

# ENVIRONMENTAL PRODUCT DECLARATION

In accordance with ISO 14025:2006 for:  
Electricity from cogeneration plant in Örtofta  
from Krafringen



Programme:	The International EPD <sup>®</sup> System, <a href="http://www.environdec.com">www.environdec.com</a>
Programme operator:	EPD International AB
EPD registration number:	S-P-07523
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# PROGRAMME INFORMATION

## **PROGRAMME: The International EPD® System**

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## **Accountabilities for PCR, LCA and independent, third-party verification**

### **Product Category Rules (PCR)**

PCR: 2007:08, version 4.2, Electricity, steam and hot/cold water generation and distribution, UN CPC 171, 173.

**PCR review was conducted by:** The Technical Committee of the International EPD® System.  
A full list of members available on [www.environdec.com](http://www.environdec.com). The review panel may be contacted via [info@environdec.com](mailto:info@environdec.com).

### **Third-party verification**

Independent third-party verification of the declaration and data, according to ISO 14025:2006, via:

EPD verification by individual verifier

**Third-party verifier:** Daniel Böckin ([Daniel@miljogiraff.se](mailto:Daniel@miljogiraff.se)), under the guidance of Pär Lindman, Miljögiraff AB.

**Approved by:** The International EPD® System

Procedure for follow-up of data during EPD validity involves third-party verifier:

Yes  No

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# Company information

**Owner of the EPD:**

Kraftringen Energi AB  
Box 25  
221 00 Lund  
Sweden

**Company number:** 556100-9852

**Contact information:** Martin Gierow,  
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**Description of the organisation:**

Kraftringen is a regional energy company in the south of Sweden, owned by the municipalities of Lund, Eslöv, Hörby and Lomma, headquartered in Lund.

Our vision is “Energy for future generations”. We strive to deliver electricity, heat, cooling, communications and other services with minimal impact on the environment. Work on a district heating grid in the city started in the early 1960’s,

replacing local boilers and thereby lowering overall emissions. Over the years, a gradual move away from fossil fuels have meant that the citizens of Lund, Lomma and Eslöv have kept warm in an ever more sustainable fashion. Waste incineration, electric boilers, heat pumps producing heat from sewage water are some examples. In 1985, a unique geothermal system was brought online, supplying 25 % of the overall heating need in the cities. In 2018, the last fraction of fossil fuels was removed from the mix. Contributing to the fact that the City of Lund reached its climate goals for 2020 a full two years early.

Kraftringen implements a certified environmental management system. The system is based on the standard ISO 14001:2015.

**Name and location of production site:**

The following production site, located in the municipality of Eslöv have been included in the EPD:

- Örtoftaverket

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# Product information

**Product name:** Electricity from cogeneration plant in Örtofta

**Product identification:****Product description:**

The combined heat and power plant in Örtofta has been in operation since 2014, supplying the local heating grid with half of its yearly demand of about 1 TWh, while generating 168 GWh of electricity (in 2020).

The site has an estimated technical lifetime of 40 years. Maintenance on the electrical grid has also been included in the assessment.

**UN CPC code:** 171 – Electrical energy.

**Geographical scope:** Sweden

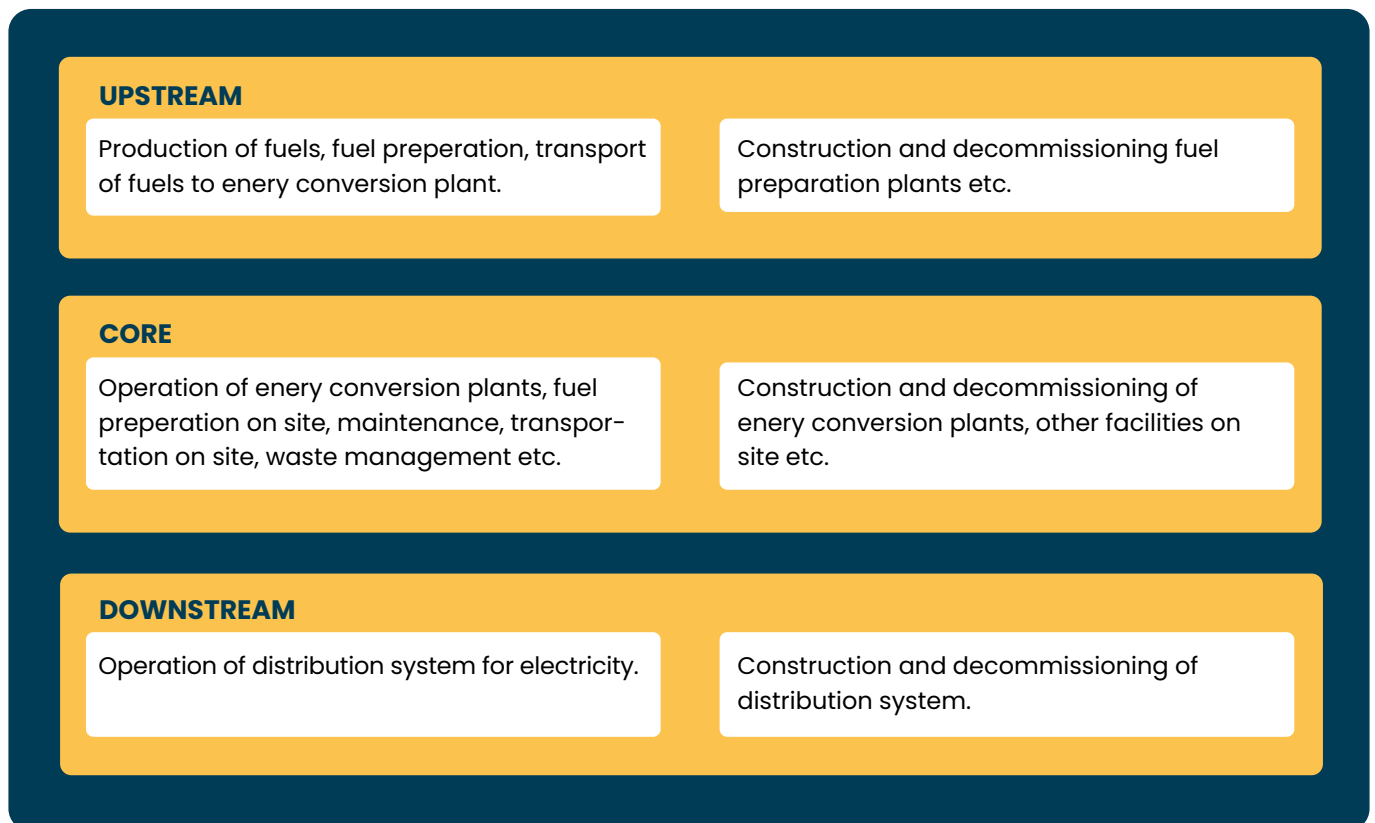
# LCA information

**Functional unit / declared unit:** 1 kWh of electricity generated and thereafter distributed to a customer.

**Time representativeness:** Production data is based on year 2020.

**Database(s) and LCA software used:** GaBi software and database, also Ecoinvent database.

**System diagram:** See figure below.



**Upstream:**

Includes production and transports of fuels and purchased materials used in the core process.

**Core:**

Includes the operation of Örtöfta co-generation plant. Construction and decommissioning of the infrastructure are also included here.

**Downstream:**

Includes distribution of electricity to a customer. Infrastructure is also included. Distribution losses in the grid are 3.8% according to Kraftringen

# Environmental performance

## Potential environmental impact

Electricity from Örtofta co-generation plant (1 kWh electricity)								
Parameter	Unit	UPSTREAM OPERATION	UPSTREAM INFRASTRUCTURE	CORE OPERATION	CORE INFRASTRUCTURE	DOWNSTREAM OPERATION	DOWNSTREAM INFRASTRUCTURE	TOTAL
GWP-fossil	kg CO2 eq.	4,11E-03	0,00E+00	4,85E-03	6,78E-04	3,70E-04	3,08E-03	1,31E-02
GWP-biogenic	kg CO2 eq.	3,94E-04	0,00E+00	1,90E-04	1,48E-06	2,23E-05	-3,71E-05	5,71E-04
GWP-luluc	kg CO2 eq.	4,14E-05	0,00E+00	5,68E-05	1,32E-06	3,78E-06	5,97E-06	1,09E-04
GWP-total	kg CO2 eq.	4,54E-03	0,00E+00	5,09E-03	6,81E-04	3,95E-04	3,05E-03	1,38E-02
AP	mol H+ eq.	1,38E-05	0,00E+00	1,21E-04	1,74E-06	5,20E-06	1,19E-04	2,61E-04
EP-freshwater	kg P eq.	1,06E-07	0,00E+00	2,32E-07	1,40E-09	1,29E-08	9,13E-06	9,48E-06
EP-marine	kg N eq.	2,00E-06	0,00E+00	6,19E-05	3,62E-07	2,44E-06	6,86E-06	7,35E-05
EP-terrestrial	mol N eq.	5,94E-05	0,00E+00	6,52E-04	3,96E-06	2,72E-05	9,06E-05	8,33E-04
POCP	kg NMVOC eq.	5,15E-06	0,00E+00	1,52E-04	1,19E-06	6,04E-06	2,58E-05	1,91E-04
ODP	kg CFC 11 eq.	2,24E-18	0,00E+00	3,09E-12	1,56E-15	1,17E-13	1,78E-10	1,81E-10
ADP-elements*	kg NMVOC eq.	9,01E-10	0,00E+00	1,62E-09	4,95E-10	1,15E-10	2,71E-06	2,71E-06
ADP-fossil*	kg CFC 11 eq.	5,15E-02	0,00E+00	5,59E-02	7,42E-03	4,41E-03	3,55E-02	1,55E-01
WDP*	m3 world eq.	1,58E-04	0,00E+00	1,45E-03	2,54E-05	6,19E-05	1,75E-03	3,44E-03

\* The results of this environmental impact indicator shall be used with care as the uncertainties of the results are high and as there is limited experience with the indicator.

## Use of resources

Electricity from Örtofta co-generation plant (1 kWh electricity)								
Parameter	Unit	UPSTREAM OPERATION	UPSTREAM INFRASTRUCTURE	CORE OPERATION	CORE INFRASTRUCTURE	DOWNSTREAM OPERATION	DOWNSTREAM INFRASTRUCTURE	TOTAL
PERE	MJ	1,05E-02	0,00E+00	1,01E-01	1,17E-03	4,29E-03	8,73E-03	1,26E-01
PERM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PERT	MJ	1,05E-02	0,00E+00	1,09E-01	1,17E-03	4,29E-03	8,73E-03	1,26E-01
PENRE	MJ	5,23E-02	0,00E+00	1,02E-01	7,79E-03	4,53E-03	3,82E-02	1,61E-01
PENRM	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
PENRT	MJ	5,23E-02	0,00E+00	1,02E-01	7,79E-03	4,53E-03	3,82E-02	1,61E-01
SM	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RSF	MJ	7,62E+00	0,00E+00	0,00E+00	0,00E+00	2,90E-01	0,00E+00	7,91E+00
NRSF	MJ	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
FW	m3	1,23E-05	0,00E+00	4,78E-05	1,44E-06	6,87E-06	5,12E-05	2,39E-04

## Waste production and output flows

### Waste production

Electricity from Örtofta co-generation plant (1 kWh electricity)								
Parameter	Unit	UPSTREAM OPERATION	UPSTREAM INFRASTRUCTURE	CORE OPERATION	CORE INFRASTRUCTURE	DOWNSTREAM OPERATION	DOWNSTREAM INFRASTRUCTURE	TOTAL
HWD	kg	4,30E-12	0,00E+00	2,24E-11	7,69E-10	2,93E-09	3,03E-05	3,03E-05
NHWD	kg	3,50E-05	0,00E+00	1,25E-04	1,84E-03	7,92E-04	1,10E-03	2,27E-02
Ash	kg	0,00E+00	0,00E+00	1,86E-02	0,00E+00	7,07E-04	0,00E+00	1,93E-02
Gypsum	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
RWD	kg	2,87E-07	0,00E+00	8,73E-07	1,12E-07	4,18E-08	0,00E+00	1,14E-06

### Output flows

Electricity from Örtofta co-generation plant (1 kWh electricity)								
Parameter	Unit	UPSTREAM OPERATION	UPSTREAM INFRASTRUCTURE	CORE OPERATION	CORE INFRASTRUCTURE	DOWNSTREAM OPERATION	DOWNSTREAM INFRASTRUCTURE	TOTAL
CRU	kg	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00	0,00E+00
MFR	kg	0,00E+00	0,00E+00	0,00E+00	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	0,00E+00	0,00E+00	0,00E+00

# Additional information

## **Radiology and human toxicological risks**

The cogeneration plant uses gauging devices containing Caesium-137. The cover around the radiation source is constructed from stainless steel, preventing ionized radiation from reaching the surrounding environment. However, during measurement the shutter mechanism is open resulting in a hazardous radiation field 1 m around the device. To mitigate danger, all personnel working in the vicinity are educated on where sources of radiation exist and how they are safely managed. Furthermore, radiation measurements are mandatory when working within the danger zone.

## **Environmental Risks**

Environmental risks are managed by systematically evaluating aspects of environmental impact and monitoring key performance indicators in line with Krafringen's certified environmental management system, based on the standard ISO 14001:2015. Identified aspects for the cogeneration plant includes emissions of CO<sub>2</sub>, CO, NO<sub>x</sub> and SO<sub>x</sub> from transports and fuel combustion, R134a-leakage from heat pumps, fly ash management, and procurement of residues from the forest industry affecting biodiversity. Actions taken to mitigate these impacts include transitioning to a fossil-free production, monitoring emissions of CO and R134a-leakage, working with sustainable procurement to reduce impacts in our value chain, and more.

## **Noise**

The cogeneration plant generates noise from machinery such as turbines and pumps. Noise is also produced from transports arriving to and departing from the facility. The noise level caused by the facility is kept below the levels specified in the environmental permit for the facility.

## **Electromagnetic Field**

A measurement of electromagnetic field (EMF) levels in the plant was conducted in 2020. Detected levels did not require further action according to regulations from the Swedish Work Environment Authority (AFS 2016:3). In areas occupied by personnel, no levels were detected which exceeded recommended levels given by Swedish authorities. The cautionary principle states that general exposure should be limited if it is possible to do so at a reasonable cost.

## **Land Use**

The cogeneration plant occupies an area of 175 000 m<sup>2</sup> arable land (Corine Land Cover Class 2.1). Since the plants construction in 2014, the area mainly consists of industrial units (Corine Land Cover Class 1.2). The area is mainly used for the production of heat and electricity, and the storage of biofuels.

## **Impact on biodiversity**

One identified aspect of environmental impact in Krafringen's environmental management system concerns the effect of forestry on biodiversity, as residues from the forest industry make up a large portion of the fuel used. Krafringen participates in the research project BIOPATH (Pathways towards an efficient alignment of the financial system with the needs of biodiversity), which aims to develop pathways to integrate biodiversity in financial decision making, especially related to land use change related to agriculture, forestry, and energy. Emissions of CO from incomplete combustion constitute another possible impact on biodiversity, and emission levels are therefore continually monitored.

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## References

General Programme Instructions of the International EPD® System. Version 3.1.

PCR 2007:08. Electricity, steam and hot/cold water generation and distribution. Version 4.2.

GaBi LCA software (10.6) and database version 2022.2.

Ecoinvent database version 3.8, 2022.

Johansson, K. (2023). LCA methodology report for electricity from Örtofta co-generation plant. IVL, Stockholm, 2023.



