STRUCTURAL PRECAST CONCRETE
REGIONALIZED INDUSTRY AVERAGE EPD

According to ISO 14025:2006 and ISO 21930:2017

ASTM INTERNATIONAL

100 Barr Harbor Drive, PO Box C700, West Conshohocken, PA 19428-2959. United States.

ASTM International Certified Environmental Product Declaration

This is a business-to-business Type III environmental product declaration for Structural Precast as produced by PCI. This declaration has been prepared in accordance with ISO 14025:2006 and ISO 21930:2017, the governing precast concrete category rules and ASTM international's EPD program operator rules.

The intent of this document is to further the development of environmentally compatible and more sustainable construction products by providing comprehensive environmental information related to potential impacts of structural precast concrete in accordance with international standards.

Environmental Product Declaration Summary

EPD Owner	
Precast/Prestressed PCI Concrete Institute	**Precast/Prestressed Concrete Institute** 8770 W Bryn Mawr Ave Suite 1150, Chicago, IL 60631, United States www.pci.org
Product Group and Name	Structural Precast concrete products
Product Definition	Structural Precast concrete (UN CPC 3755) is a construction product produced by casting concrete in a reusable mold or "form" which is then cured in a controlled environment, conventionally reinforced or prestressed.
Product Category Rules	NSF/ASTM International, PCR for Precast Concrete, V3.0, May 2021.
Certification Period	05.01.2025 - 05.01.2030
Declared Unit	1 metric tonne (1,000 kg) of structural precast concrete
ASTM Declaration Number	EPD 964

EPD Program Operator	ASTM International
Declaration Holder	Precast/Prestressed Concrete Institute
Declaration Type A "cradle-to-gate" EPD for structural precast concrete as a product group manufactured by 64 PCI member facilities spread across 11 regions in the United States. Activity stages or information modules covered include all production with the product ready for shipment from the point of manufacture (modules A1 to A3). The declaration is intended for use in Business-to-Business (B-to-B) communication.	
Product Applicability Structural precast concrete includes bridge decks, girders, columns, beams, walls, stairs, and other reinforced or prestressed components, cast in reusable molds and cured off-site.	
Content of the Declaration This declaration follows Section 9; Content of an EPD, NSF/ASTM International PCR for Precast Concrete, V3.0, May 2021.	
This EPD was independently verified by ASTM in accordance with ISO 14025: **Internal** **External** X (External)	Timothy Brooke ASTM International 100 Barr Harbor Dr. West Conshohocken, PA 19428 tbrooke@astm.org
EPD Project Report Information	
EPD Project Report	A Cradle-to-Gate LCA of Structural Precast Concrete Products produced by PCI members, March 2025
Prepared by WAP SUSTAINABILITY CONSULTING	**WAP Sustainability Consulting LTD** 1701 Market Street Chattanooga, TN 37408 https://wapsustainability.com/
This EPD project report was independently verified by in accordance with ISO 14025 and the reference PCR:	Thomas P. Gloria, Ph. D. Industrial Ecology Consultants 35 Bracebridge Rd. Newton, MA 02459-1728 t.gloria@industrial-ecology.com
This EPD was prepared using WAP's Theta Concrete EPD Tool v1	
PCR Information	
Program Operator	NSF and ASTM International
Reference PCR	NSF/ASTM International, PCR for Precast Concrete, V3.0, May 2021.
PCR review was conducted by:	Dr. Thomas Gloria, Industrial Ecology Consultants Mr. Bill Stough, Bill Stough, LCC Dr. Michael Overcash, Environmental Clarity

1 PRODUCT IDENTIFICATION

1.1 PRODUCT DEFINITION

Precast concrete (UN CPC 3755) is a construction product produced by casting concrete in a reusable mold or "form" which is then cured in a controlled environment, transported to the construction site, and lifted into place. In contrast, standard concrete is placed into site-specific forms and cured on site. In order of greatest mass, the Structural Precast concrete product covered in this EPD are composed of Aggregates, Portland Cement, Portland Limestone cement, Batch water, fly ash, Rebar, Welded wire reinforcement, Steel and including other Admixtures/ SCMs.

Structural precast products can be conventionally reinforced or prestressed. It typically uses steel reinforcement elements such as rebar and welded wire mesh. These materials enhance the concrete's tensile strength and help resist cracking. It focuses on strength, durability, and the ability to support significant loads.

2 PRODUCT APPLICATION

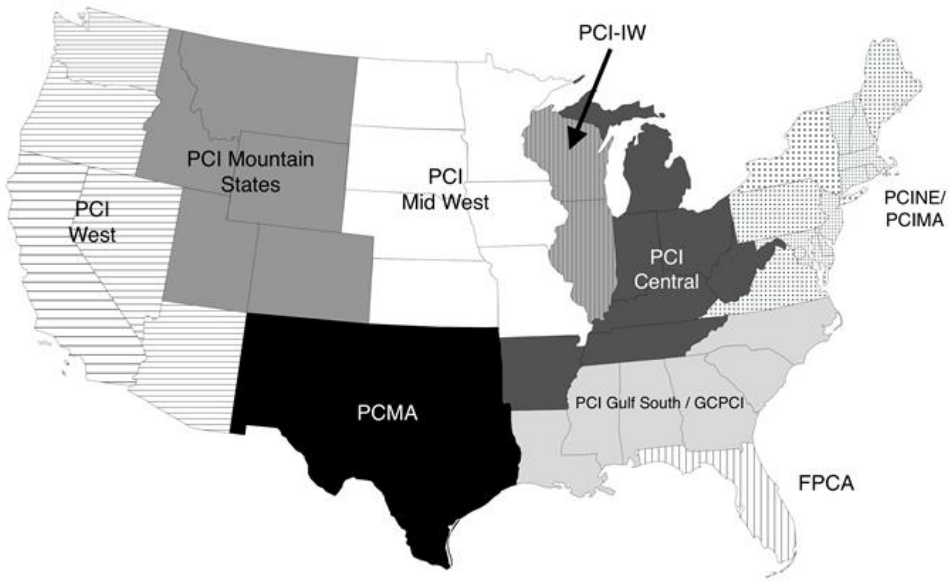
Structural precast concrete is primarily designed for load-bearing applications and includes components like beams, columns, and slabs. superstructure bridge products such as bridge decks, girders, and parapets; substructure bridge products such as abutments, piers, footings, and pile caps; building products such as columns, beams, interior solid bearing and shear walls, double tees, hollow core, spandrels, and solid slabs; stairs and stadia seating; and other items such as piles, footings, barriers, retaining walls, rail ties, sound walls and the like. Structural precast products can be conventionally reinforced or prestressed.

3 DECLARED UNIT

The declared unit is 1 metric tonne of structural precast concrete products.

This study for the structural precast concrete products considers regional factors for accurate results, covering all 11 PCI regions in the United States as derived from LCI data for the reference year 2023. Two sets of regions were combined to anonymize data, ensuring a comprehensive analysis that reflects specific conditions and highlights supply chain improvement opportunities. The regions assessed in this study are shown in Figure 1.

Figure 1: PCI Production Regions Considered in this Study.



4 PRODUCTION STAGE

Figure 2 Production stage system boundary

Production			Construction		Use							End of Life				Benefits & Loads Beyond System Boundary
A1	A2	A3	A4	A5	B1	B2	B3	B4	B5	B6	B7	C1	C2	C3	C4	D
Raw Material Supply	Transport	Manufacturing	Transport to Site	Assembly/Install	Use	Maintenance	Repair	Replacement	Refurbishment	Operational Energy Use	Operational Water Use	Deconstruction	Transport	Waste Processing	Disposal	Reuse, Recovery, Recycling Potential
X	X	X	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND	MND

X = Module Included in LCA Report, MND = Module not Declared

Figure 2 shows the production stage system boundary for the declared product system. The Production Stage includes the following processes:

- A1 - Extraction and processing of raw materials, including fuels used in product production and transport within the manufacturing process (A3);
- A2 - Average or specific transportation of raw materials from the extraction site or source to manufacturing site, inclusive of empty backhauls (where applicable);
- A3 - Manufacturing of each precast product including all energy and materials required and all emissions and wastes produced;
- Average or specific transportation from manufacturing site to recycling/reuse/landfill for pre-consumer wastes and unutilized by-products from manufacturing, including empty backhauls (where applicable); and
- Final disposition of pre-consumer wastes inclusive of transportation.

The Production Stage excludes the following processes:

- Production, manufacture, and construction of manufacturing capital goods and infrastructure;
- Formwork;
- Production and manufacture of production equipment, delivery vehicles, and laboratory equipment;
- Personnel related activities (travel, office operations and supplies); and
- Energy and water use related to company management and sales activities that may be located either within the factory site or at another location.

5 LIFE CYCLE INVENTORY

5.1 DATA COLLECTION AND REPRESENTATIVENESS

All gate-to-gate LCI flow data for energy, total water use, emissions and waste generated were used to determine an overall per unit precast plant operations profile. These per unit gate-to-gate operational flows were used to calculate the plant production effects for Structural Precast Concrete. Each plant also provided material consumption data that was specific to Structural Precast production which was used to develop an average composition on a production weighted basis.

5.2 CUT OFF RULES, ALLOCATION RULES AND DATA QUALITY REQUIREMENTS

Cut-off rules, as specified in NSF PCR for precast concrete: 2021, Section 7.1.8 were applied. All input/output flow data reported by the participating member facilities were included in the LCI modeling. None of the reported flow data were excluded based on the cut-off criteria. No substances with hazardous and toxic properties that pose a concern for human health and/or the environment were identified in the framework of this EPD.

Allocation procedures observed the requirements and guidance of ISO 14044:2006, clause 4.3 and those specified in NSF PCR for precast concrete, section 7.1. A small number of the facilities also produced other specialty precast products – a co-product - and in such instances “mass” allocation was used to allocate facility LCI environmental flows (inputs and outputs) across the co-products for those facilities prior to calculating and rolling up the weighted average LCI flows for the gate-to-gate process and individual product groups.

In addition, the following allocation rules are applied:

- Allocation related to transport is based on the mass and distance of transported inputs;
- The NSF sub-category PCR recognizes fly ash, silica fume and granulated bast furnace slag as recovered materials and thus the environmental impacts allocated to these materials are limited to the treatment and transportation required to use as a precast concrete material input. That is, any allocations before reprocessing are allocated to the original product;
- The environmental flows related to the disposal of the manufacturing (pre-consumer) solid and liquid waste are allocated to module A3 Manufacturing.

Data quality requirements, as specified in NSF's Precast Concrete PCR: 2021, section 7.1.9, were observed. This section also describes the achieved data quality relative to the ISO 14044:2006 requirements. Data quality is judged on the basis of its precision (measured, calculated or estimated), completeness (e.g., unreported emissions), consistency (degree of uniformity of the methodology applied within a study serving as a data source) and representativeness (geographical, temporal, and technological).

Precision: The precision of the data is considered high. The participating member companies through measurement and calculation collected primary data on their production of structural precast concrete. For accuracy the LCA team individually validated these plant gate-to-gate input and output data.

Completeness: All relevant, specific processes, including inputs (raw materials, energy and ancillary materials) and outputs (emissions and production volume) were considered and modeled to represent structural precast production. The relevant background materials and processes were taken from the US LCI Database, Ecoinvent v 3.4 LCI database for Canada, United States and/or global and modeled in WAP’s pre-verified Theta Concrete EPD Tool v2 (February 2022).

Consistency: The consistency of the model is considered high. The bills of materials provided by the product engineers were developed for multiple internal departments use and are maintained regularly. The LCA practitioner also cross-referenced the installation documents and other relevant information to ensure consistency. Furthermore, modeling assumptions were consistent across the model, with preference given towards Ecoinvent data, where available.

Reproducibility: This study is considered reproducible. Descriptions of the data and assumptions through this report would allow a practitioner to utilize the LCA tool to generate results for the products. A high level of transparency is provided throughout the LCA background report (publicly available) as the weighted average LCI profile for each product sub-group is presented for the declared product. Key primary (manufacturer specific) and secondary (generic) LCI data sources are also summarized in the LCA background report. The provision of more detailed data to allow full external reproducibility was not possible due to reasons of confidentiality.

Representativeness: The representativeness of the data is summarized as follows.

- ***Time related coverage*** of the precast manufacturing process - primary data collected: 2023 (12 months).
- Generic data: the most appropriate LCI datasets were used as found in the US LCI (adjusted) Database, Ecoinvent v.3.4 database for United States, Canada and global.
- ***Geographical coverage***: the geographical coverage is the United States.
- ***Technological coverage***: typical or average.

6 LIFE CYCLE ASSESSMENT

6.1 RESULTS OF THE LIFE CYCLE ASSESSMENT

This section summarizes the results of the life cycle impact assessment (LCIA) based on the cradle-to-gate life cycle inventory inputs and outputs analysis. The results are calculated on the basis of one metric tonne (1,000 kg) of Structural Precast Concrete products. The production results are delineated by information module (A1 – Raw material supply), (A2 – Raw material transport), and (A3 – precast core manufacturing).

As per NSF PCR for precast concrete:2021, Section 7.3, the US EPA Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI), version 2.1, 2012 impact categories are used as they provide a North American context for the mandatory category indicators to be included in this EPD. These are relative expressions only and do not predict category impact end-points, the exceeding of thresholds, safety margins or risks. Total primary and sub-set energy consumption was compiled using a cumulative energy demand model. Material resource consumption and generated waste reflect cumulative life cycle inventory flow information. To promote uniform guidance on the data collection, calculation and reporting of results, the ISO 21930 was used.

Table 1: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the FPCA Region

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	3.17E+02	2.18E+02	6.70E+01	3.24E+01
ODP [kg CFC 11 eq]	5.28E-06	3.84E-06	2.79E-09	1.44E-06
EP [kg N eq]	3.34E-01	2.20E-01	5.07E-02	6.34E-02
AP [kg SO2 eq]	1.72E+00	7.82E-01	8.62E-01	7.75E-02
POCP [kg O3 eq]	3.29E+01	8.75E+00	2.27E+01	1.50E+00
Use of Primary Resources				
RPRE [MJ]	1.13E+02	1.09E+02	0.00E+00	3.75E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.84E+03	1.59E+03	1.00E+03	2.53E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	8.42E+01	8.42E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	2.22E+03	1.06E+03	9.47E+02	2.14E+02
ADPE [kg Sb eq]	2.75E-04	2.63E-04	0.00E+00	1.15E-05
Consumption of Freshwater				
FW [m3]	1.36E+00	1.18E+00	0.00E+00	1.85E-01
Waste and Output Flows				
HWD [kg]	7.15E+00	7.01E-02	0.00E+00	7.08E+00
NHWD [kg]	1.35E+01	3.71E+00	0.00E+00	9.76E+00
HLRW [m3]	1.84E-03	1.84E-03	0.00E+00	1.19E-08
ILLRW [m3[	7.48E-04	7.48E-04	0.00E+00	1.28E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	7.73E+01	7.73E+01	0.00E+00	0.00E+00

Table 2: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the GCPCI and PCI Gulf South Region

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.73E+02	2.15E+02	4.27E+01	1.54E+01
ODP [kg CFC 11 eq]	5.15E-06	4.25E-06	1.78E-09	8.99E-07
EP [kg N eq]	3.65E-01	2.47E-01	3.17E-02	8.58E-02
AP [kg SO2 eq]	1.07E+00	4.42E-01	5.36E-01	9.49E-02
POCP [kg O3 eq]	2.45E+01	8.23E+00	1.40E+01	2.28E+00
Use of Primary Resources				
RPRE [MJ]	8.52E+01	8.17E+01	0.00E+00	3.58E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.26E+03	1.36E+03	6.42E+02	2.59E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	9.87E+01	9.87E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.81E+03	1.01E+03	6.05E+02	1.93E+02
ADPE [kg Sb eq]	1.25E-04	1.17E-04	0.00E+00	7.63E-06
Consumption of Freshwater				
FW [m3]	1.20E+00	1.02E+00	0.00E+00	1.85E-01
Waste and Output Flows				
HWD [kg]	4.56E-02	4.56E-02	0.00E+00	0.00E+00
NHWD [kg]	1.53E+01	5.17E+00	0.00E+00	1.02E+01
HLRW [m3]	1.84E-03	1.84E-03	0.00E+00	2.65E-08
ILLRW [m3[	4.73E-04	4.72E-04	0.00E+00	2.47E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	9.05E+01	9.05E+01	0.00E+00	0.00E+00

Table 3: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCI Central Region

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.63E+02	2.06E+02	2.43E+01	3.27E+01
ODP [kg CFC 11 eq]	5.26E-06	4.03E-06	1.02E-09	1.23E-06
EP [kg N eq]	3.62E-01	2.35E-01	1.73E-02	1.09E-01
AP [kg SO2 eq]	9.26E-01	4.64E-01	2.91E-01	1.70E-01
POCP [kg O3 eq]	1.70E+01	7.94E+00	7.46E+00	1.62E+00
Use of Primary Resources				
RPRE [MJ]	8.65E+01	8.16E+01	0.00E+00	4.86E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.25E+03	1.34E+03	3.68E+02	5.43E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	9.20E+01	9.20E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.77E+03	9.85E+02	3.47E+02	4.39E+02
ADPE [kg Sb eq]	1.48E-04	1.37E-04	0.00E+00	1.04E-05
Consumption of Freshwater				
FW [m3]	1.39E+00	1.02E+00	0.00E+00	3.72E-01
Waste and Output Flows				
HWD [kg]	4.55E-02	4.55E-02	0.00E+00	0.00E+00
NHWD [kg]	3.20E+01	4.66E+00	0.00E+00	2.73E+01
HLRW [m3]	1.83E-03	1.83E-03	0.00E+00	3.42E-08
ILLRW [m3[	4.74E-04	4.74E-04	0.00E+00	3.22E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	8.44E+01	8.44E+01	0.00E+00	0.00E+00

Table 4: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCI-IW

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.48E+02	2.08E+02	1.55E+01	2.49E+01
ODP [kg CFC 11 eq]	5.01E-06	4.05E-06	6.45E-10	9.60E-07
EP [kg N eq]	3.28E-01	2.37E-01	1.18E-02	7.99E-02
AP [kg SO2 eq]	8.16E-01	4.79E-01	2.00E-01	1.37E-01
POCP [kg O3 eq]	1.43E+01	8.03E+00	5.31E+00	9.43E-01
Use of Primary Resources				
RPRE [MJ]	8.71E+01	8.32E+01	0.00E+00	3.84E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.01E+03	1.36E+03	2.32E+02	4.21E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	9.25E+01	9.25E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.55E+03	9.93E+02	2.19E+02	3.42E+02
ADPE [kg Sb eq]	1.50E-04	1.42E-04	0.00E+00	8.35E-06
Consumption of Freshwater				
FW [m3]	1.50E+00	1.03E+00	0.00E+00	4.76E-01
Waste and Output Flows				
HWD [kg]	4.69E-02	4.69E-02	0.00E+00	0.00E+00
NHWD [kg]	9.66E+00	4.67E+00	0.00E+00	4.99E+00
HLRW [m3]	1.84E-03	1.84E-03	0.00E+00	2.52E-08
ILLRW [m3[	4.89E-04	4.89E-04	0.00E+00	2.33E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	8.49E+01	8.49E+01	0.00E+00	0.00E+00

Table 5: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCI Midwest

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.76E+02	2.07E+02	3.21E+01	3.76E+01
ODP [kg CFC 11 eq]	4.52E-06	3.95E-06	1.35E-09	5.73E-07
EP [kg N eq]	3.99E-01	2.41E-01	2.35E-02	1.35E-01
AP [kg SO2 eq]	1.13E+00	4.98E-01	3.96E-01	2.36E-01
POCP [kg O3 eq]	1.97E+01	8.05E+00	1.03E+01	1.35E+00
Use of Primary Resources				
RPRE [MJ]	1.05E+02	8.67E+01	0.00E+00	1.86E+01
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.44E+03	1.35E+03	4.84E+02	5.99E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	9.10E+01	9.10E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.97E+03	9.97E+02	4.57E+02	5.17E+02
ADPE [kg Sb eq]	1.56E-04	1.46E-04	0.00E+00	1.01E-05
Consumption of Freshwater				
FW [m3]	1.19E+00	1.03E+00	0.00E+00	1.57E-01
Waste and Output Flows				
HWD [kg]	4.72E-02	4.71E-02	0.00E+00	1.00E-04
NHWD [kg]	1.11E+01	4.34E+00	0.00E+00	6.79E+00
HLRW [m3]	1.83E-03	1.83E-03	0.00E+00	1.74E-08
ILLRW [m3[	4.92E-04	4.91E-04	0.00E+00	1.61E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	8.35E+01	8.35E+01	0.00E+00	0.00E+00

Table 6: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCI Mountain

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.97E+02	2.04E+02	3.75E+01	5.53E+01
ODP [kg CFC 11 eq]	5.47E-06	3.94E-06	1.58E-09	1.53E-06
EP [kg N eq]	4.10E-01	2.36E-01	2.64E-02	1.48E-01
AP [kg SO2 eq]	1.28E+00	5.54E-01	4.41E-01	2.84E-01
POCP [kg O3 eq]	2.19E+01	8.10E+00	1.12E+01	2.54E+00
Use of Primary Resources				
RPRE [MJ]	1.50E+02	9.20E+01	0.00E+00	5.80E+01
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.82E+03	1.37E+03	5.69E+02	8.84E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	8.68E+01	8.68E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	2.32E+03	1.01E+03	5.37E+02	7.72E+02
ADPE [kg Sb eq]	1.85E-04	1.62E-04	0.00E+00	2.24E-05
Consumption of Freshwater				
FW [m3]	1.37E+00	1.05E+00	0.00E+00	3.19E-01
Waste and Output Flows				
HWD [kg]	4.80E-02	4.80E-02	0.00E+00	0.00E+00
NHWD [kg]	3.89E+01	3.26E+00	0.00E+00	3.57E+01
HLRW [m3]	1.83E-03	1.83E-03	0.00E+00	2.25E-08
ILLRW [m3[	5.03E-04	5.02E-04	0.00E+00	2.20E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	7.96E+01	7.96E+01	0.00E+00	0.00E+00

Table 7: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCI West

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.55E+02	2.08E+02	2.03E+01	2.67E+01
ODP [kg CFC 11 eq]	5.30E-06	4.10E-06	8.52E-10	1.20E-06
EP [kg N eq]	3.66E-01	2.52E-01	1.47E-02	9.95E-02
AP [kg SO2 eq]	9.90E-01	6.55E-01	2.47E-01	8.85E-02
POCP [kg O3 eq]	1.65E+01	8.58E+00	6.41E+00	1.47E+00
Use of Primary Resources				
RPRE [MJ]	1.39E+02	9.99E+01	0.00E+00	3.91E+01
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.16E+03	1.45E+03	3.07E+02	4.08E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	8.32E+01	8.32E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.73E+03	1.09E+03	2.89E+02	3.52E+02
ADPE [kg Sb eq]	2.01E-04	1.84E-04	0.00E+00	1.68E-05
Consumption of Freshwater				
FW [m3]	1.77E+00	1.08E+00	0.00E+00	6.93E-01
Waste and Output Flows				
HWD [kg]	1.03E-01	4.95E-02	0.00E+00	5.37E-02
NHWD [kg]	1.19E+01	1.80E+00	0.00E+00	1.01E+01
HLRW [m3]	1.90E-03	1.90E-03	0.00E+00	1.58E-08
ILLRW [m3[	5.20E-04	5.19E-04	0.00E+00	1.50E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	7.63E+01	7.63E+01	0.00E+00	0.00E+00

Table 8: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCI Mid Atlantic (PCIMA) & PCI Northeast (PCINE)

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.40E+02	1.88E+02	2.21E+01	3.07E+01
ODP [kg CFC 11 eq]	5.19E-06	3.74E-06	9.26E-10	1.45E-06
EP [kg N eq]	4.11E-01	2.22E-01	1.61E-02	1.73E-01
AP [kg SO2 eq]	8.38E-01	3.99E-01	2.69E-01	1.70E-01
POCP [kg O3 eq]	1.66E+01	7.23E+00	7.00E+00	2.37E+00
Use of Primary Resources				
RPRE [MJ]	7.80E+01	7.29E+01	0.00E+00	5.10E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.05E+03	1.22E+03	3.33E+02	4.93E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	8.41E+01	8.41E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.60E+03	9.22E+02	3.15E+02	3.64E+02
ADPE [kg Sb eq]	1.44E-04	1.30E-04	0.00E+00	1.40E-05
Consumption of Freshwater				
FW [m3]	1.21E+00	9.65E-01	0.00E+00	2.50E-01
Waste and Output Flows				
HWD [kg]	3.76E-02	3.76E-02	0.00E+00	0.00E+00
NHWD [kg]	1.39E+01	4.16E+00	0.00E+00	9.76E+00
HLRW [m3]	1.83E-03	1.83E-03	0.00E+00	5.13E-08
ILLRW [m3[	3.90E-04	3.89E-04	0.00E+00	4.73E-07
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	7.72E+01	7.72E+01	0.00E+00	0.00E+00

Table 9: Cradle to Gate Results for One Metric Tonne Structural Precast Concrete Produced in the PCMA.

Indicator	A1-A3	A1	A2	A3
Environmental Impacts				
GWP [kg CO2 eq]	2.61E+02	2.08E+02	3.99E+01	1.31E+01
ODP [kg CFC 11 eq]	4.80E-06	4.02E-06	1.65E-09	7.76E-07
EP [kg N eq]	3.30E-01	2.39E-01	3.12E-02	5.99E-02
AP [kg SO2 eq]	1.15E+00	5.49E-01	5.38E-01	6.04E-02
POCP [kg O3 eq]	2.35E+01	8.17E+00	1.43E+01	1.07E+00
Use of Primary Resources				
RPRE [MJ]	9.51E+01	8.95E+01	0.00E+00	5.58E+00
RPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRPRE [MJ]	2.19E+03	1.39E+03	5.92E+02	2.07E+02
NRPRM [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Use of Secondary Resources				
SM [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
RSF [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
NRSF [MJ]	8.90E+01	8.90E+01	0.00E+00	0.00E+00
RE [MJ]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Abiotic Depletion Potential				
ADPF [MJ]	1.76E+03	1.02E+03	5.59E+02	1.76E+02
ADPE [kg Sb eq]	1.69E-04	1.61E-04	0.00E+00	7.77E-06
Consumption of Freshwater				
FW [m3]	1.52E+00	1.05E+00	0.00E+00	4.62E-01
Waste and Output Flows				
HWD [kg]	4.91E-02	4.91E-02	0.00E+00	0.00E+00
NHWD [kg]	2.00E+01	3.70E+00	0.00E+00	1.63E+01
HLRW [m3]	1.84E-03	1.84E-03	0.00E+00	8.68E-09
ILLRW [m3[	5.14E-04	5.14E-04	0.00E+00	8.47E-08
CRU [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MR [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
MER [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
EE [kg]	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Additional inventory parameters for transparency				
CCE [kg CO2 eq]	8.16E+01	8.16E+01	0.00E+00	0.00E+00

6.2. SAMPLE MINIMUM AND MAXIMUM

Table 10-11 represent the minimum and maximum values of cradle-to-gate results for all three product categories across the nine regions.

Table 10: Maximum values for Cradle to Gate results for One Metric Tonne Structural Precast Concrete Produced in the nine different regions.

Indicator	Unit	FPCA	GCPCI/PCI Gulf South	PCI Central	PCI IW	PCI Midwest	PCI Mountain	PCI West	PCIMA/PCINE	PCMA
Environmental Impacts										
GWP	kg CO2 eq.	3.64E+02	3.18E+02	3.06E+02	2.92E+02	3.19E+02	3.38E+02	2.95E+02	2.79E+02	3.03E+02
ODP	kg CFC 11 eq.	5.96E-06	5.92E-06	5.99E-06	5.74E-06	5.24E-06	6.15E-06	5.96E-06	5.87E-06	5.50E-06
EP	kg N eq.	3.69E-01	4.05E-01	3.99E-01	3.66E-01	4.36E-01	4.45E-01	4.00E-01	4.45E-01	3.66E-01
AP	kg SO2 eq.	1.91E+00	1.16E+00	1.02E+00	9.18E-01	1.23E+00	1.39E+00	1.12E+00	9.20E-01	1.26E+00
POCP	kg O3 eq.	3.49E+01	2.63E+01	1.87E+01	1.60E+01	2.14E+01	2.35E+01	1.81E+01	1.81E+01	2.52E+01
ADPF	MJ	2.43E+03	1.99E+03	1.95E+03	1.73E+03	2.15E+03	2.50E+03	1.91E+03	1.77E+03	1.93E+03

Table 11: Minimum values for Cradle to Gate results for One Metric Tonne Structural Precast Concrete Produced in the nine different regions.

Indicator	Unit	FPCA	GCPCI/PCI Gulf South	PCI Central	PCI IW	PCI Midwest	PCI Mountain	PCI West	PCIMA/PCINE	PCMA
Environmental Impacts										
GWP	kg CO2 eq.	2.70E+02	2.29E+02	2.20E+02	2.05E+02	2.34E+02	2.55E+02	2.14E+02	2.01E+02	2.18E+02
ODP	kg CFC 11 eq.	4.60E-06	4.38E-06	4.53E-06	4.28E-06	3.80E-06	4.79E-06	4.64E-06	4.51E-06	4.10E-06
EP	kg N eq.	2.99E-01	3.25E-01	3.24E-01	2.91E-01	3.62E-01	3.74E-01	3.32E-01	3.76E-01	2.94E-01
AP	kg SO2 eq.	1.53E+00	9.83E-01	8.27E-01	7.13E-01	1.02E+00	1.16E+00	8.63E-01	7.56E-01	1.03E+00
POCP	kg O3 eq.	3.09E+01	2.28E+01	1.53E+01	1.25E+01	1.79E+01	2.02E+01	1.48E+01	1.50E+01	2.18E+01
ADPF	MJ	2.02E+03	1.63E+03	1.59E+03	1.37E+03	1.79E+03	2.15E+03	1.56E+03	1.43E+03	1.58E+03

6.2 INTERPRETATION

Across the production information modules for all regions, module A1 raw material supply contributes the largest share of the impact category results – accounting for roughly 70-80% of the impact burden. The upstream raw material supply (A1) also accounts for the largest share of energy use; almost all of which is drawn from non-renewable energy sources. Raw material transportation (A2) proves to be a minor contributor to the burdens exhibited by precast products. Manufacturing (A3) precast products contributes in the order of 10% of all greenhouse gases and 20% of the primary energy use. Across the product groups there is a correlation between cement use and the global warming potential and energy use results.

7 ADDITIONAL ENVIRONMENTAL INFORMATION

Quality and Environmental Management Systems
In general, PCI manufacturing facilities follow the ISO 14001 environmental management system, ISO 9001 quality management system or other in-house quality control systems.

8 DECLARATION TYPE AND PRODUCT AVERAGE DECLARATION

The type of EPD is defined as:
A "Cradle-to-gate" EPD of regionalized structural precast concrete products covering the product stage (modules A1 to A3) and is intended for use in Business-to-Business communication.

9 DECLARATION COMPARABILITY LIMITATION STATEMENT

The following ISO statement indicates the EPD comparability limitations and intent to avoid any market distortions or misinterpretation of EPDs based on the NSF's Precast Concrete PCR: 2021:
- EPDs from different programs (using different PCR) may not be comparable.
- Declarations based on the NSF Precast Concrete PCR are not comparative assertions; that is, no claim of environmental superiority may be inferred or implied.

10 EPD EXPLANATORY MATERIAL

For any explanatory material, in regard to this EPD, please contact the program operator.
ASTM International
Environmental Product Declarations
100 Barr Harbor Drive,
West Conshohocken,
PA 19428-2959, http://www.astm.org

11 REFERENCES

1. ISO 14044: 2006 Environmental Management – Life cycle assessment – Requirements and Guidelines.
2. ISO 14044: 2006/ Amd 1:2017 Environmental Management – Life cycle assessment – Requirements and Guidelines – Amendment 1.
3. ISO 14044: 2006/ Amd 2:2020 Environmental Management – Life cycle assessment – Requirements and Guidelines – Amendment 2.
4. ISO 14025:2006 Environmental labels and declarations – Type III environmental declarations – Principles and Procedures.
5. ISO 21930:2017 Sustainability in buildings and civil engineering works – Core rules for environmental product declarations of construction products and services.
6. EPA PCR Guidance Document: U.S. EPA Criteria for Product Category Rules (PCRs) to Support the Label Program for Low Embodied Carbon Construction Materials (EPA's PCR Criteria) (Version 1—2024)
7. IPCC AR5: IPCC, 2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, R.K. Pachauri and L.A. Meyer (eds.)]. IPCC, Geneva, Switzerland, 151 pp
8. CED V1.10 NCV: Cumulative Energy Demand (CED) V1.10
9. NSF/ASTM International, Product Category Rules for Precast Concrete, UNCPC: 37550 Version 3 (April 30, 2021)

APPENDIX A – SECONDARY DATASETS

Table A1: Datasets used in the A1 Module of this LCA

Flow Ref.	Materials	LCI Data Source	Year / Region	Data Quality Assessment
A1-1	GU and GUL Cement *ASTM C150, C595, C1157*	Portland Cement Association EPD of Portland Cement and Portland Limestone Cement (2021)	2021 North America	• Technology: very good • Time: very good • Geography: very good • Completeness: very good • Reliability: very good
A1-2	Fly Ash *ASTM C618*	None, no incoming burden, only transport is considered	N/A	• N/A • Recovered material
A1-3	Silica Fume *ASTM c1240*	None, no incoming burden, only transport is considered	N/A	• N/A • Recovered material
A1-4	Slag Cement *ASTM C989*	Slag Cement Association EPD of North America Slag Cement (2021)	2021 North America	• Technology: very good • Time: very good • Geography: very good • Completeness: very good • Reliability: very good
A1-5	Crushed Aggregates *coarse and fine ASTM C33*	ecoinvent 3.9: “Gravel, crushed {RoW}| production | Cut-off, U” Modified foreground process with region-specific electricity grid.	2024 World/ Regional	• Technology: very good • Time: poor • Geography: good • Completeness: very good • Reliability: very good
A1-6	Natural Aggregates *coarse and fine ASTM C330*	ecoinvent 3.9: “Gravel, round {RoW}| gravel and sand quarry operation | Cut-off, U” Modified foreground process with region-specific electricity grid.	2024 World/ Regional	• Technology: very good • Time: poor • Geography: good • Completeness: very good • Reliability: very good

Flow Ref.	Materials	LCI Data Source	Year / Region	Data Quality Assessment
A1-7	Pelletized Slag	Slag Cement Association EPD of North America Slag Cement, Module A1 (2021)	2021 North America	• Technology: very good • Time: very good • Geography: very good • Completeness: very good • Reliability: very good
A1-8	Admixtures *ASTM C494*	EFCA EPDs for Air Entrainers, Plasticisers and superplasticisers, Hardening Accelerators, Set Accelerators, Water Resisting Admixtures, and Retarders (2015) [8] Non-supported LCIA indicators estimated – adjusted using TRACI equivalents	2022 EU	• Technology: very good • Time: very good • Geography: fair • Completeness: good • Reliability: very good
A1-9	Batch and Wash Water *ASTM C1602*	ecoinvent 3.9: Tap water {RoW}| market for | Cut-off, U	2024 World/ USA	• Technology: very good • Time: good • Geography: good • Completeness: very good • Reliability: very good
A1-10	Steel Plate	American Iron and Steel Institute – Life Cycle Inventories of North American Steel Products (2020) – wire and plate	2017 USA	• Technology: very good • Time: very good • Geography: good • Completeness: very good • Reliability: very good
A1-11	Rebar, Welded Wire, Steel Stressing Strand*	Concrete Reinforcing Steel Institute EPD for Steel Reinforcement Bar (2020) – *Adjusted by factor 1.10 for Steel Stressing Strand	2022 North America	• Technology: very good • Time: very good • Geography: good • Completeness: very good • Reliability: very good
A1-12	Lightweight Aggregates	Ecoinvent 3.9: **Expanded clay {RoW}| production | Cut-off U**	2024 World/ USA	• Technology: very good • Time: good • Geography: good • Completeness: very good • Reliability: very good
A1-13	Glass Fiber	Ecoinvent 3.9: **Glass fiber,** {RoW}| market for | Cut-off, U	2024 World/ USA	• Technology: very good • Time: good • Geography: good • Completeness: very good • Reliability: very good

Flow Ref.	Materials	LCI Data Source	Year / Region	Data Quality Assessment
A1-14	Expanded Polystyrene and **Waste expanded polystyrene**	**EPD: EPS Industry Alliance: Expanded Poystyrene (EPS) Insulation Type VIII; Waste expanded polystyrene {GLO}| market for | APOS, S**	2023 North America	• Technology: very good • Time: good • Geography: good • Completeness: very good • Reliability: very good

Table A2: Datasets used in the A2 Module of this LCA

Flow Ref.	Process	LCI Data Source	Year / Region	Data Quality Assessment
A2-1	Road	USLCI 2014: Transport, combination Truck, short-haul, diesel powered/tkm/RNA (2014) [13]	2014 USA	• Technology: very good • Time: good • Geography: very good • Completeness: very good • Reliability: very good
A2-2	Rail	USLCI 2014: Transport, train, diesel powered /US U (2014) [13]	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good • Reliability: very good
A2-3	Ocean	USLCI 2014: Transport, Ocean freighter, average fuel mix /US U (2014) [13]	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good • Reliability: very good
A2-4	Barge	USLCI 2014: Transport, Barge, average fuel mix /US U (2014) [13]	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good • Reliability: very good

Table A3: Datasets used in the A3 Module of this LCA

Flow Ref	Process	LCI Data Source	Year / Region	Data Quality Assessment
A3-1	Electricity	ecoinvent 3.9: Electricity, low voltage {XX}| market for | Cut-off, U (2018) [18]	2024 North America	• Technology: very good • Time: very good • Geography: very good • Completeness: very good Reliability: very good

Flow Ref	Process	LCI Data Source	Year / Region	Data Quality Assessment
A3-2	Natural Gas	USLCI 2014: Natural Gas, combusted in industrial boiler /US U (2014)	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good • Reliability: very good
A3-3	Diesel	USLCI 2014: Diesel, combusted in industrial equipment /US U (2014) [13]	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good Reliability: very good
A3-4	Gasoline	USLCI 2014: Gasoline, combusted in equipment /US U (2014) [13]	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good • Reliability: very good
A3-5	Liquefied Propane Gas	USLCI 2014: Liquefied petroleum gas, combusted in industrial boiler /US U (2014) [13]	2014 USA	• Technology: very good • Time: fair • Geography: very good • Completeness: very good • Reliability: very good
A3-6	Hazardous Solid Waste,	ecoinvent 3.9: Hazardous waste, for incineration {RoW}| treatment of hazardous waste, hazardous waste incineration | Alloc Rec, U (2018) [18]	2024 World/ USA	• Technology: very good • Time: good • Geography: good • Completeness: very good • Reliability: very good
A3-7	Non-Hazardous Solid Waste	ecoinvent 3.9: Inert waste {RoW}| treatment of, sanitary landfill | Alloc Rec, U (2018) [18] Modified foreground process with United States average electricity grid	2024 World/ USA	• Technology: very good • Time: good • Geography: good • Completeness: very good • Reliability: very good

APPENDIX B – PARTICIPATING COMPANIES

Company	Facility	PCI Reporting Region
ATMI Precast	ATMI Indy	PCI Central
	ATMI Aurora	PCI-IW
Boccella Precast	Boccella NJ	PCIMA/PCINE
Clark Pacific	Adelanto, CA	PCI West
	Woodland, CA	PCI West
Con-Fab California, LLC	Lathrop, CA	PCI West
Concrete Building Systems	Delaware	PCIMA/PCINE
Concrete Industries, Inc.	Nebraska	PCI Midwest
Concrete Technology Corporation	Washington	PCI West
Coreslab Structures Inc.	Coreslab Structures (Missouri)	PCI Midwest
	Coreslab Structures (ARIZ) Inc.	PCI West
	Coreslab Structures (Indianapolis) Inc.	PCI Central
	Coreslab Structures (OKLA) Inc	PCMA
	CoreSlab Tampa	FPCA
	CoreSlab Perris, CA	PCI West
County Prestress	Illinois	PCI-IW
East Texas Precast	East Texas Precast	PCMA
EnCon United	EnCon Colorado	PCI Mountain States
	Stresscon	PCI Mountain States
	EnCon Arizona	PCI West
Fabcon	Grandville, MI	PCI Central
	Grove City, OH	PCI Central
	Mahanoy City, PA	PCIMA/PCINE
	Pleasanton, KS	PCI Midwest

	Savage, MN	PCI Midwest
	Selkirk, NY	PCIMA/PCINE
	Trenton, MI	PCI Central
Finfrock	Florida	FPCA
Gage Brothers	Sioux Falls, SD	PCI Midwest
Gate Precast	Ashland City, TN	PCI Central
	Kissimmee, FL	FPCA
	Jacksonville, FL	FPCA
	Hillsboro, TX (Arch and Structural Plants)	PCMA
	Monroeville, AL	GCPCI/PCI Gulf South
High Concrete Group LLC	Denver, PA	PCIMA/PCINE
Joseph P.Cararra & Sons	Vermont	PCIMA/PCINE
Knife River Precast	Harrisburg, OR	PCI West
	Newman Lake, WA	PCI West
Lindsay Precast	Lindsay North Carolina	GCPCI/PCI Gulf South
	Lindsay South Carolina	GCPCI/PCI Gulf South
Metromont	Bartow, FL	FPCA
	Greenville, SC	GCPCI/PCI Gulf South
	Hiram, GA	GCPCI/PCI Gulf South
	Richmond, VA	PCIMA/PCINE
	Spartanburg, SC	GCPCI/PCI Gulf South
	Winchester, VA	PCIMA/PCINE
Molin	Lino Lakes, MN	PCI Midwest
	Ramsey, MN	PCI Midwest
Mid-States Concrete Industries, LLC	Illinois	PCI-IW
Dailey Precast LLC, A Peckham Family Company	Dailey Precast	PCIMA/PCINE
Plum Creek Structures	Plum Creek, CO	PCI Mountain States
Prestress Services	Kentucky	PCI Central
Tindall Corporation	Spartanburg, SC	GCPCI/PCI Gulf South
	Petersburg, VA	PCIMA/PCINE
	Moss Point, MS	GCPCI/PCI Gulf South
United Concrete Products	Connecticut	PCIMA/PCINE
Wells	Crystal Lake, MN	PCI Midwest
	Valders, MN	PCI Midwest
	Albany, MN	PCI Midwest
	Rosemount, MN	PCI Midwest
	Wells, MN	PCI Midwest
	Brighton, CO	PCI Mountain States
Willis Construction	San Juan Bautista, CA	PCI West