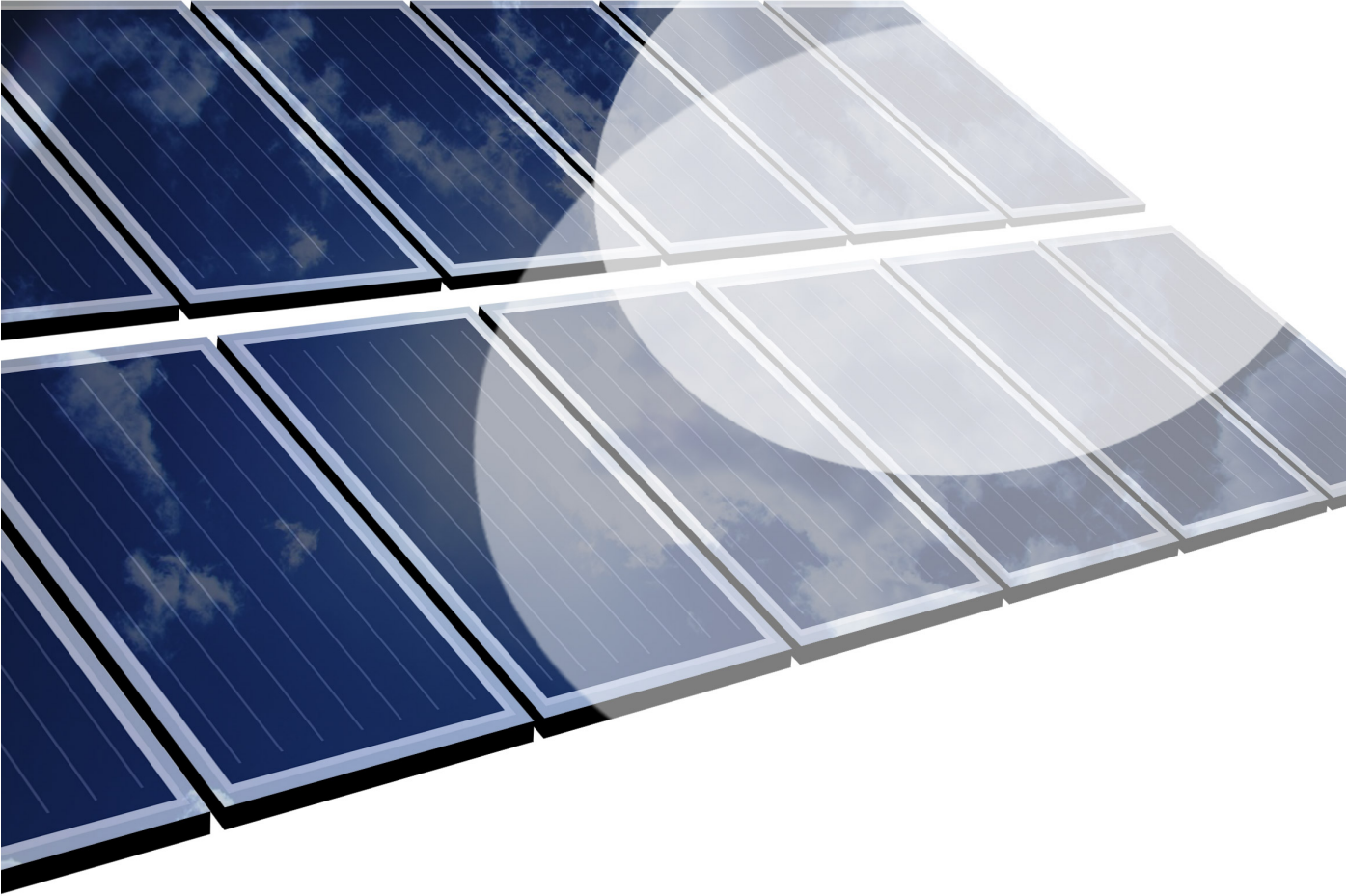
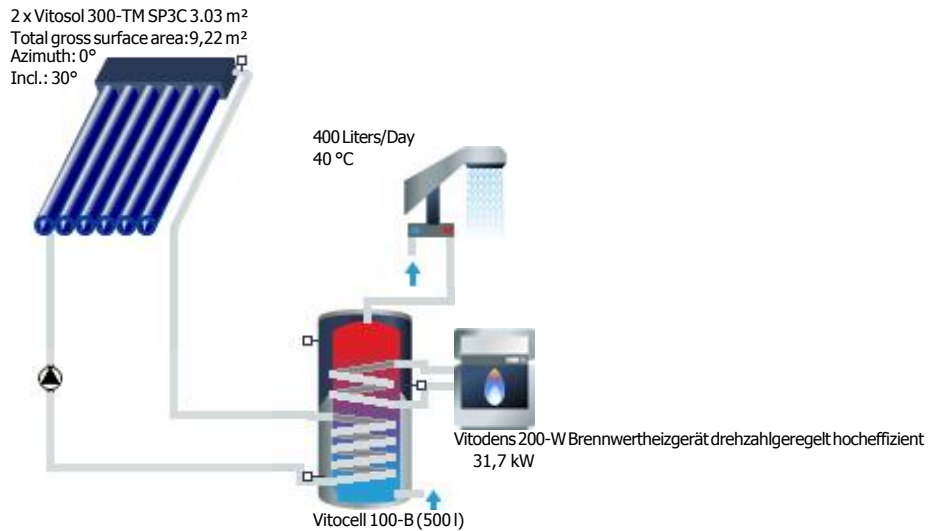

VIESSMANN



Variante 1



Results of annual simulation

| | | |
|---|---------------|-----------------------------|
| Installed collector power: | | 6,45 kW |
| Installed solar surface area (gross): | | 9,22 m ² |
| Irradiation on collector surface (active): | 10.649,82 kWh | 1.155,08 kWh/m ² |
| Energy delivered by collectors: | 3.878,88 kWh | 420,70 kWh/m ² |
| Energy delivered by collector loop: | 3.497,64 kWh | 379,35 kWh/m ² |
| DHW heating energy supply: | | 5.065,96 kWh |
| Solar energy contribution to DHW: | | 3.288,22 kWh |
| Energy from auxiliary heating: | | 2.045,7 kWh |
| Natural gas (H) savings: | | 317,4 m³ |
| CO2 emissions avoided: | | 671,25 kg |
| DHW solar fraction: | | 61,6 % |
| Relative savings of supplementary energy (DIN EN 12977): | | 64,7 % |
| System efficiency: | | 30,9 % |

Variante 1

Site Data

Climate data

| | |
|----------------------------------|-----------------------------|
| Location: | Uccle |
| Climate data record: | Uccle |
| Total annual global irradiation: | 1015,006 kWh/m ² |
| Latitude: | 50,8 ° |
| Longitude: | -4,35 ° |

Domestic hot water

| | |
|----------------------------|---------------------------------|
| Average daily consumption: | 0,4 m ³ |
| Desired temperature: | 40 °C |
| Consumption profile: | Detached house (evening max) |
| Cold water temperature: | February: 8 °C August: 12 °C |
| Circulation: | no |

Variante 1

System

Collector loop

| | |
|----------------------------------|---|
| Manufacturer: | Viessmann Werke GmbH & Co |
| Type: | Vitosol 300-TM SP3C 3.03 m ² |
| Number: | 2,00 |
| Total gross surface area: | 9,22 m ² |
| Total active solar surface area: | 9,22 m ² |
| Inclination (Tilt Angle): | 30 ° |
| Orientation: | 180 ° |
| Azimuth: | 0 ° |

Speicher-Wasserewärmer mit zwei Heizwendeln

| | |
|---------------|------------------------|
| Manufacturer: | Viessmann |
| Type: | Vitocell 100-B (500 l) |
| Volume: | 0,5 m ³ |

Auxiliary heating

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

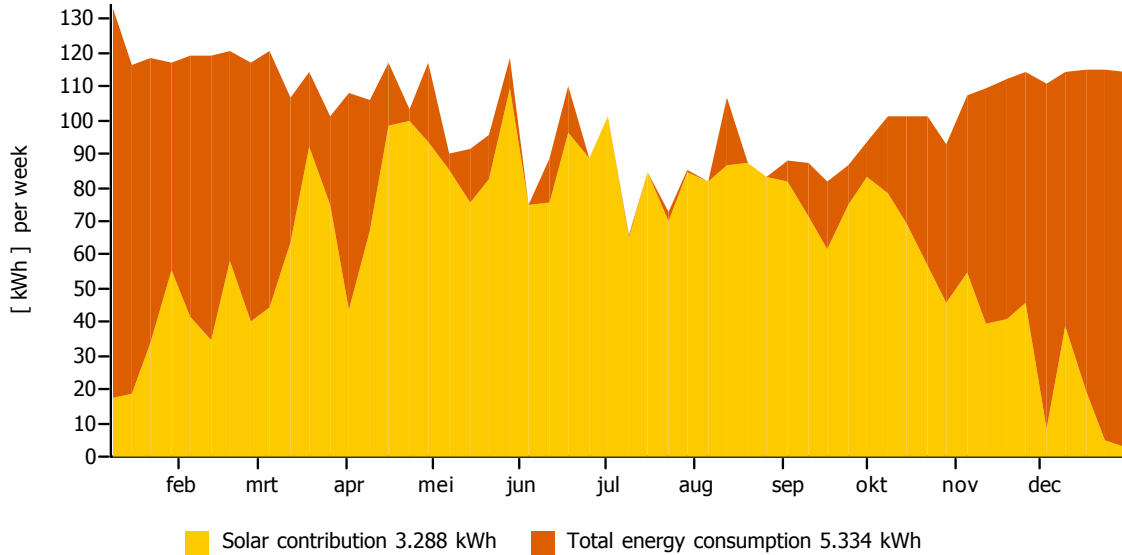
Legend

With test report
Solar Keymark

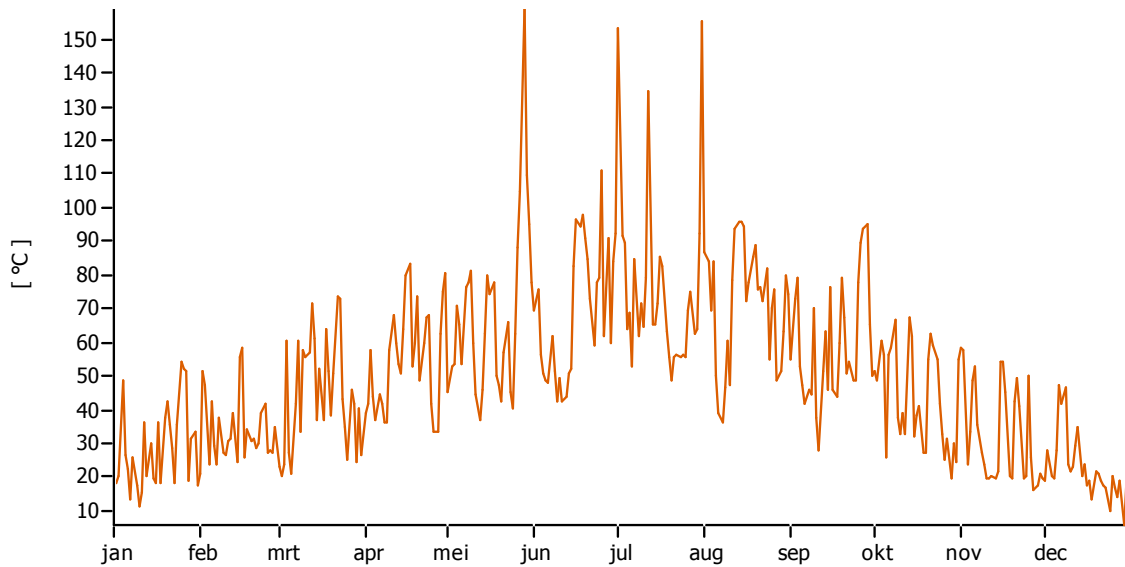


Variante 1

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.

Variante 1

Financial analysis

System

| | |
|-----------------------|--------------------------------------|
| Active solar surface: | 9,22 m ² |
| System yield: | 3.288,22 kWh |
| Annual fuel savings: | 317,4 m ³ 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: | 3.688 € |
| Subsidies: | 0 € |
| Loan capital: | 0 € |
| Remaining investment: | 3.688 € |
| Running costs in first year: | 0 € |
| Savings in first year: | 159 € |

Financial analysis

| | |
|-----------------------|-------------|
| Cost of solar energy: | 0,069 €/kWh |
| Capital return time: | 17,9 Years |
| Amortization period: | --- |

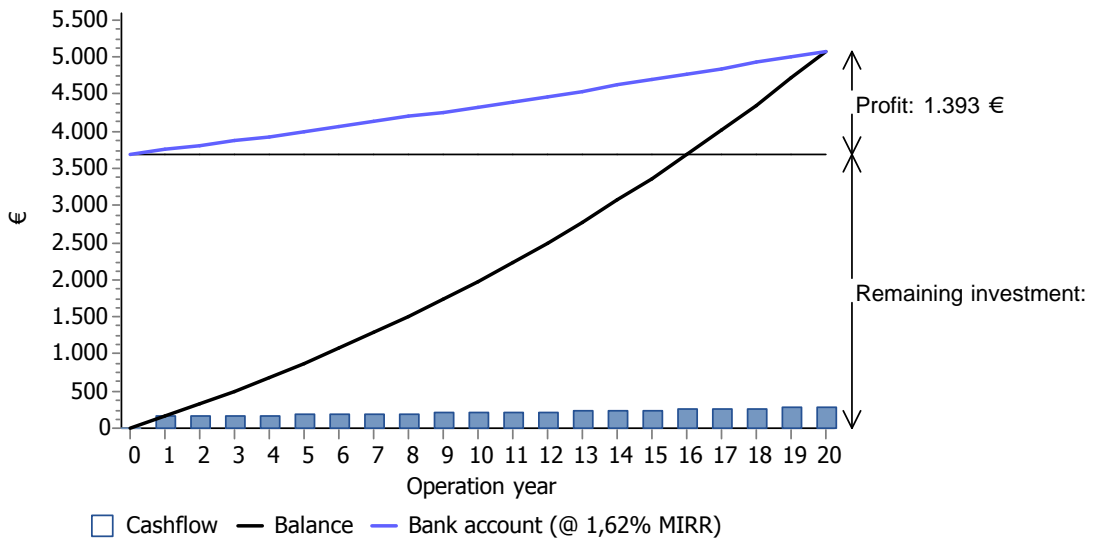
Profitability

| | |
|------------------------------------|---------|
| Return on assets: | 115,6 % |
| Return on equity: | 115,6 % |
| Internal rate of return rate, IRR: | 1,30 % |
| Net present value: | -268 € |

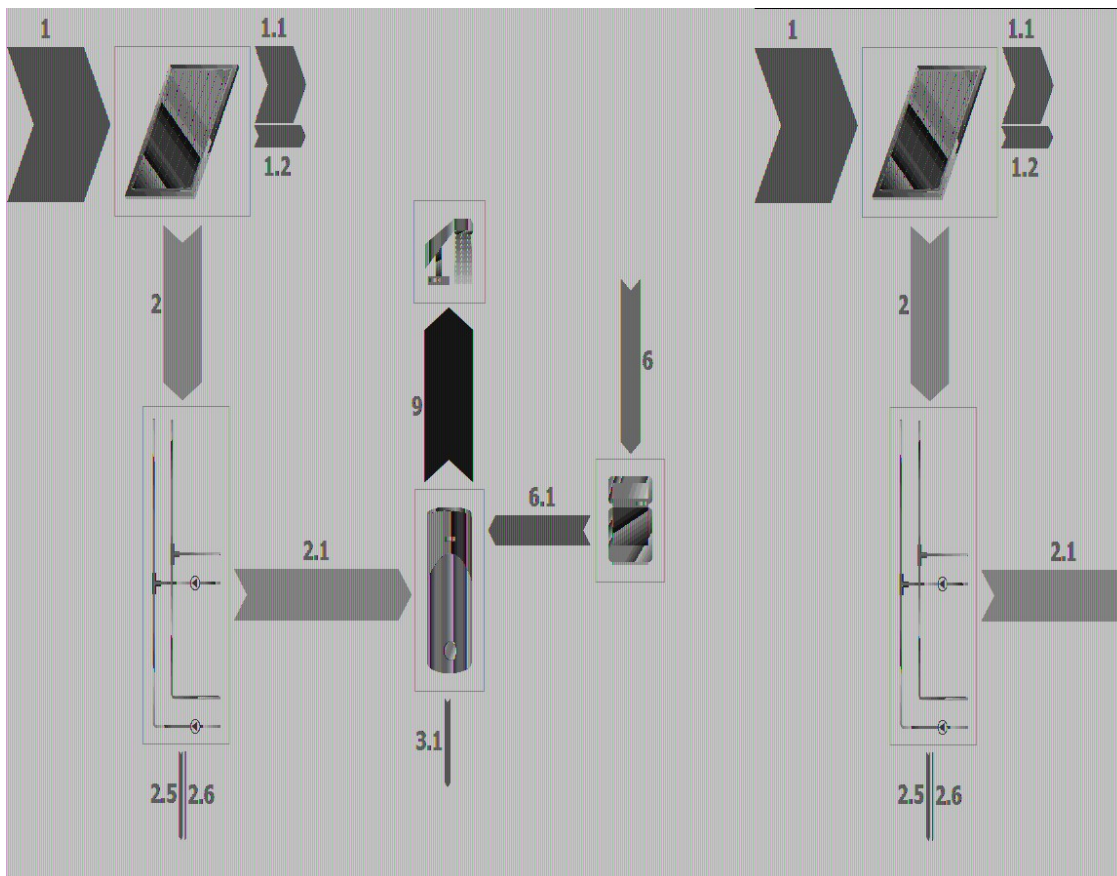
Reinvestment premise

| | |
|---|---------|
| Profit: | 1.393 € |
| Modified internal rate of return, MIRR: | 1,62 % |

Variante 1



Energy balance schematic



Legend

| | | |
|-----|---|------------|
| 1 | Irradiation on collector surface (active) | 10.650 kWh |
| 1.1 | Optical collector losses | 5.286 kWh |
| 1.2 | Thermal collector losses | 1.483 kWh |
| 2 | Energy from collector array | 3.879 kWh |
| 2.1 | Solar energy to storage tank | 3.498 kWh |
| 2.5 | Internal piping losses | 316 kWh |
| 2.6 | External piping losses | 66 kWh |
| 3.1 | Tank losses | 477 kWh |
| 6 | Final energy | 2.002 kWh |
| 6.1 | Supplementary energy to tank | 2.046 kWh |
| 9 | DHW energy from tank | 5.066 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 (excluding circulation) for DHW consumption