

naturemade
basic!

naturemade
star!

How much nature is in your energy?

naturemade labelled energy and resources: LCA ensures low footprint solutions

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About naturemade

- **naturemade** is a quality label for renewable and ecological energy
- **Association for Environmentally Sound Energy (VUE)** is the inventor and owner of the **quality label naturemade**, founded in 2001.
 - 160 member: Environmental organizations; energy producers and suppliers; renewable energy producers and their associations; energy consumers and their associations
- The VUE **provides orientation** through credible, evidence-based quality standards and relevant quality labels that are ahead of legal regulations.

Certifiable energy systems (production and supply)



Electricity
Hydropower, wind power, solar, biomass

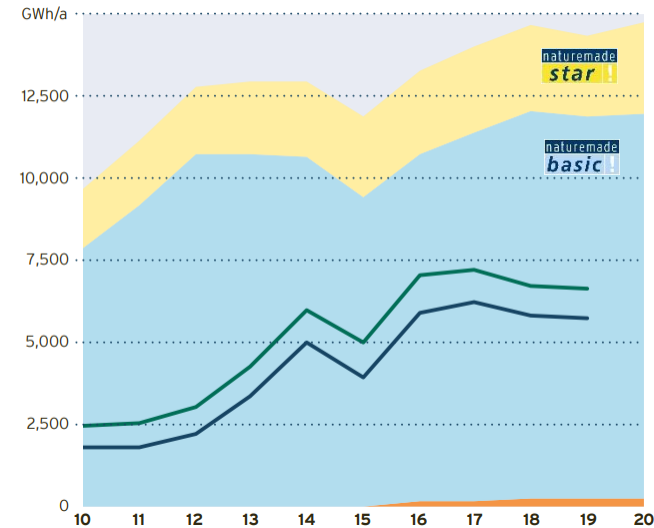


Biogas
Wood fuels, green waste, agricultural biogas, sewage gas

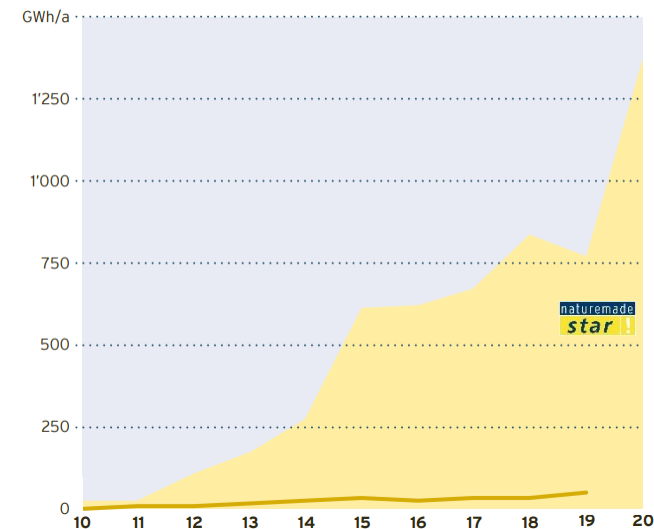


Heat
Wood fuels

Electricity: production and sales volumes

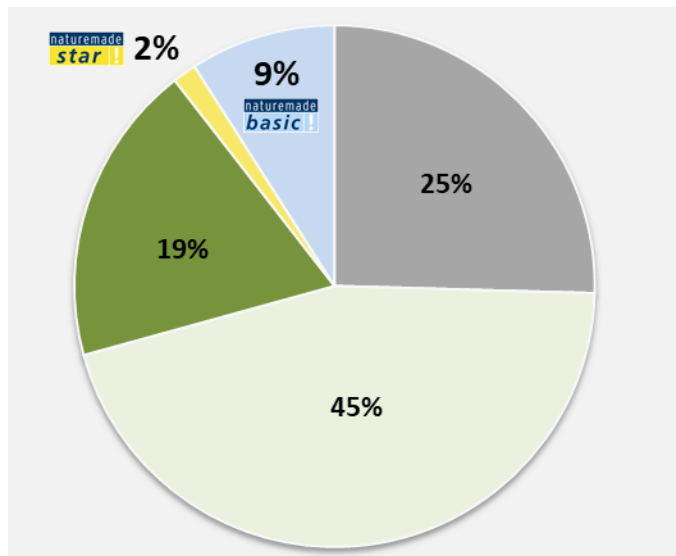


Biogas: production and sales volumes

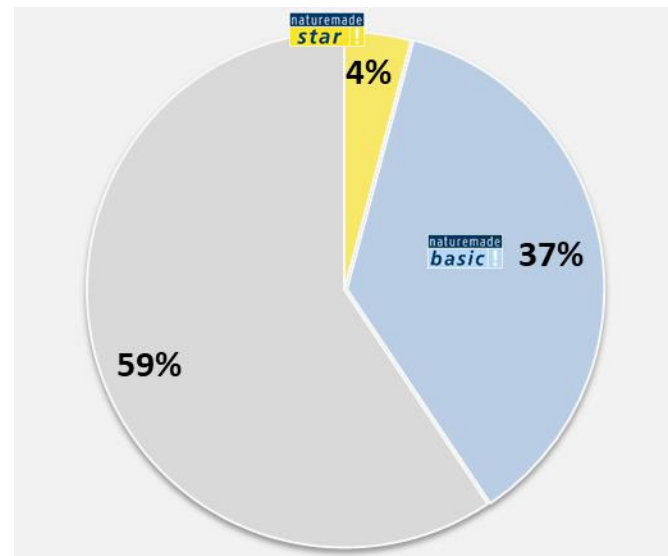


Our share in the energy market

CH electricity market 2019
(57 TWh electricity consumption)



Hydropower production (CH) 2020
(33 TWh electricity production)



Quality assurance system

Criteria

Criteria set has been **developed in collaboration** with professional associations, environmental organizations and producers and suppliers of energy products.

- **Production**

- Global impact -> Threshold value
- Local/regional impact

- **Supply**

- Minimal amount of ecological energy (naturemade star) in each certified energy product
- Support system



Criteria on global impact (in revision process)

Threshold values

System boundary includes energy production and supply. Usage is outside scope.

- **Electricity:** less than 50% of environmental impact of a modern combined-cycle gas-turbine power plant
- **Heat:** less than 50% of environmental impact of a condensing natural gas boiler
- **Biogas:** less than 50% of environmental impact of natural gas used as fuel.

Criteria on global impact (in revision process)

- Assessment of environmental impact (LCA) -> detailed LCAs for each certifiable energy system
 - Evaluation method EcoIndicator '99 (hierachist – average) using type-specific baseline data (future method: ReCiPe 2016)
 - Some energy systems **achieve the threshold value categorically**
 - For the others: VUE provides a **standardized parameter model** specific for each energy system (simplified LCA).
 - Identification and selection of **technology-specific parameters** with high impact and availability of data for parameters by owner/operator

Standardised parameter model for wind plants

Ökostrom-Prüfung: Stromerzeugung mit Windkraft

Eingabe:

Anlagenname:

Bewertungsmethode: EI'99-aggregated, Hierarchist

Inputs

Installierte Leistung	kW	<input type="text" value="30"/>
Turmhöhe	m	<input type="text" value="22"/>

Outputs

Verkaufter Strom pro Jahr (Mittelwert)	kWh	<input type="text" value="18705"/>
Lebensdauer bewegliche Teile	a	<input type="text" value="20"/>
Lebensdauer Turm	a	<input type="text" value="50"/>

Resultate:

	Pro kWh	Im Vergleich zu:
Sool	0	4.26E-03
Windmix CH	0	3.12E-03 136.4%
Oekostrom Schweiz Grenzwert	0	1.40E-02 30.5%

Ökostromkriterium erfüllt

Standardised parameter model for biogas plants

Substrates for the biogas plant

- Agriculture conversion from livestock
- Residual and waste materials
- Intercrops not competing with food and feed
- Glucosine
- Energy crop silage
- Sewage sludge and similar substrates
- Chemicals
- Industrial wastewater and substrates
- Water consumption

Total input quantity for the plant

External energy consumption of the biogas plant (without internal consumption)

Power supply from the

- not certified
- renewable, naturemade star
- renewable, other certificates

Fuels (lower heating value)

- Diesel (default 10 kWh/kg)
- Ignition oil (default 10 kWh/kg)

Heat (specify fuels with)

- Fuel oil consumption (default 10.5 kWh/litre)
- Natural gas consumption (default 11.2 kWh/m³)
- Biomethane, naturemade star (default 10.6 kWh/m³)
- Biomethane, other certificates (default 10.6 kWh/m³)
- Sewage sludge incineration
- Municipal waste incineration plant
- Municipal waste incineration plant, naturemade resources star
- Wood (default 5.6 kWh/kg)
- Wood, naturemade star (default 5.6 kWh/kg)
- Wood pellets (default 5.6 kWh/kg)
- Wood pellets, naturemade star (default 5.6 kWh/kg)

Share of district heating in fuels and heat

Total external energy consumption

To be deducted for calculation of net energy

Energy products

Biogas (specify higher heating value)

- Gross production biogas (default 7.4 kWh/m³)
- Methane slip in upgrading plant (default 7.4 kWh/m³)
- Biogas burned in flare (default 7.4 kWh/m³)

Substrates (input)

Substrate	amount	ancial ie (plus) (pense inus), excluding transport costs	costs with tractor	truck	number c animals	Transport /distance
Slurry and manure from agricultural livestock with return of digestate to field	t/a	#NV	km	km	-	% m ³ Biogas/a
Dairy cow	0.0 t	-	0 km	0 km	0	100% 0 m ³
Suckle cow (heavy)	0.0 t	-	0 km	0 km	0	100% 0 m ³
Young cattle < 1 year old	0.0 t	-	0 km	0 km	0	100% 0 m ³
Young cattle 1 - 2 years old	0.0 t	-	0 km	0 km	0	100% 0 m ³
Bulls and cattle > 2 years old	0.0 t	-	0 km	0 km	0	100% 0 m ³
Fattened calf	0.0 t	-	0 km	0 km	0	100% 0 m ³
Cattle fattening intensive 65-520	0.0 t	-	0 km	0 km	0	100% 0 m ³
Horses over 3 years old	0.0 t	-	0 km	0 km	0	100% 0 m ³
Ewes or goats	0.0 t	-	0 km	0 km	0	100% 0 m ³
Breeding pigs	0.0 t	-	0 km	0 km	0	100% 0 m ³
Pigs for fattening / Remonten 25-	0.0 t	-	0 km	0 km	0	100% 0 m ³
Piglets 10-35 kg	0.0 t	-	0 km	0 km	0	100% 0 m ³
Breeding boar	0.0 t	-	0 km	0 km	0	100% 0 m ³
Laying hens	0.0 t	-	0 km	0 km	0	100% 0 m ³
Fattened chicken	0.0 t	-	0 km	0 km	0	100% 0 m ³
Slurry or manure from agric	t/a	#NV	km	km	-	m ³ Biogas/a
Fish slurry, fish farming residues	0 t FM	-	0 km	0 km	0	0 m ³
Slurry from agricultural animal hu	0 t FM	-	0 km	0 km	0	0 m ³
Slurry from agricultural animal husbandry, pigs, piglets, etc.	0 t FM	-	0 km	0 km	0	0 m ³
Manure from animal farms (slaughterhouses, circus, zoo, riding stables outside LZ)	0 t FM	-	0 km	0 km	0	0 m ³
Residual and waste materials	t/a	#NV	km	km	-	m ³ Biogas/a
Apple pomace	0 t FM	0 \$	0 km	0 km	0	0 m ³
Bakery waste, confectionery waste, dough and flour residues	0 t FM	0 \$	0 km	0 km	0	0 m ³
Tree, vine and shrub pr	0 t FM	0 \$	0 km	0 km	0	0 m ³
Brewer's grains ensilag	0 t FM	0 \$	0 km	0 km	0	0 m ³
Brewer's grains, malt gi	0 t FM	0 \$	0 km	0 km	0	0 m ³
Blood, fat separator res	0 t FM	0 \$	0 km	0 km	0	0 m ³
Blood meal, animal meal	0 t FM	0 \$	0 km	0 km	0	0 m ³
Mushroom substrate, ec	0 t FM	0 \$	0 km	0 km	0	0 m ³
De-icing water	0 t FM	0 \$	0 km	0 km	0	0 m ³
Faulty and test batches	0 t FM	0 \$	0 km	0 km	0	0 m ³
Grease from grease se	0 t FM	0 \$	0 km	0 km	0	0 m ³
Filter residues from foo	0 t FM	0 \$	0 km	0 km	0	0 m ³
Filtration sludge (slaughtermouse)	0 t FM	0 \$	0 km	0 km	0	0 m ³
Fruit waste (oranges, lemons, bananas, pineapples, etc.)	0 t FM	0 \$	0 km	0 km	0	0 m ³
Amniotic fluid, sugar water	0 t FM	0 \$	0 km	0 km	0	0 m ³
Fermentation material from the food industry	0 t FM	0 \$	0 km	0 km	0	0 m ³
Green waste	0 t FM	0 \$	0 km	0 km	0	0 m ³
Vegetables, food waste	0 t FM	0 \$	0 km	0 km	0	0 m ³
Glucose, sugar water, fruit juices	0 t FM	0 \$	0 km	0 km	0	0 m ³
Grass silage	0 t FM	0 \$	0 km	0 km	0	0 m ³
House hold waste, kitchen refuse, bar (faucet)	0 t FM	0 \$	0 km	0 km	0	0 m ³

Agricultural livestock (slurry and manure)

Residual and waste material

External energy consumption (input - power, fuels, heat)

Energy products (outcome)

Treatment of fermentation residues

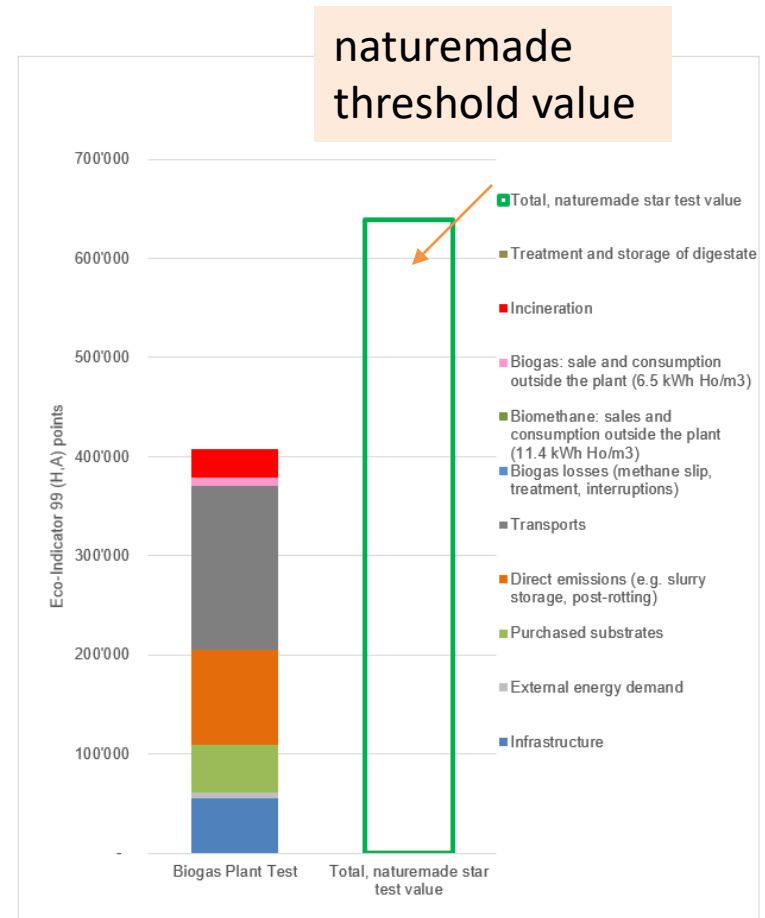
Output of standardized parameter model

Global criterion results overview

	Eco-indicator 99 points
Test value naturemade star	638'486
Biogas Plant Test	407'286
Degree of fulfilment of global criterion	64%
Environmental impact threshold value met	✓
data is plausible	✓
The naturemade star test has been passed	✓
naturemade star certifiable energy quantity	kWh
Gas	68'391'076
Electricity	2'467'026
Heat	-

Life cycle impact assessment results

Biogas Plant Test	Eco-indicator 99 points
Infrastructure	55'221
External energy demand	6'135
Purchased substrates	47'479
Direct emissions (e.g. slurry storage, post-rotting)	96'100
Transports	165'302
Biogas losses (methane slip, treatment, interruptions)	0
Biomethane: sales and consumption outside the plant (11.4 kWh Ho/m3)	-
Biogas: sale and consumption outside the plant (6.5 kWh Ho/m3)	8'518
Incineration	28'531
Treatment and storage of digestate	-
Total	407'286



Additional results: Carbon footprint 100a 2013; demand for non-renewable energy resources; Ecological scarcity points 2013

Further information

Available on www.naturemade.ch

- LCA documents
- **standardised parameter models**
- Criteria set (local-regional impact)
- ...

Thank you for your attention!

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