Sustainable Leather Foundation
Standard for Energy Consumption

Reference: FSE6.1
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Peer Reviewed by: R Arbeid and I Kral
Accredited by: XXX

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ENERGY CONSUMPTION STANDARD AND BENCHMARK

Summary: The SLF *Energy Consumption Standard and Benchmark* provides the context, calculation of energy consumption, and the global benchmark. This gives the facility under audit the methodology to record and report their energy consumption to an interested party to ensure the reporting of total energy consumption, and the energy consumption per unit area. It results in visibility of the environmental impact and comparisons of the facilities' energy consumption against international benchmarks which provides the framework for consideration of improvement measures.

1. Scope

The International Standard and Benchmarks for energy consumption specify the method and definition of energy consumption for facilities (and their waste treatment plants) in the leather value chain. The facilities in the value chain include all facilities from the farm to the end of life of the leather.

The Standard and Benchmark on energy consumption includes all direct thermal and electrical energy of the facilities. The energy consumption in question is only related to the Scope of the SLF audit (or mapped certification) that is being audited. The Scope of the *Energy Consumption Standard and Benchmark* does not include indirect energy consumption that is related to the preparation of inputs - that are then used on the site. If a facility uses a subcontractor for part of its process, the energy consumption of the subcontractor will be considered to reflect the overall consumption for that facility.

2. Normative references

The following references are useful in the understanding of this document and are provided for further guidance. In the case of dispute these references will form the core of the evidence in support of the Standard and Benchmarks used here:

BS EN ISO 50001: 2011 *Energy management systems guidance – Requirements with guidance for use*[1]

FSE9.2 – *Energy efficiency and Equipment & Machinery*

EU Directive 2009/28/EC - *on the promotion of the use of energy from renewable sources*[2]

3. Terms and definitions

3.1 **Btu – British Thermal Unit**

3.2 **Calorie (Cal)** - the energy needed to raise the temperature of 1 gram of water through 1 °C (now usually defined as 4.1868 joules)

3.3 **Joule** – the SI unit of work or energy, equal to the work done by a force of one newton when its point of application moves one metre in the direction of action of the force, equivalent to one 3600th of a watt-hour.

3.4 **Tce** – tonne of coal equivalent

3.5 **Toe** – tonne of oil equivalent

3.6 **Watt hour (Wh) -** the SLF will use the Wh hours unit of measurement as the standard unit of measurement (as is also used by the International Energy Agency, IEA), with the kilowatt hour, with the megawatt hour and gigawatt hour when necessary.

3.7 **Renewable energy** - sources of energy (wind power, solar power, hydroelectric power, ocean energy, geothermal energy, biomass, and biofuels) are alternatives to fossil fuels that contribute to reducing greenhouse gas emissions, diversifying energy supply, and reducing dependence on unreliable and volatile fossil fuel markets, in particular oil and gas.

[1] https://www.iso.org/standard/51297.html

[2] https://www.legislation.gov.uk/eudr/2009/28/contents#

4. Principle

The principle of the *Energy Consumption Standard and Benchmark* is to ascertain what the facility is doing to identify, characterise, plan, and implement measures that will reduce the environmental impact of the energy consumed. The Standard identifies the definitions of energy consumption, characterises typical understanding and working practices in the global leather value chain.

The *Energy Consumption Standard and Benchmark* helps the facility identify levels of consumption, using the Calculation outlined in this document, and then compares the amount consumed against international energy benchmarks.

Energy consumption in a facility is more complicated than just taking the electricity meter reading at the incoming electricity meter as the facility also uses other forms (see Annex A) of energy in production (e.g., steam and heating). The Sustainable Leather Foundation (SLF) takes the absolute energy consumption per year (and the energy per m^2) and reports that to interested parties through the SLF Dashboard and SLF Application. SLF does not take best month data and does not compensate for material thickness. Total and absolute energy use is the environmental impact, and this is what must be reported in the measurement of sustainability. All energy required for production including heating of premises; transport within factory compound should be taken into consideration.

SLF does reflect the energy consumption per unit of leather produced and asks for the energy consumption per article within the *Audit Report*. The SLF *Value Chain Transparency Tool* requires data about environmental impacts per article, so a facility will gain extra recognition for granularity at the product level. The facility dashboard looks at total impacts, so the *Audit Report* seeks total measurements of fuel and energy. The main SLF kWh/m^2 energy consumption benchmark is derived from taking the global energy consumption patterns for facilities and establishing a minimum level of acceptable consumption for facilities that use certain operations (excluding drying, finishing, and air/effluent treatment). The energy consumption reports all energy consumed, energy consumed per unit area (benchmarked), and the energy consumed in drying, finishing, and treatment (if performed). SLF acknowledges that farmers, traders, merchants, warehouses, and retailers will have different energy use patterns to slaughterhouses, leather producers, and leather product manufacturers - so two benchmarks of energy consumption are used. The drying, finishing, and treatment are highlighted as separate from the main energy consumption benchmark for comparison and focus for improvement.

The governing principle of this document is to encourage facilities to minimise energy consumption and encourage the selection of renewable energy as their primary source. The transparent declaration of total energy consumption and energy consumption per unit area of leather (less the amount of renewable energy) will establish the overall energy environmental impact of the facility.

5. Procedure

The facility will collect energy consumption figures using verifiable documentary evidence. Types of documentary evidence that are accepted:

a. Electricity bills (electronic or paper copies) on a letterhead or digital equivalent which identifies the electricity supply company.
b. The Energy consumption is converted into kWh using the conversions listed in Annex A and the size of the number converted using appropriate multipliers and a suitable prefix for Wh (using Annex B).

c. Fuel supplier invoices (electronic or paper copies) on a letterhead or digital equivalent which identifies the fuel supply company.
d. Electricity bill from the waste treatment facility (these could include effluent treatment plants – communal, municipal or self-treatment plants) on a letterhead or digital equivalent which identifies the electricity supply company.
e. Records of metered readings that identify the self-generation quantity of renewable energy.
f. Renewable energy from suppliers (electricity; heat/steam) – bills with confirmation/certification of source of energy (renewable; wind; hydropower; photovoltaic; biomass)
g. The records of energy use in the drying areas, finishing, and the effluent plant/air abatement are highlighted.

The documents listed above should identify, the following:

a. Quantity of electrical or fuel energy consumed.
b. How those amounts are converted to kWh (if it has not already done so).
c. The dates of energy consumed or acquired.
d. Records should also indicate when the fuel was consumed. It is assumed that electrical energy is consumed as it is generated or received unless the company can demonstrate electrical energy storage.
e. Records should also indicate the yearly production of leather in square meters that can be linked to the energy footprint to the production of that leather.

6. Calculation of energy use

Parameter	**kWh**
Supplied and metered electricity (not drying, finishing, treatment)	
Supplied and measured fuel	
Energy used in drying	
Energy used in finishing	
Energy used in waste treatment (ETP, air abatement)	
SUBTOTAL	
Less renewable energy (fuel and electricity)	
SUBTOTAL	
Total annual amount of leather produced (m^2)	
Facility energy consumption per square meter of leather produced (kWh/m^2):	

7. Diagnostic parameters

The data that has been acquired in Clause 5 and calculated and tabulated in Clause 6 are audited and reported on the web page dashboard and digital device application of the Sustainable Leather Foundation. The calculated amount given in Clause 6 is compared to producing and non-producing facilities. Annex C indicates the current global energy consumption levels for leather value chain facilities (separated by yearly throughput of leather – raw materials, leather sheets, or leather parts). The comparison of kWh/m^2 for producing and non-producing facilities are plotted on energy range (and yearly indicator comparisons) curves as shown in Annex D. The energy range comparisons (total energy consumption per unit area) are also published for the facility on the webpage dashboard and digital device application. The total energy (in MWh) is also reported (as an indicator of environmental impact). The drying/finishing/treatment energy range comparison (drying/finishing/treatment energy consumption per area) are also reported.

A total energy consumption per unit area level below the maximum acceptable energy consumption (in kWh/m^2, marked in red as shown in Annex D) is deemed a pass and will be marked off as an energy consumption module element completion – that will be reflected on the SLF platforms.

8. Energy Consumption Report

The Test Report for Energy Consumption is the latest digital or printed report that shows the energy consumption calculated (see Clause 6). The test report should include:

1. A reference to this Sustainable Leather Foundation Standard (i.e., FSE6.1: 2020)
2. The energy consumption calculated in kWh by totalling all electricity and fuel inputs in the facility and of the waste treatment plant.
3. Renewable energy as a percentage of total is reported.
4. Drying/Finishing/Waste treatment energy as a percentage of total is reported.
5. Performance in terms of benchmarks against facilities of the same size using Annex C and the correct energy rating range and transposed onto the energy range diagram shown in Annex D.
6. The Energy Report (total consumption, consumption per unit area) and how the consumption per unit area compare to the SLF benchmark should appear on the webpage dashboard and the digital device application content.
7. Whether the SLF module element can be earned or not.

Annex A

	kWh/kg	MJ/kg
Buffing dust (chrome)	4.69	16.9
Butane	12.58	45.3
Charcoal	8.22	29.6
Coke	7.22	26
Crude oil	11.67	42
Diesel	11.67	42
Ethane	13.28	47.8
Fleshings (dried)	2.47	8.9
Hard black coal (Australia and Canada)	6.64	23.9
Hard black coal (IEA)	6.94	25
Hydrogen (H_2)	33.30	120
Kerosene	11.94	43
Landfill gas (biogas)	17.70	63.72
Leather trimmings	5.47	19.7
Lignite/brown coal (Australia)	4.83	17.4
Lignite/brown coal (IEA)	2.78	10
Liquefied petroleum gas (LPG)	12.78	46
Methane (CH_4)	13.90	50
Methanol (CH_3OH)	6.31	22.7
Natural gas (methane and higher alkanes)	11.67	42
Pentane	12.60	45.36
Peat	4.72	17
Petroleum coke	8.69	31.3
Propane	12.88	46.4
Petrol/Gasoline	12.22	44
Rendered oil (methyl ester)	10.50	37.8
Shaving dust (chrome)	1.83	6.6
Soft bituminous coal (Australia and Canada)	4.83	17.4
Soft bituminous coal (IEA)	5.00	18
Steam	0.63	2.3
Sub-bituminous coal	6.78	24.4
Tannery mixed waste	3.33	12.0
Wood (dry)	4.44	16

Engineering ToolBox, (2003). *Fuels - Higher and Lower Calorific Values*. [online] Available at: https://www.engineeringtoolbox.com/fuels-higher-calorific-values-d_169.html [Accessed 12/11/2020].

Annex B

Unit	Conversion
1 GigaWatt hour (Wh)	1.0 x 10^9 Wh
1 MegaWatt hour (MWh)	1.0 x 10^6 Wh
1 kiloWatt hour (kWh)	1.0 x 10^3 Wh
1 Megajoule (MJ)	277.7778 Wh or 0.2778 kWh
1 BTU	0.293 Wh
1 Therm (US)	29.300 kWh

Annex C

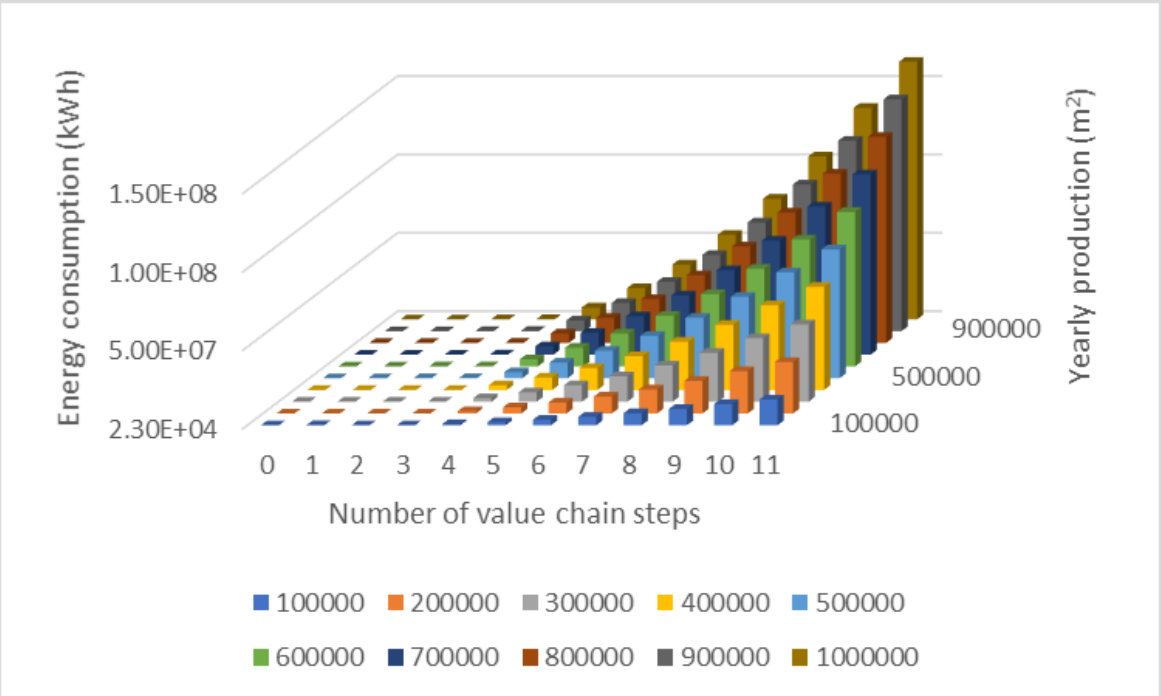
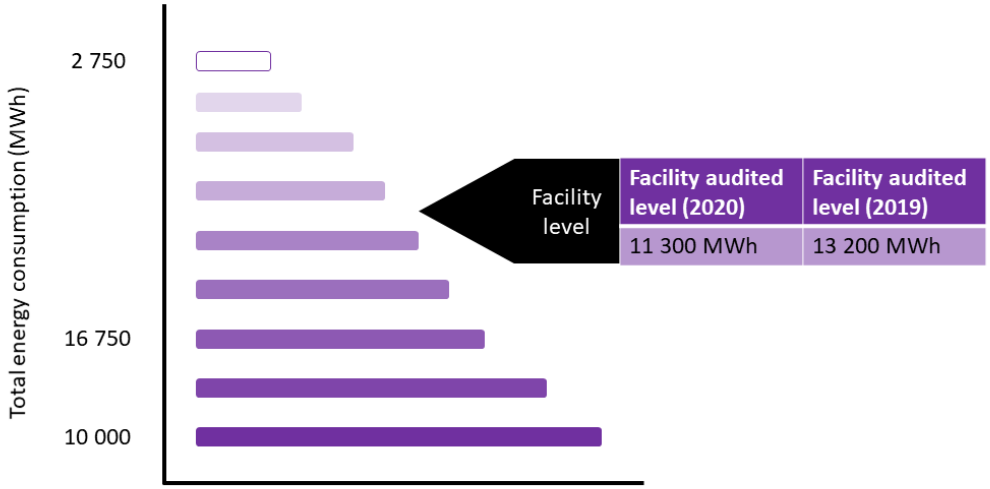
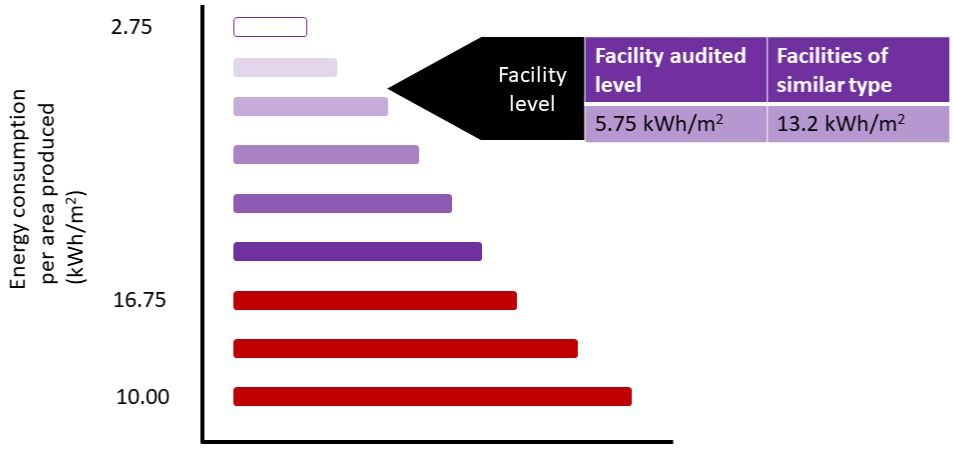


Figure 1. The standard curve for global energy use patterns - as defined on the 13 November 2020 (kWh/sq m) differentiated by monthly throughput (sq. m)

Annex D





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