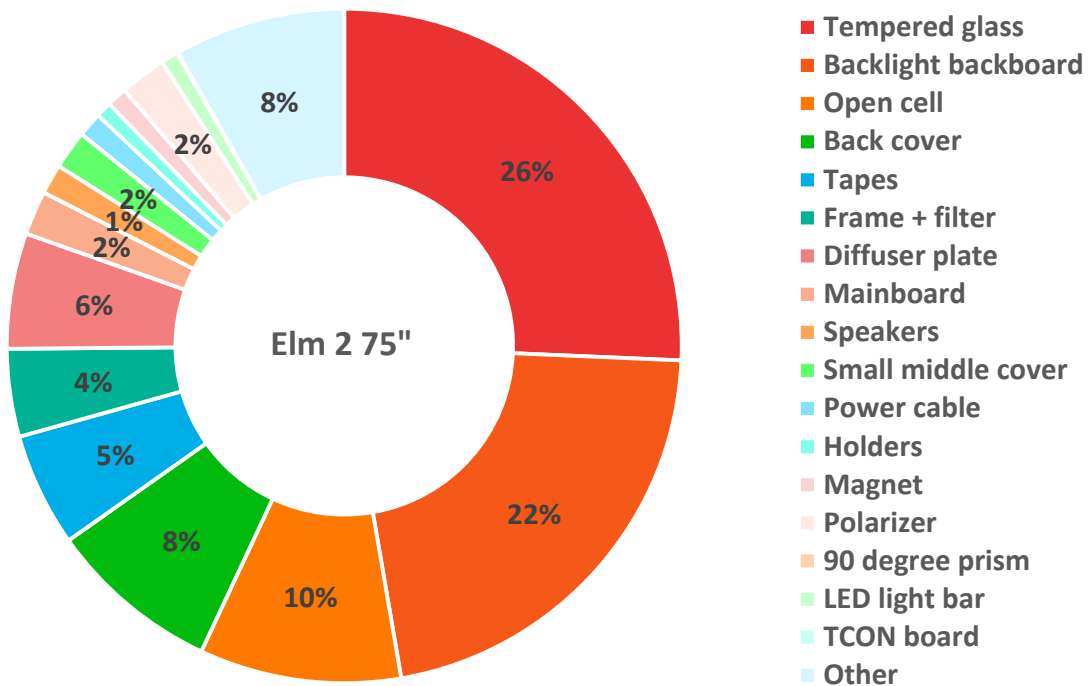


Figure 2. Mass composition of the i3CONNECT Elm 2 75".

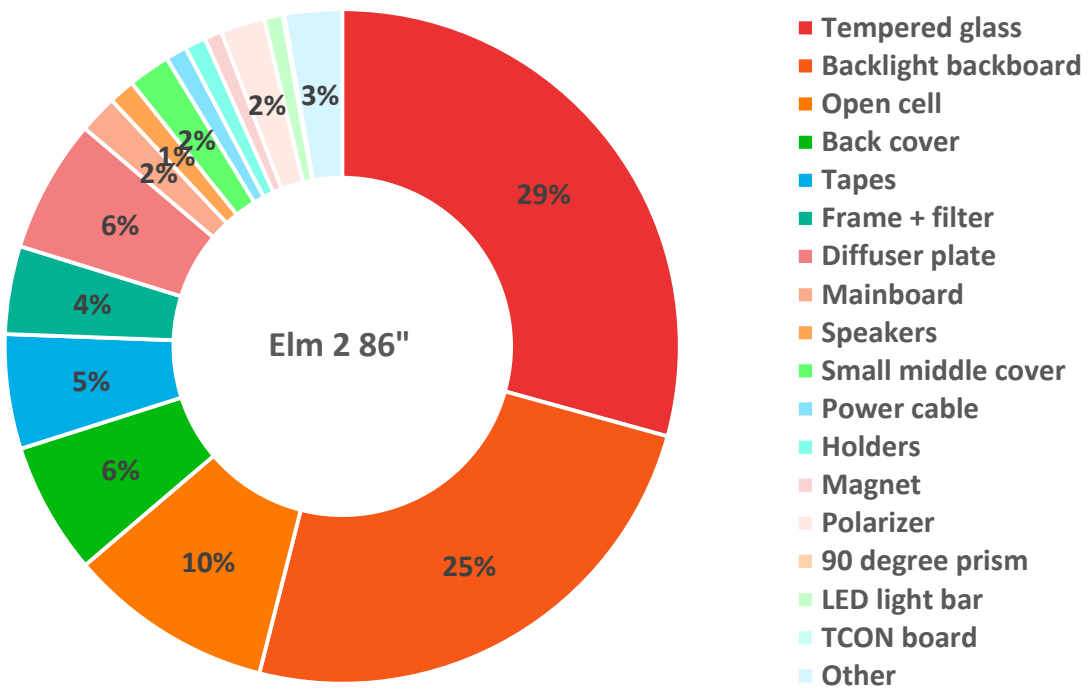


Figure 3. Mass composition of the i3CONNECT Elm 2 86".

Table 2 lists the packaging materials used for each size of the Elm 2.

Table 2. Inventory of packaging materials that are used for the three sizes of the i3CONNECT Elm 2.

Packaging material	65" (kg)	75" (kg)	86" (kg)
Aluminium plastic bag	0.339	0.450	0.521
Box buckle	0.000	0.064	0.064
Cardboard box	6.016	8.046	10.371
Desiccant	0.052	0.052	0.052
Documentation	0.063	0.063	0.063
EPE packaging	0.000	0.128	0.191
EPP packaging	0.723	1.058	1.058
Slip sheets	0.000	0.000	3.200
Valve bag	0.009	0.009	0.009

The components outlined above are assembled into the final, packaged products at the manufacturing partner's facilities. The environmental impacts of assembly are directly related to the energy consumption during this process. Table 3 contains the electricity used to manufacture one Elm 2, including the share of grey and green electricity, as indicated by the manufacturing partner.

Table 3. Electricity consumption to manufacture one Elm 2 IFPD.

Electricity	65"	75"	86"
Grey electricity (kWh)	747.017	747.017	502.643
Green electricity (kWh)	9.789	9.788	6.852

Table 4 contains an inventory of the auxiliary materials used and lost during the manufacturing of the Elm 2, for each unique size. The data provided by the manufacturing partner was in terms of meters or pieces, so an assumption of the mass per meter or piece was made to convert the data into kilograms.

Table 4. Auxiliary material used and lost during manufacturing.

Auxiliary material	65" (kg)	75" (kg)	86" (kg)
Black carbon ribbon	0.00048	0.00048	0.00048
Label	3.0	3.0	3.0
Packing belt	0.0559	0.0634	0.0691
Sealing compound	0.086	0.086	0.086
Stretch film	0.351	0.437	0.491

Distribution (A4)

The impacts relating to distribution occur in four different transportation stages, which are described in Table 5. Since the geographical scope of this EPD assumes final consumption in the Netherlands, an average distance to customers in the Dutch market is used.

Table 5. Transportation modes and distances for each part of the distribution route.

Transportation stage	Mode of transport	Distance (km)
Manufacturer factory to Port of Guangzhou	Truck	10
Port of Guangzhou to Port of Rotterdam	Ship	18,207
Port of Rotterdam to i3CONNECT Eindhoven	Truck	135
i3CONNECT Eindhoven to final customer in NL	Truck	150

Installation (A5)

The only environmental impact associated with the installation of the Elm 2 at the customer site arises from the end-of-life treatment of the packaging materials. Accordingly, the life cycle inventory for the installation phase (A5) focuses on the manual unpacking of the product and the subsequent processing of the resulting packaging waste.

Use (B6)

The Elm 2 consumes electricity during its functional lifetime, which is assumed to be 8.5 years. Energy consumption estimates were based on measured power consumption values obtained through ENERGY STAR testing of the products. Real-life usage data from the 75" CTOUCH Riva model were used as a baseline and scaled according to the actual ENERGY STAR-certified power consumption measurements for each Elm 2 screen size (65", 75", and 86"). In addition, it is assumed that the displays are used 210 days per year, based on the typical school/working days in a year. This approach ensures that the energy use inventory closely reflects typical real-world operation across the different product variants. The data used can be found in Table 6.

Table 6. The assumed lifetime energy consumption of the Elm 2 IFPDs during the use phase. The estimates are derived from real-life usage measurements of the 75" Riva and scaled based on power consumption.

IFPD	Power consumption (W)	Scaling factor	Average daily consumption (kWh)	Annual consumption (kWh)	Lifetime consumption (kWh)
Riva 75"	125	Reference	1.03	216	1839
Elm 2 65"	74.9	0.60	0.62	130	1102
Elm 2 75"	83.2	0.67	0.69	144	1224
Elm 2 86"	101.8	0.81	0.84	176	1497

Since the geographical scope of this EPD assumes that the Elm 2 is used and reaches its end-of-life in the Netherlands, the electricity mix of the Netherlands has been used to model the environmental impacts of operational energy consumption during the use phase. The Dutch electricity mix, presented in Table 7, is sourced from the International Energy Agency (IEA) database (IEA, 2023) and reflects the most current available data at the time of the study. This approach ensures consistency with the assumed market and aligns with the system boundaries defined for this assessment.

Table 7. Electricity mix of the Netherlands, assumed during use phase.

Electricity source	Share in NL mix	Emission factor (kg CO ₂ -eq/kWh)
Natural gas	37.9%	0.64
Wind	24.0%	0.02
Solar PV	16.5%	0.10
Coal	8.8%	1.00
Biofuels	4.6%	0.23
Nuclear	3.28%	0.00685
Waste	3.12%	0
Oil	1.3%	1.14
Other	0.4%	0.50

End-of-Life (C2-4)

The end-of-life (EoL) stage of the Elm 2 displays was modelled in accordance with the product's expected waste management practices in the Netherlands, covering transport to treatment facilities (C2), processing for recovery (C3), and final disposal (C4).

The transportation distance to the treatment facility was assumed to be 50 km and the subsequent distance to an incineration plant or landfill was assumed to be an additional 100km.

The end-of-life treatment of the displays were modelled based on the Dutch scenario in which the products are processed by Mirec, a specialized electronics recycling facility in Eindhoven. In 2024, MIREC processed approximately 5,065 kg of CTOUCH products, for which detailed primary data on material recycling rates were obtained. The processing (C3) and final disposal (C4) stages are based on this primary data collected from MIREC's 2024 operations. This dataset, presented in Table 8, provided specific information on the actual shares of material that were recycled, incinerated (with or without energy recovery), or landfilled. Using these detailed recycling and disposal rates, the associated environmental impacts were modelled, ensuring that the waste treatment modelling accurately reflects real-world performance at the end-of-life stage for the Elm 2 products.

Table 8. Waste treatment trajectories for the materials in the IFPDs, based on a study conducted by Mirec.

Waste category	Recycling (%)	Incineration with energy recovery (%)	Incineration without energy recovery (%)	Landfill (%)
Aluminium	100%			
Battery	100%			
Ferrous	100%			
Flat panel display	73%	26%		1%
Glass	100%			
Metal containing products ("raffineer")	74%	25%	1%	
Other		100%		
Paper		100%		
Plastic	59%	41%		

Environmental Performance

Table 9. EPD results for the 65" Elm 2.

Impact category	Unit	A1-3	A4	A5	B6	C2	C3	C4	Total
Acidification	mol H+ eq	5.86E+00	2.46E-01	2.46E-03	7.67E-01	4.13E-03	9.87E-03	5.60E-05	6.89E+00
Climate change	kg CO2 eq	8.72E+02	1.03E+01	6.34E+00	4.18E+02	9.99E-01	9.48E+00	1.98E-01	1.32E+03
Climate change - biogenic	kg CO2 eq	2.69E+00	2.08E-03	4.56E+00	5.09E+00	2.90E-04	1.93E-01	2.48E-06	1.25E+01
Climate change - fossil	kg CO2 eq	8.68E+02	1.03E+01	1.79E+00	4.12E+02	9.98E-01	9.29E+00	1.98E-01	1.30E+03
Climate change - land use and LU change	kg CO2 eq	1.29E+00	7.32E-03	1.29E-04	6.94E-02	4.88E-04	1.91E-03	1.63E-06	1.37E+00
Ecotoxicity, freshwater	CTUe	2.23E+04	6.56E+01	2.04E+01	5.48E+02	7.03E+00	7.95E+01	2.08E+00	2.30E+04
Ecotoxicity, freshwater - inorganics	CTUe	1.64E+04	6.28E+01	2.02E+01	5.28E+02	6.78E+00	7.86E+01	2.08E+00	1.71E+04
Ecotoxicity, freshwater - organics	CTUe	2.58E+02	2.73E+00	1.71E-01	2.04E+01	2.55E-01	9.15E-01	5.99E-04	2.83E+02
Eutrophication, freshwater	kg P eq	1.48E-01	5.22E-05	3.64E-06	8.21E-03	8.04E-06	4.35E-05	6.37E-08	1.56E-01
Eutrophication, marine	kg N eq	1.03E+00	6.27E-02	4.22E-03	2.10E-01	1.56E-03	3.72E-03	3.22E-05	1.31E+00
Eutrophication, terrestrial	mol N eq	1.14E+01	6.93E-01	9.73E-03	2.54E+00	1.68E-02	3.37E-02	2.89E-04	1.47E+01
Human toxicity, cancer	CTUh	8.25E-07	4.51E-09	2.22E-09	8.22E-08	4.56E-10	4.27E-09	5.44E-11	9.19E-07
Human toxicity, cancer - inorganics	CTUh	5.57E-07	2.73E-09	3.96E-10	4.58E-08	2.20E-10	2.81E-09	2.71E-11	6.09E-07
Human toxicity, cancer - organics	CTUh	2.26E-07	1.78E-09	1.83E-09	3.63E-08	2.36E-10	1.46E-09	2.73E-11	2.67E-07
Human toxicity, non-cancer	CTUh	2.63E-05	5.21E-08	2.79E-08	1.76E-06	1.00E-08	1.92E-07	4.30E-09	2.84E-05
Human toxicity, non-cancer - inorganics	CTUh	2.37E-05	4.92E-08	1.96E-08	1.68E-06	9.44E-09	1.90E-07	4.29E-09	2.57E-05
Human toxicity, non-cancer - organics	CTUh	7.24E-07	2.94E-09	8.32E-09	7.91E-08	5.95E-10	2.06E-09	1.78E-12	8.17E-07
Ionising radiation	kBq U235 eq	3.14E+01	3.47E-02	2.45E-03	8.72E+00	7.14E-03	4.05E-02	5.04E-05	4.02E+01
Land use	Pt	4.38E+03	2.74E+01	2.63E+00	2.99E+03	8.49E+00	2.07E+01	1.90E-02	7.44E+03
Ozone depletion	kg CFC11 eq	1.08E-04	1.65E-07	7.80E-09	1.67E-05	2.19E-08	2.89E-08	4.04E-10	1.25E-04
Particulate matter	disease inc.	5.76E-05	4.26E-07	1.10E-07	4.08E-06	8.15E-08	1.28E-07	3.67E-10	6.24E-05
Photochemical ozone formation	kg NMVOC eq	3.41E+00	1.90E-01	4.61E-03	7.77E-01	6.05E-03	9.90E-03	7.41E-05	4.39E+00
Resource use, fossils	MJ	1.08E+04	1.31E+02	2.84E+00	6.09E+03	1.42E+01	1.69E+01	3.00E-02	1.70E+04
Resource use, minerals and metals	kg Sb eq	1.68E-01	1.53E-05	6.27E-07	9.52E-04	3.23E-06	2.09E-05	1.02E-08	1.69E-01
Water use	m3-world eq	2.09E+02	3.63E-01	1.66E-01	6.97E+01	5.83E-02	4.61E-01	9.74E-04	2.80E+02

Table 10. EPD results for the 75" Elm 2.

Impact category	Unit	A1-3	A4	A5	B6	C2	C3	C4	Total
Acidification	mol H+ eq	7.30E+00	3.49E-01	3.37E-03	8.52E-01	5.91E-03	1.42E-02	7.64E-05	8.52E+00
Climate change	kg CO2 eq	1.09E+03	1.46E+01	9.08E+00	4.64E+02	1.43E+00	1.35E+01	2.87E-01	1.59E+03
Climate change - biogenic	kg CO2 eq	3.58E+00	2.95E-03	6.09E+00	5.65E+00	4.14E-04	3.15E-01	3.38E-06	1.56E+01
Climate change - fossil	kg CO2 eq	1.08E+03	1.46E+01	2.99E+00	4.58E+02	1.43E+00	1.31E+01	2.87E-01	1.57E+03
Climate change - land use and LU change	kg CO2 eq	1.52E+00	1.04E-02	1.75E-04	7.70E-02	6.98E-04	2.71E-03	2.25E-06	1.61E+00
Ecotoxicity, freshwater	CTUe	2.54E+04	9.30E+01	2.73E+01	6.09E+02	1.01E+01	1.15E+02	3.03E+00	2.63E+04
Ecotoxicity, freshwater - inorganics	CTUe	1.76E+04	8.91E+01	2.71E+01	5.86E+02	9.69E+00	1.13E+02	3.03E+00	1.85E+04
Ecotoxicity, freshwater - organics	CTUe	3.18E+02	3.88E+00	2.31E-01	2.27E+01	3.65E-01	1.29E+00	7.90E-04	3.47E+02
Eutrophication, freshwater	kg P eq	1.64E-01	7.41E-05	4.88E-06	9.12E-03	1.15E-05	6.26E-05	8.70E-08	1.73E-01
Eutrophication, marine	kg N eq	1.41E+00	8.89E-02	5.68E-03	2.33E-01	2.24E-03	5.38E-03	4.21E-05	1.74E+00
Eutrophication, terrestrial	mol N eq	1.34E+01	9.83E-01	1.35E-02	2.82E+00	2.41E-02	4.88E-02	3.95E-04	1.73E+01

Human toxicity, cancer	CTUh	1.02E-06	6.40E-09	3.01E-09	9.13E-08	6.53E-10	6.28E-09	7.10E-11	1.13E-06
Human toxicity, cancer - inorganics	CTUh	6.54E-07	3.87E-09	5.46E-10	5.09E-08	3.15E-10	4.12E-09	3.55E-11	7.14E-07
Human toxicity, cancer - organics	CTUh	3.09E-07	2.53E-09	2.47E-09	4.04E-08	3.38E-10	2.15E-09	3.55E-11	3.57E-07
Human toxicity, non-cancer	CTUh	2.82E-05	7.39E-08	3.81E-08	1.95E-06	1.44E-08	2.96E-07	6.27E-09	3.06E-05
Human toxicity, non-cancer - inorganics	CTUh	2.49E-05	6.97E-08	2.70E-08	1.86E-06	1.35E-08	2.93E-07	6.27E-09	2.72E-05
Human toxicity, non-cancer - organics	CTUh	8.54E-07	4.17E-09	1.11E-08	8.79E-08	8.51E-10	2.98E-09	2.34E-12	9.61E-07
Ionising radiation	kBq U235 eq	4.15E+01	4.92E-02	3.32E-03	9.69E+00	1.02E-02	5.88E-02	6.86E-05	5.13E+01
Land use	Pt	5.21E+03	3.88E+01	3.57E+00	3.32E+03	1.21E+01	3.15E+01	2.21E-02	8.62E+03
Ozone depletion	kg CFC11 eq	1.45E-04	2.34E-07	1.06E-08	1.85E-05	3.13E-08	4.20E-08	5.66E-10	1.64E-04
Particulate matter	disease inc.	7.30E-05	6.05E-07	1.47E-07	4.54E-06	1.17E-07	1.93E-07	4.81E-10	7.86E-05
Photochemical ozone formation	kg NMVOC eq	4.10E+00	2.70E-01	6.29E-03	8.63E-01	8.66E-03	1.49E-02	1.00E-04	5.26E+00
Resource use, fossils	MJ	1.34E+04	1.86E+02	3.88E+00	6.76E+03	2.04E+01	2.61E+01	3.92E-02	2.04E+04
Resource use, minerals and metals	kg Sb eq	1.49E-01	2.18E-05	8.56E-07	1.06E-03	4.62E-06	2.74E-05	1.39E-08	1.50E-01
Water use	m3-world eq	2.71E+02	5.15E-01	2.23E-01	7.74E+01	8.35E-02	6.36E-01	1.34E-03	3.50E+02

Table 11. EPD results for the 86" Elm 2.

Impact category	Unit	A1-3	A4	A5	B6	C2	C3	C4	Total
Acidification	mol H+ eq	7.88E+00	4.26E-01	5.34E-03	1.04E+00	6.80E-03	1.54E-02	9.07E-05	9.38E+00
Climate change	kg CO2 eq	1.22E+03	1.78E+01	1.37E+01	5.67E+02	1.64E+00	1.57E+01	3.47E-01	1.84E+03
Climate change - biogenic	kg CO2 eq	4.27E+00	3.60E-03	1.03E+01	6.92E+00	4.77E-04	3.41E-01	4.01E-06	2.18E+01
Climate change - fossil	kg CO2 eq	1.22E+03	1.78E+01	3.48E+00	5.60E+02	1.64E+00	1.54E+01	3.47E-01	1.82E+03
Climate change - land use and LU change	kg CO2 eq	1.71E+00	1.27E-02	2.82E-04	9.43E-02	8.03E-04	2.93E-03	2.68E-06	1.82E+00
Ecotoxicity, freshwater	CTUe	2.76E+04	1.13E+02	4.47E+01	7.45E+02	1.16E+01	1.35E+02	3.68E+00	2.87E+04
Ecotoxicity, freshwater - inorganics	CTUe	1.86E+04	1.09E+02	4.43E+01	7.17E+02	1.11E+01	1.33E+02	3.68E+00	1.96E+04
Ecotoxicity, freshwater - organics	CTUe	3.47E+02	4.73E+00	3.72E-01	2.77E+01	4.20E-01	1.46E+00	9.29E-04	3.82E+02
Eutrophication, freshwater	kg P eq	1.83E-01	9.03E-05	7.67E-06	1.12E-02	1.32E-05	6.55E-05	1.03E-07	1.94E-01
Eutrophication, marine	kg N eq	1.36E+00	1.08E-01	9.38E-03	2.86E-01	2.57E-03	5.98E-03	4.93E-05	1.77E+00
Eutrophication, terrestrial	mol N eq	1.50E+01	1.20E+00	2.10E-02	3.45E+00	2.77E-02	5.40E-02	4.69E-04	1.97E+01
Human toxicity, cancer	CTUh	1.10E-06	7.81E-09	4.73E-09	1.12E-07	7.51E-10	6.86E-09	8.31E-11	1.23E-06
Human toxicity, cancer - inorganics	CTUh	6.93E-07	4.72E-09	8.51E-10	6.23E-08	3.62E-10	4.57E-09	4.17E-11	7.66E-07
Human toxicity, cancer - organics	CTUh	3.36E-07	3.08E-09	3.87E-09	4.94E-08	3.89E-10	2.29E-09	4.15E-11	3.95E-07
Human toxicity, non-cancer	CTUh	3.13E-05	9.01E-08	6.07E-08	2.39E-06	1.65E-08	3.21E-07	7.60E-09	3.42E-05
Human toxicity, non-cancer - inorganics	CTUh	2.74E-05	8.50E-08	4.21E-08	2.28E-06	1.55E-08	3.18E-07	7.60E-09	3.02E-05
Human toxicity, non-cancer - organics	CTUh	9.72E-07	5.08E-09	1.86E-08	1.07E-07	9.78E-10	3.23E-09	2.75E-12	1.11E-06
Ionising radiation	kBq U235 eq	4.18E+01	6.00E-02	5.37E-03	1.19E+01	1.18E-02	6.12E-02	8.14E-05	5.38E+01
Land use	Pt	5.83E+03	4.74E+01	5.64E+00	4.07E+03	1.40E+01	3.44E+01	2.48E-02	9.99E+03
Ozone depletion	kg CFC11 eq	1.50E-04	2.85E-07	1.69E-08	2.27E-05	3.60E-08	4.47E-08	6.77E-10	1.73E-04
Particulate matter	disease inc.	8.24E-05	7.37E-07	2.34E-07	5.55E-06	1.34E-07	2.00E-07	5.64E-10	8.92E-05
Photochemical ozone formation	kg NMVOC eq	4.55E+00	3.29E-01	1.01E-02	1.06E+00	9.96E-03	1.58E-02	1.19E-04	5.97E+00
Resource use, fossils	MJ	1.50E+04	2.26E+02	6.14E+00	8.27E+03	2.34E+01	2.62E+01	4.59E-02	2.36E+04
Resource use, minerals and metals	kg Sb eq	1.57E-01	2.65E-05	1.36E-06	1.29E-03	5.31E-06	3.06E-05	1.65E-08	1.59E-01
Water use	m3-world eq	2.98E+02	6.28E-01	3.58E-01	9.47E+01	9.60E-02	7.24E-01	1.60E-03	3.94E+02



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