# Grid-Connected System: Simulation parameters

**Project :** **Caso 1 - Simples**

| | | | | |
|---|---|---|---|---|
| **Geographical Site** | **Juiz de Fora** | | Country | **Brazil** |
| **Situation** | Latitude | 21.7°S | Longitude | 43.4°W |
| Time defined as | Legal Time | Time zone UT-2 | Altitude | 688 m |
| | Albedo | 0.20 | | |
| **Meteo data:** | **Juiz de Fora** | Synthetic | | |

**Simulation variant :** **New simulation variant**

Simulation date 10/05/18 09h38

**Simulation parameters**

| | | | | |
|---|---|---|---|---|
| **Collector Plane Orientation** | Tilt | 28° | Azimuth | 0° |
| **Models used** | Transposition | Perez | Diffuse | Perez, Meteonorm |
| **Horizon** | Free Horizon | | | |
| **Near Shadings** | No Shadings | | | |

**PV Array Characteristics**

| | | | | |
|---|---|---|---|---|
| **PV module** | Si-poly | Model | **JAP6-72-330/3BB** | |
| Original PVsyst database | | Manufacturer | JA Solar | |
| Number of PV modules | | In series | 15 modules | In parallel 2 strings |
| Total number of PV modules | | Nb. modules | 30 | Unit Nom. Power 330 Wp |
| Array global power | | Nominal (STC) | **9.90 kWp** | At operating cond. 8.88 kWp (50°C) |
| Array operating characteristics (50°C) | | U mpp | 512 V | I mpp 17 A |
| Total area | | Module area | **58.2 m²** | Cell area 52.6 m² |

| | | | | |
|---|---|---|---|---|
| **Inverter** | | Model | **Sinvert PVM13** | |
| Original PVsyst database | | Manufacturer | Siemens | |
| Characteristics | | Operating Voltage | 420-850 V | Unit Nom. Power 12.4 kWac |
| Inverter pack | | Nb. of inverters | 1 units | Total Power 12.4 kWac |

**PV Array loss factors**

| | | | | |
|---|---|---|---|---|
| Thermal Loss factor | Uc (const) | 20.0 W/m²K | Uv (wind) | 0.0 W/m²K / m/s |
| Wiring Ohmic Loss | Global array res. | 498 mOhm | Loss Fraction | 1.5 % at STC |
| Module Quality Loss | | | Loss Fraction | -0.8 % |
| Module Mismatch Losses | | | Loss Fraction | 1.0 % at MPP |
| Incidence effect, ASHRAE parametrization | IAM = | 1 - bo (1/cos i - 1) | bo Param. | 0.05 |

**User's needs :** Unlimited load (grid)

# Grid-Connected System: Main results

**Project :** **Caso 1 - Simples**

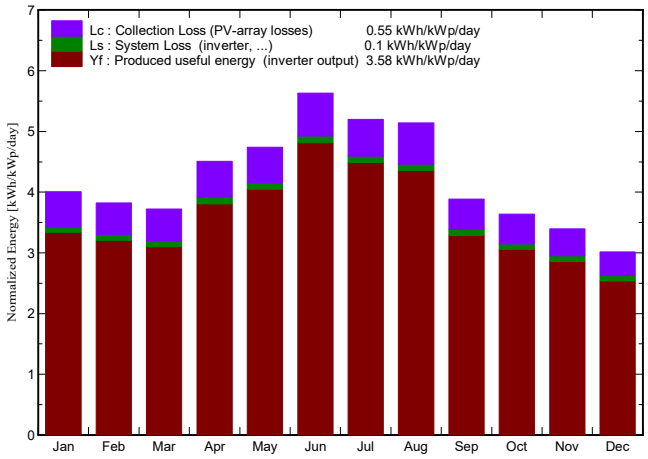
**Simulation variant :** **New simulation variant**

| | | | | | |
|---|---|---|---|---|---|
| **Main system parameters** | System type | **Grid-Connected** | | | |
| PV Field Orientation | tilt | 28° | azimuth | 0° | |
| PV modules | Model | JAP6-72-330/3BB | Pnom | 330 Wp | |
| PV Array | Nb. of modules | 30 | Pnom total | **9.90 kWp** | |
| Inverter | Model | Sinvert PVM13 | Pnom | 12.40 kW ac | |
| User's needs | Unlimited load (grid) | | | | |

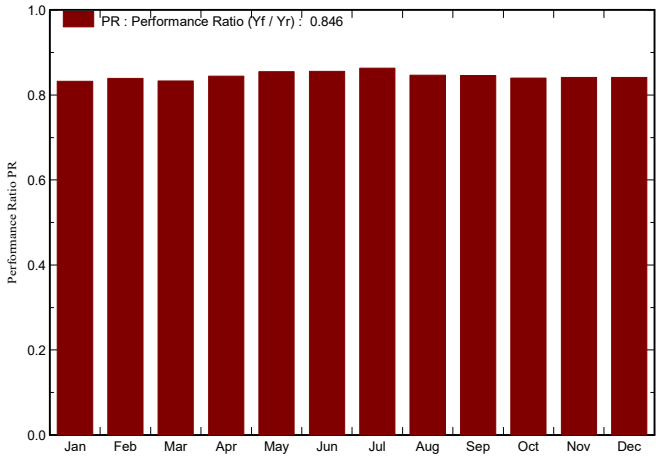
**Main simulation results**

| | | | | |
|---|---|---|---|---|
| System Production | **Produced Energy** | **12.92 MWh/year** | Specific prod. | 1306 kWh/kWp/year |
| | Performance Ratio PR | 84.6 % | | |

**Normalized productions (per installed kWp): Nominal power 9.90 kWp**




**Performance Ratio PR**




## New simulation variant

## Balances and main results

| | GlobHor kWh/m² | T Amb °C | GlobInc kWh/m² | GlobEff kWh/m² | EArray MWh | E_Grid MWh | EffArrR % | EffSysR % |
|---|---|---|---|---|---|---|---|---|
| **January** | 139.5 | 23.10 | 124.3 | 119.4 | 1.054 | 1.024 | 14.59 | 14.17 |
| **February** | 113.7 | 23.30 | 107.0 | 102.8 | 0.916 | 0.889 | 14.72 | 14.29 |
| **March** | 113.4 | 22.50 | 115.4 | 111.5 | 0.981 | 0.952 | 14.62 | 14.19 |
| **April** | 119.9 | 21.10 | 135.3 | 131.4 | 1.161 | 1.131 | 14.76 | 14.38 |
| **May** | 117.5 | 19.00 | 147.0 | 143.0 | 1.274 | 1.243 | 14.91 | 14.55 |
| **June** | 121.4 | 17.80 | 168.9 | 165.0 | 1.463 | 1.430 | 14.90 | 14.56 |
| **July** | 122.0 | 17.70 | 161.2 | 157.0 | 1.410 | 1.377 | 15.04 | 14.69 |
| **August** | 131.6 | 19.20 | 159.4 | 155.4 | 1.369 | 1.336 | 14.77 | 14.41 |
| **September** | 110.5 | 20.40 | 116.6 | 112.8 | 1.005 | 0.976 | 14.82 | 14.40 |
| **October** | 116.6 | 21.20 | 112.8 | 108.9 | 0.966 | 0.938 | 14.73 | 14.30 |
| **November** | 112.6 | 21.60 | 101.9 | 98.0 | 0.877 | 0.849 | 14.80 | 14.33 |
| **December** | 105.4 | 22.30 | 93.5 | 89.7 | 0.806 | 0.778 | 14.83 | 14.32 |
| Year | 1424.1 | 20.75 | 1543.1 | 1495.1 | 13.282 | 12.925 | 14.80 | 14.40 |

Legends:

| | | | |
|---|---|---|---|
| GlobHor | Horizontal global irradiation | EArray | Effective energy at the output of the array |
| T Amb | Ambient Temperature | E_Grid | Energy injected into grid |
| GlobInc | Global incident in coll. plane | EffArrR | Effic. Eout array / rough area |
| GlobEff | Effective Global, corr. for IAM and shadings | EffSysR | Effic. Eout system / rough area |

# Grid-Connected System: Loss diagram

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**Loss diagram over the whole year**