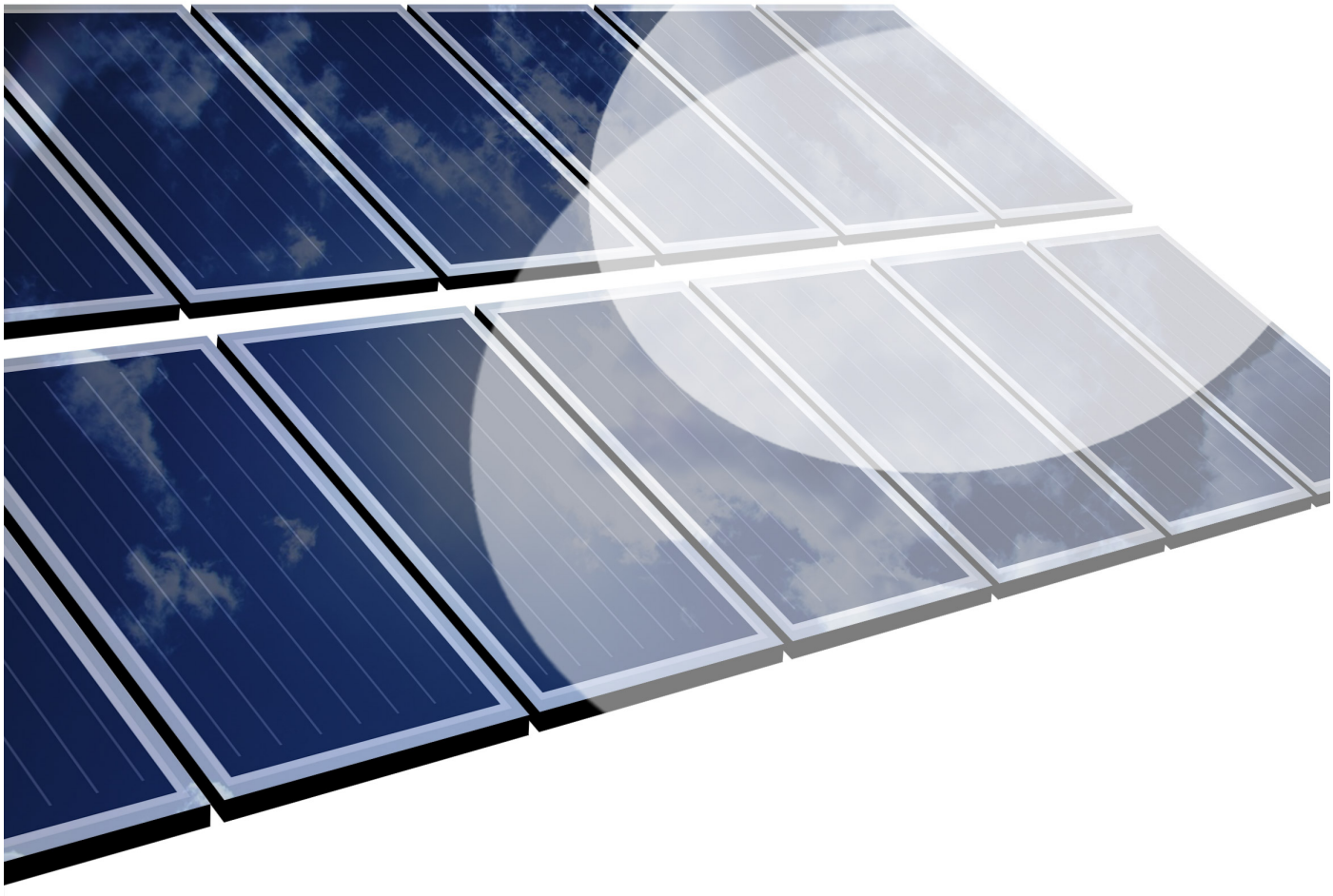
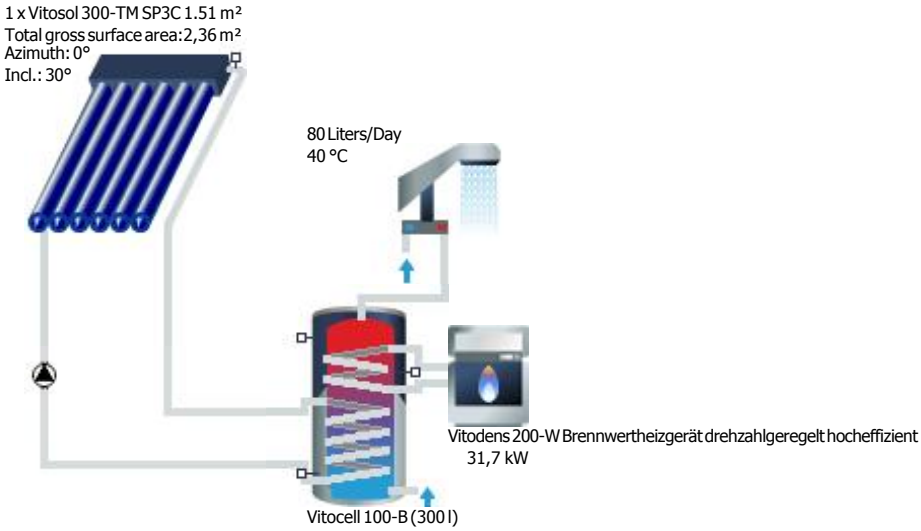
VIESMANN





Results of annual simulation

Installed collector power:		1,65 kW
Installed solar surface area (gross):		2,36 m²
Irradiation on collector surface (active):	2.725,99 kWh	1.155,08 kWh/m²
Energy delivered by collectors:	1.017,98 kWh	431,35 kWh/m²
Energy delivered by collector loop:	791,20 kWh	335,26 kWh/m²
DHW heating energy supply:		1.013,19 kWh
Solar energy contribution to DHW:		720,23 kWh
Energy from auxiliary heating:		460,1 kWh
Natural gas (H) savings:		**69,6 m³**
CO2 emissions avoided:		**147,14 kg**
DHW solar fraction:		**61,0 %**
Relative savings of supplementary energy (DIN EN 12977):		**65,6 %**
System efficiency:		**26,4 %**

Site Data

Climate data

Location:	Uccle
Climate data record:	Uccle
Total annual global irradiation:	1015,006 kWh/m²
Latitude:	50,8 °
Longitude:	-4,35 °

Domestic hot water

Average daily consumption:	0,08 m³
Desired temperature:	40 °C
Consumption profile:	Detached house (evening max)
Cold water temperature:	February: 8 °C August: 12 °C
Circulation:	no

System

Collector loop

Manufacturer:	Viessmann Werke GmbH & Co
Type:	Vitosol 300-TM SP3C 1.51 m²
Number:	1,00
Total gross surface area:	2,36 m²
Total active solar surface area:	2,36 m²
Inclination (Tilt Angle):	30 °
Orientation:	180 °
Azimuth:	0 °

Speicher-Wassererwärmer mit zwei Heizwendeln

Manufacturer:	Viessmann
Type:	Vitocell 100-B (300 l)
Volume:	0,3 m³

Auxiliary heating

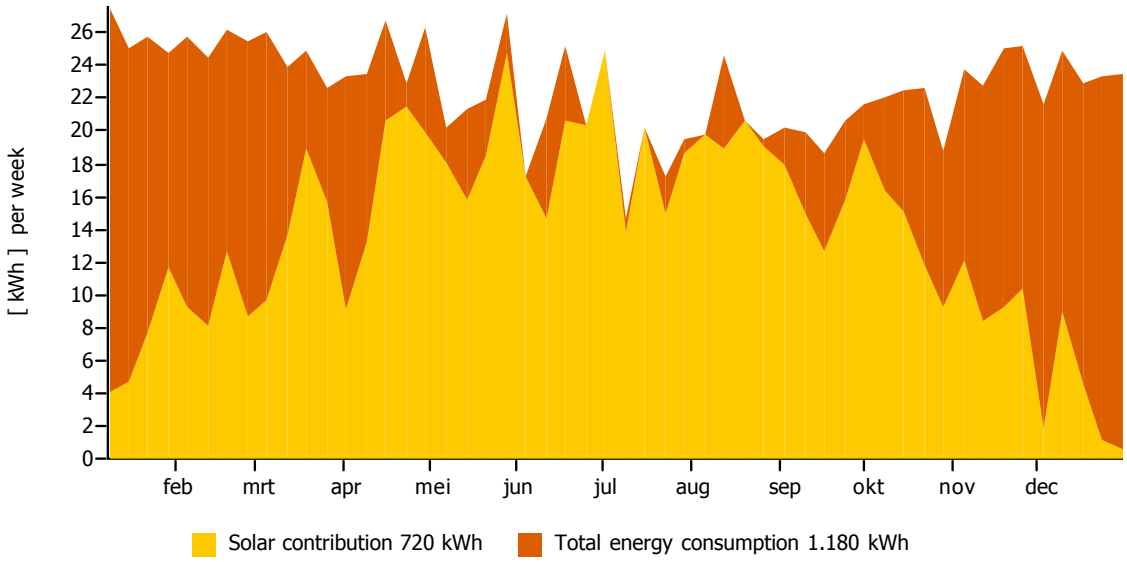
Manufacturer:	Viessmann Werke GmbH & Co
Type:	Vitodens 200-W Brennwertheizgerät drehzahlgeregelt hocheffizient
Nominal output:	31,7 kW

Legend

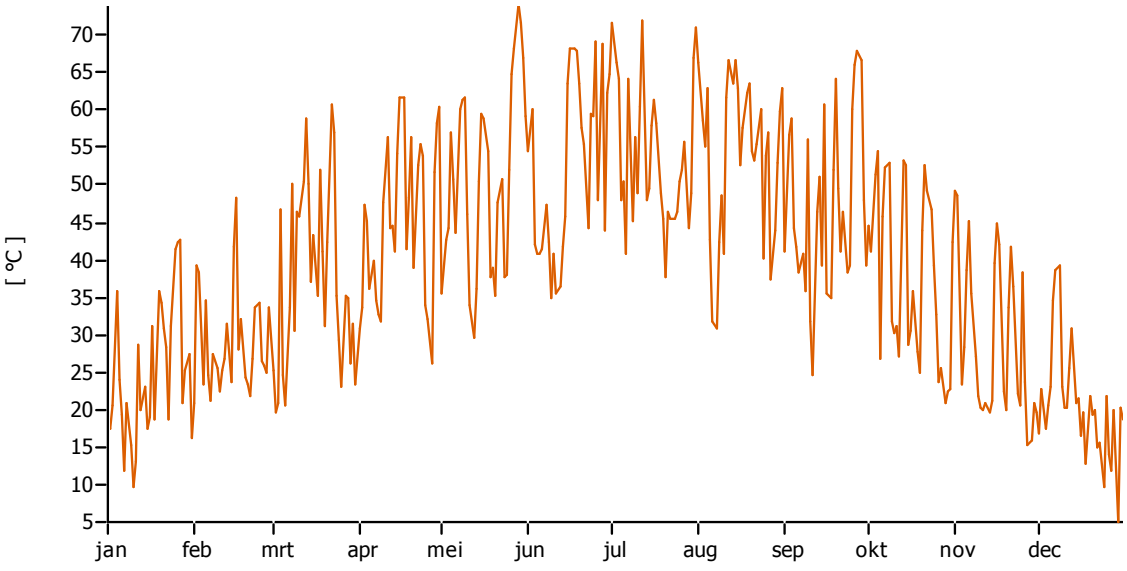
With test report

Solar Keymark

Solar energy consumption as percentage of total consumption



Daily maximum collector temperature



These calculations were carried out by T*SOL 2017 (R5) - the simulation program for solar thermal heating systems The results are determined by a mathematical model calculation with variable time steps of up to 6 minutes. Actual yields can deviate from these values due to fluctuations in climate, consumption and other factors. The system schematic diagram above does not represent and cannot replace a full technical drawing of the solar system.

Financial analysis

System

Active solar surface:	2,36 m²
System yield:	720,23 kWh
Annual fuel savings:	69,6 m³ Natural gas (H)

Financial analysis parameters

Life span:	20 Years
Interest on capital:	2,0 %
Reinvestment return:	2,0 %
Energy cost escalation rate:	3,0 %
Running cost escalation rate:	1,0 %

Financing

Total investments:	944 €
Subsidies:	0 €
Loan capital:	0 €
Remaining investment:	944 €
Running costs in first year:	0 €
Savings in first year:	35 €

Financial analysis

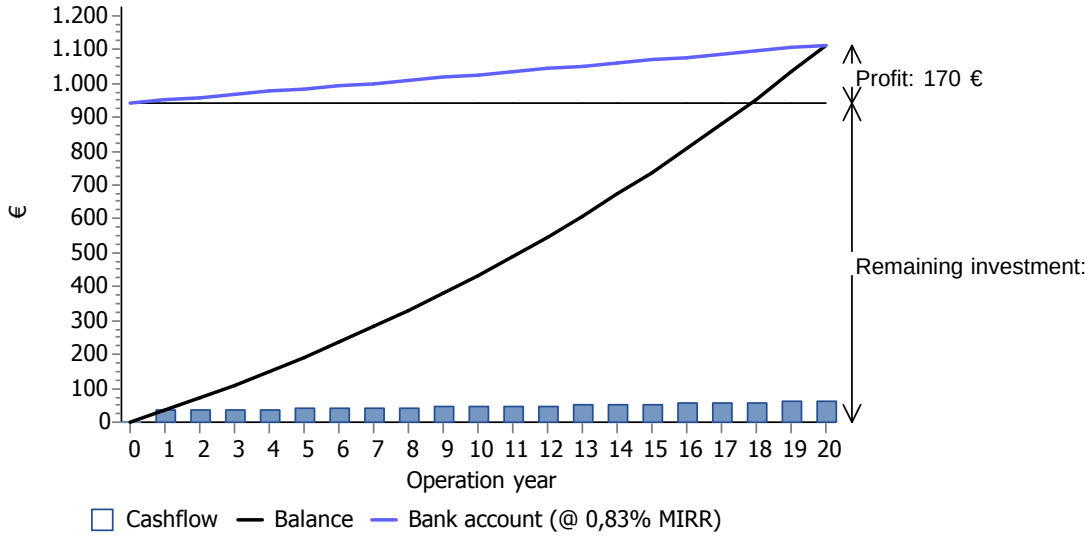
Cost of solar energy:	0,080 €/kWh
Capital return time:	---
Amortization period:	---

Profitability

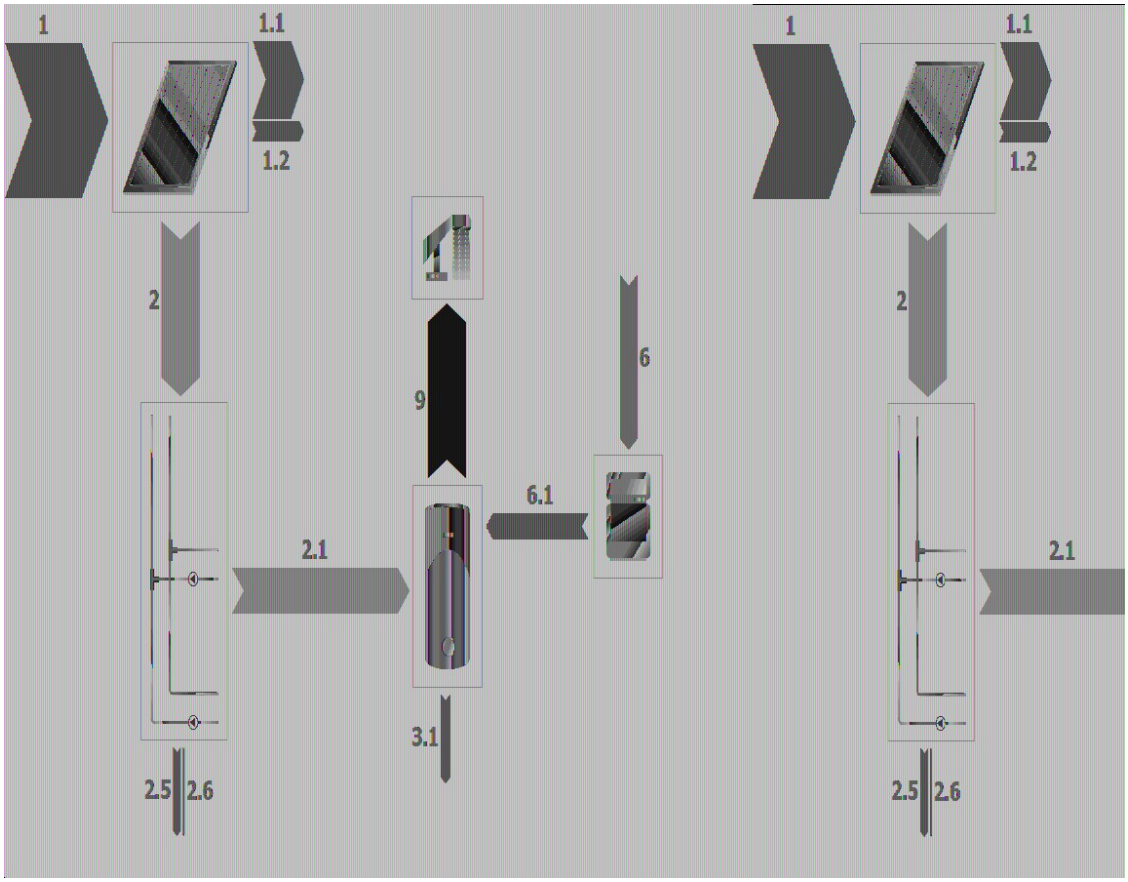
Return on assets:	99,0 %
Return on equity:	99,0 %
Internal rate of return rate, IRR:	---
Net present value:	-194 €

Reinvestment premise

Profit:	170 €
Modified internal rate of return, MIRR:	0,83 %


1.200
1.100
1.000
900
800
700
600
500
400
300
200
100
0
€
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20
Operation year
Profit: 170 €
Remaining investment:
Cashflow
Balance
Bank account (@ 0,83% MIRR)

Energy balance schematic



Legend

1	Irradiation on collector surface (active)	2.726 kWh
1.1	Optical collector losses	1.370 kWh
1.2	Thermal collector losses	338 kWh
2	Energy from collector array	1.018 kWh
2.1	Solar energy to storage tank	791 kWh
2.5	Internal piping losses	187 kWh
2.6	External piping losses	40 kWh
3.1	Tank losses	238 kWh
6	Final energy	448 kWh
6.1	Supplementary energy to tank	460 kWh
9	DHW energy from tank	1.013 kWh

Glossary

1	Irradiation on collector surface (active) Solar energy irradiated onto tilted collector area (active surface area)
1.1	Optical collector losses Reflection and other losses
1.2	Thermal collector losses Heat conduction and other losses
2	Energy from collector array Energy output at collector array outlet (i.e. before piping)
2.1	Solar energy to storage tank Energy from collector loop to storage tank (minus piping losses)
2.5	Internal piping losses Internal piping losses
2.6	External piping losses External piping losses
3.1	Tank losses Heat losses via surface area
6	Final energy Final energy supply to system. This can be supplied from natural gas, oil or electricity (not including solar energy) and takes efficiency into account.
6.1	Supplementary energy to tank Supplementary energy (e.g. boiler) to tank
9	DHW energy from tank Heat from tank (exluding circulation) for DHW consumption