|  |
| --- |
| **DES - Appendix to credit: EAc5 - Measurement and Verification**  |
| **Requirement** | **Information provided by the DES company** |
| Regarding all data | Data should be based on one or several periods of 12 months of data that includes at least a portion of the project M&V period.  The provided data from the DES company must not be fully identical to the project M&V period. For example if the DES-company provides data from January through December, 2016, the project M&V period may be for September 2015 through September 2016. |
| Information about the measured amount of energy delivered to the building from the DES has to be given to the LEED seeking project | 1) Heat delivered [MWh/year] |
| **Fylls i av kund****Lev. Fjärrvärme: MWh****Lev Fjärrkyla: MWh** |
| Amount (in energy terms) and type of fuel used for heat production in heat only boilers (HOB). | 1) Fuel in (all fuels) [MWh/year] |
|

|  |  |
| --- | --- |
| **Bränsletyp** | Tillfört 2016 MWh |
| Bioolja | 481 672 |
| El | 753 207 |
| Fossilolja | 78 073 |
| Förädlat Trädbränsle | 12 785 |
| Kol | 47 201 |
| Oförädlat Trädbränsle | 896 462 |
| Övriga | 1 230 894 |

 |
| Amount (in energy terms) and type of fuel used in each combined heat and power (CHP) plant in the DES. | 1) Fuel in (all fuels) [MWh/year] |
|

|  |  |
| --- | --- |
| **Bränsletyp** | Tillfört 2016 MWh |
| Avfallsbränsle | 1 336 251 |
| Bioolja | 11 122 |
| El | 307 644 |
| Fossilolja | 304 231 |
| Förädlat Trädbränsle | 590 011 |
| Kol | 944 921 |
| Oförädlat Trädbränsle | 570 629 |
| Returbränsle | 1 418 971 |
| Övriga | 2 381 |
| Övriga Biobränsle | 52 460 |

 |
| Specific primary energy factors, PEF, for fuels that the DES- company uses compared to those suggested in Swedish DES-guide, table 5 in Appendix A. If the PEF differs an explanation why is needed. | 1) PEFHOB(i) and PEFCHP(i) (specific fuels) [kWhp/kWhfuel]

|  |  |
| --- | --- |
| **PEF Fortum Värme (VMK)** | **Swedish DES calculation method** |
| Eo1 | 1,11 | 1,11 |
| Eo5 | 1,11 | 1,11 |
| Kol | 1,15 | 1,15 |
| Secondary biofuels | 0,03 | 1,05 |
| Wooden pellets etc | 0,11 | 1,05 |
| Biooil | 0,04 | 0,03 |
| Household waste | 0,04 | 0,03 |
| Return fuel\* | 0,05 | 0,03 |
| City gas | 1,11 | - |
| Peat | 1,01 | - |
| Electricity unspec. Nordic mix | 1,9 | 1,90 |
| Electricity origin labeled | 0 | - |
| Waste heat | 0 | 0,00 |
| Energy from sea and sewer | 0 | - |

\*Return fuels consist of sorted and quality-controlled paper, wood and plastic that can not be recycled and come from offices, shops and industriesThe biggest difference is that tiles and wood pellets according to VMK (as used by Fortum Värme) are considered secondary fuels while Swedish DES Calc. Meth blends biofuels into a primary fuel mail. |
| Additional PEF can be found in the appendix to the “*VMK-agreement* [[1]](#footnote-1)“or in the “Miljöfaktabok 2016- Estimated emission factors for fuels, electricity, heat and transport in Sweden2” |
| Total amount of produced heat in the specific combined heat and power plant. | 1) Heat produced [MWh/year] |
| 4 457 857MWh (2016) |
| Total amount of produced electricity, without deduction of auxiliary electricity, in the specific combined heat and power plant. | 1) Electricity produced [MWh/year] |
| 813 058 MWh (2016) |
| The total delivered district heating to all customers in the district heating network. | 1) Heat delivered [MWh/year] |
| Total heating delivered in heating network (2016): 7 812 **GWh**/year |
| **For district cooling additional information is needed. That is;** |
| The amount of electricity used to produce the cooling (including both the auxiliary electricity for circulation of the cold water in the DES and the electric energy needed for the heat pumps). | 1) Auxiliary electricity [MWh/year ] |
| 54 540 MWh (2016) |
| 2) Electricity used in combined heat pumps [MWh/year] |
| Combined heat pumps: 598 670 MWh (2016)Refrigerating machines: 22 694 MVh (2016) |
| Produced heat and cooling in heat pumps | 1) Total produced Heat [MWh/year] |
| 2 195 967 MWh (2016) |
| 2) Total produced cooling [MWh/year] |
| Combined heat pumps 103 600 + waste cooling 125 800 = 229 400 MWh (2016)+ Free cooling 51 800 + cooling machines 88 800 = total 370 000 MWh  |
| The amount of heat energy used to produce cooling in absorption chillers. In best case monthly amounts are used and summarized for one year. | 1) Heat month, Jan - Dec [MWh/month] |
| *Fortum does not have any absorption chillers in its network.* |
| 2) Monthly Production Scheme [Fuel type, MWh, production type] |
| *Fortum does not have any absorption chillers in its network.* |

1. *Överenskommelse i värmemarknadskommittén om synen på bokförda miljövärden för fastigheter uppvärmda med fjärrvärme.*

2 Jenny Gode, Fredrik. Martinsson., Linus Hagberg, Andreas Öman, Jonas Höglund, David Palm (2016). "Miljöfaktaboken 2016 - Uppskattade emissionsfaktorer för bränslen, el, värme och transporter." Värmeforsk, Anläggnings- och förbränningsteknik 1183 [↑](#footnote-ref-1)