SOLAR TECHNICAL AND FINANCIAL REPORT

ECONOMY
ON MY GRID BILLS
POWER 10.0 kWh
FINANCING **CASH**

CLIENT NAME	JANGAL PARIS
PROJECT LOCATION	5 AVENUE DE L'OPÉRA, PARIS, FRANCE
SOLAR FILE	SIMULATION PARIS
SIMULATION	ÉCONOMIE SUR MES FACTURES RÉSEAU V8602
CONTACT	-
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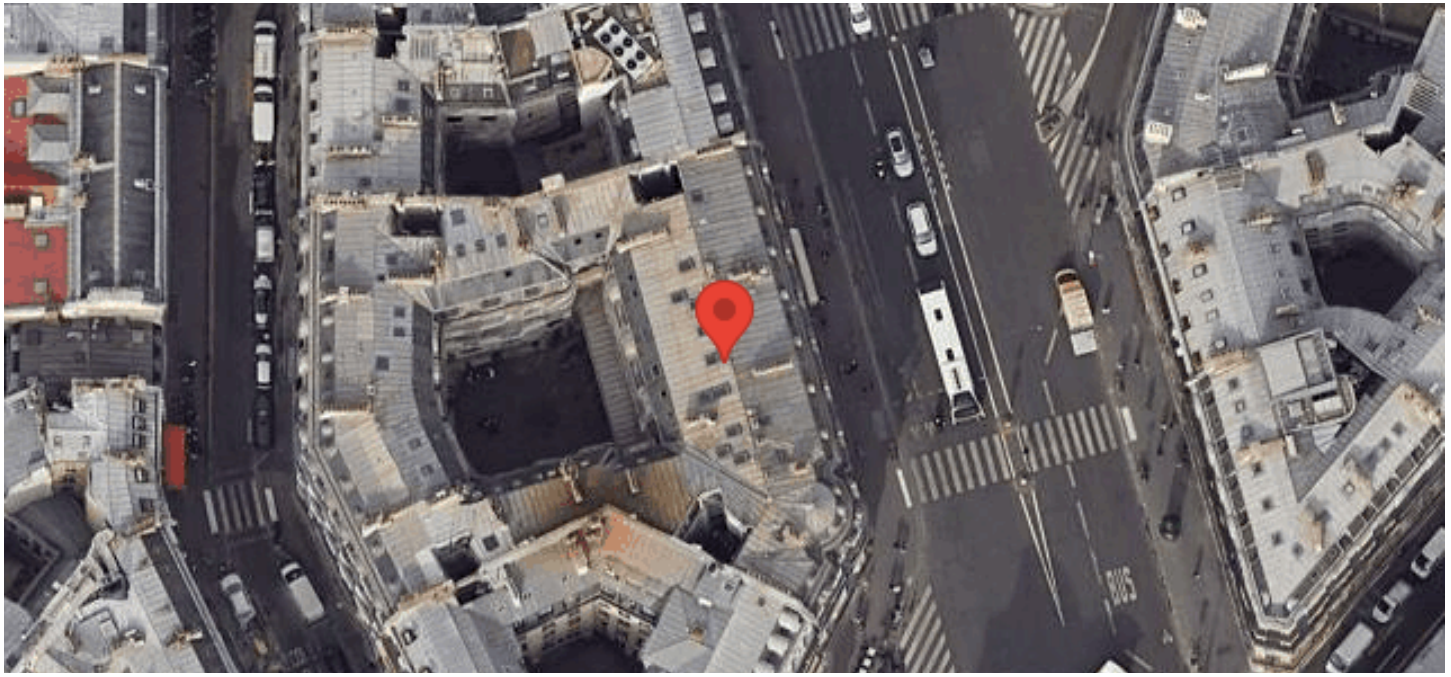
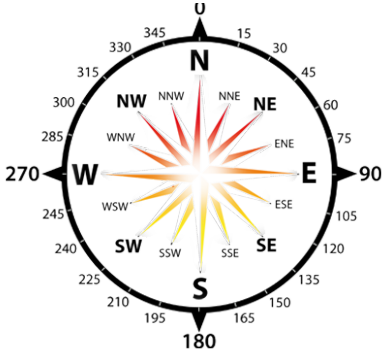
Geolocation

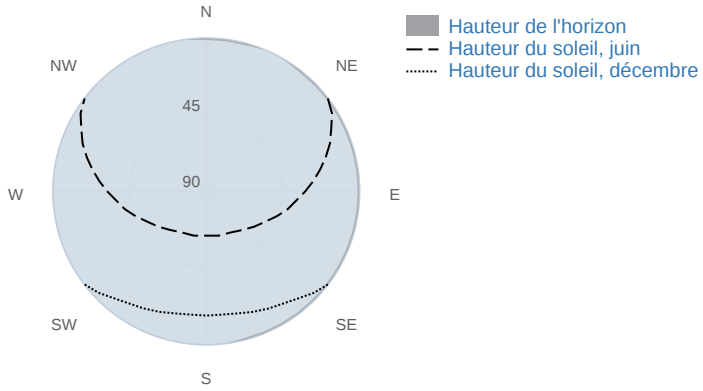
of the photovoltaic system



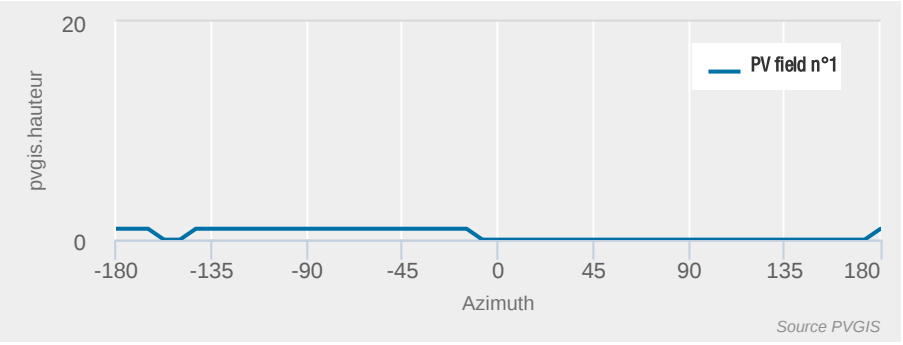
Installed PV : **10.0 KWp**
Country : **France**
City : **Paris**
Address: **Avenue de l'Opéra -5**
Latitude : **48.864809962**
Longitude: **2.3345111288**
Horizon: **Calculated** (default PVGIS24)



PVGIS Information



Solar radiation and photovoltaic production will vary if there are local hills or mountains that block sunlight at certain times of the day. PVGIS can calculate their effect using ground elevation data with a resolution of 3 arc-seconds (about 90 meters). This calculation does not consider shadows from very nearby objects like houses or trees.



On this graph, we can read the height of the relief while around the photovoltaic installation, it is the distant mask, which can cause shading on installation.
These shadings are taken into account in the estimate of annual photovoltaic production.

- Database used : **PVGIS-SARAH3**
- Estimated additional loss of production due à l'angle d'incidence aux effets spectraux : **11.43%**

Photovoltaic System Information

- Photovoltaic technology : **Crystalline silicon**
- Mounting system : **Overlay**

Installed PV :	**10.0 kWp**
Cable loss :	**1%**
Inverter loss :	**2%**
Annual PV loss :	**0.5%**
Slope angle :	**0°**
Azimuth angle :	**180° (N)**

The estimated system losses encompass all losses within the system, which means the actual energy supplied to the power grid is less than the energy produced by the photovoltaic modules. Several factors contribute to these losses, including cable losses, inverters, dirt (sometimes snow) on the modules, etc. Over the years, the modules also tend to lose some of their power, so the average annual production over the system's lifetime will be a few percentage points lower than the production of the initial years.

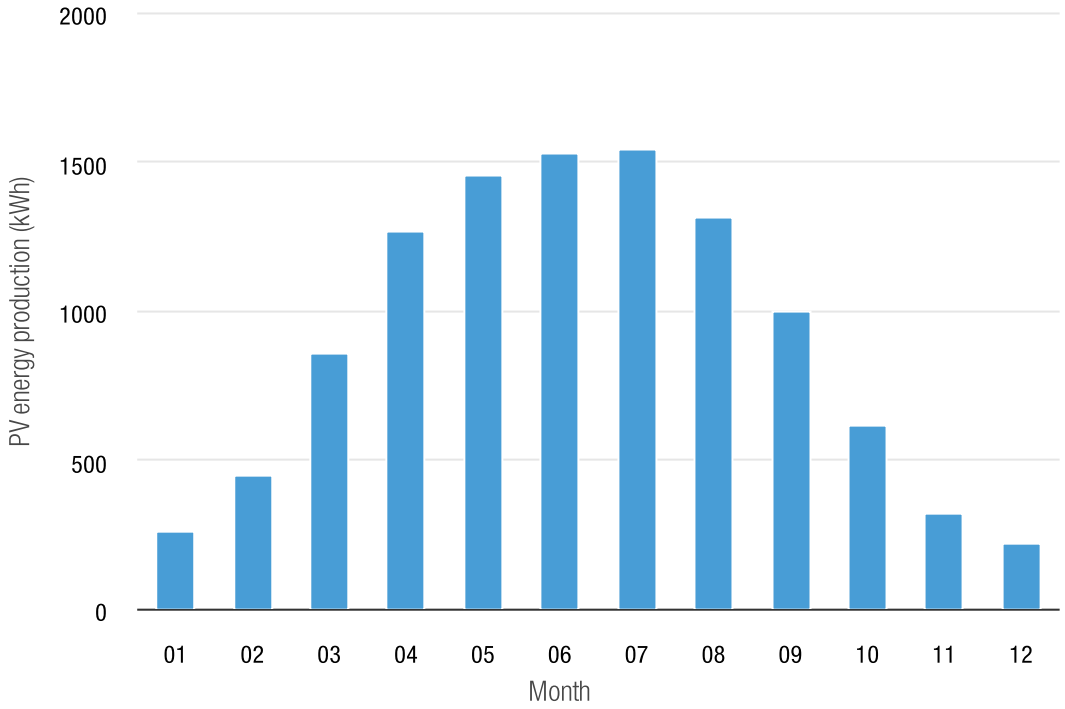
PVGIS 5.3 provides a default value of 14% for the total losses in the solar electricity generation system.

PVGIS24 Simulator proposes a loss value for the first year of operation. This loss will evolve year by year. This first-year loss value allows for a more detailed technical and financial analysis, year by year. Thus, over a 20-year operational period, the total production loss is close to 13% to 14%.

PVGIS Photovoltaic Production

Annual photovoltaic energy production : **10,795.00 kWh**

Variability from year to year: **4.21%** (454.00kWh)

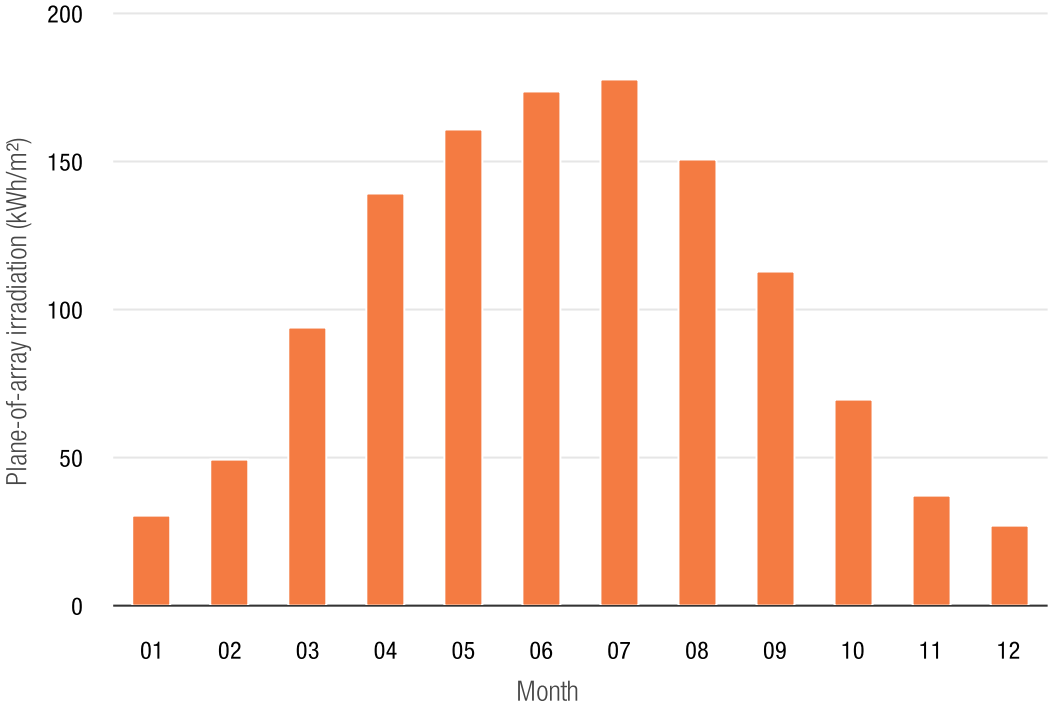


Month	kWh	%
01 - January	258,80	2.40%
02 - February	444,80	4.12%
03 - March	857,80	7.95%
04 - April	1 264,60	11.71%
05 - May	1 449,80	13.43%
06 - June	1 524,30	14.12%
07 - July	1 537,90	14.25%
08 - August	1 314,20	12.17%
09 - September	996,80	9.23%
10 - October	611,70	5.67%
11 - November	315,60	2.92%
12 - December	218,50	2.02%

The result of the photovoltaic energy calculation: is the average monthly energy production and the average annual production of the photovoltaic installation with the chosen properties. The inter-annual variability is the standard deviation of the annual values calculated over the period covered by the selected solar radiation database.

Monthly irradiation on a fixed plane

Annual irradiation	1,218.83 kWh/m²

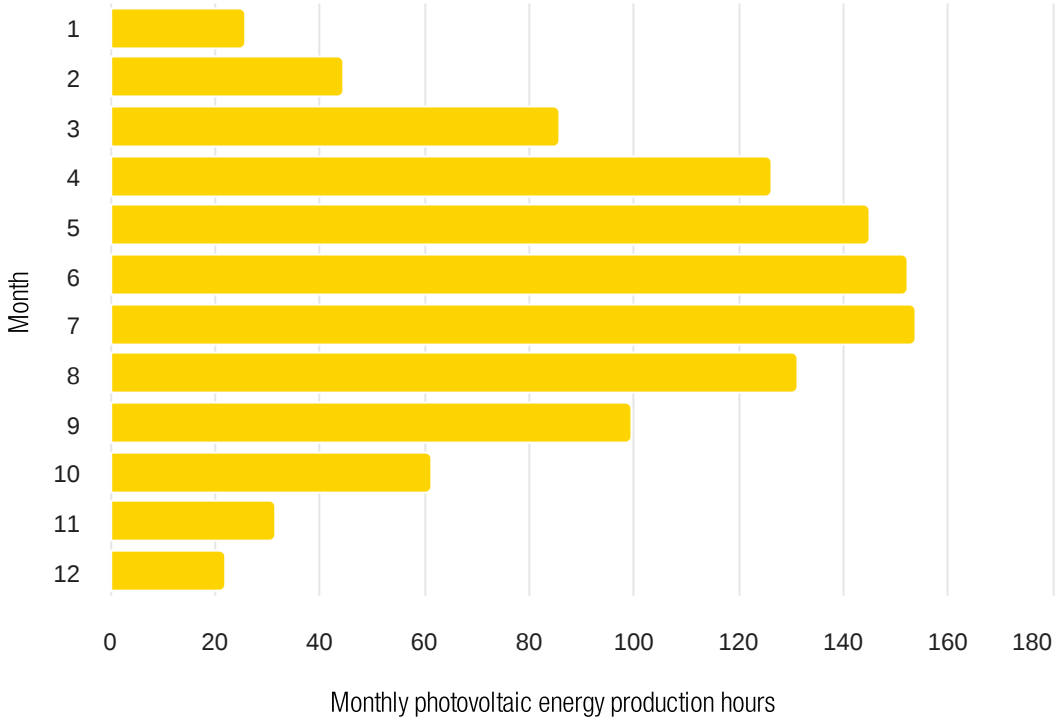


Month	kWh/m²	%
01 - January	30,31	2.49%
02 - February	49,31	4.05%
03 - March	93,31	7.66%
04 - April	139,03	11.41%
05 - May	160,76	13.19%
06 - June	173,06	14.20%
07 - July	177,10	14.53%
08 - August	150,46	12.34%
09 - September	112,76	9.25%
10 - October	69,09	5.67%
11 - November	36,79	3.02%
12 - December	26,85	2.20%

Monthly solar irradiation Is determined for each hour of the day for a selected month, with the average being calculated over all days of that month during the multi-year period for which PVGIS has data. In addition to calculating the average solar radiation, the daily application of radiation also computes the daily variation of clear-sky radiation.

Monthly Production Hours photovoltaic energy

Annual photovoltaic energy production hours : **1,079.50 hours** (average 3.0 hours per day)



Month	Hours/Month	Hours/Day
01 - January	25.9	0.9
02 - February	44.5	1.6
03 - March	85.8	2.8
04 - April	126.5	4.3
05 - May	145.0	4.7
06 - June	152.5	5.1
07 - July	153.8	5.0
08 - August	131.5	4.3
09 - September	99.7	3.4
10 - October	61.2	2.0
11 - November	31.6	1.1
12 - December	21.9	0.7

The hours of monthly photovoltaic energy production represent the total time over a month that a solar installation produces of electricity, influenced by sunlight, system efficiency and operating conditions. It is a key indicator for evaluating performance and energy self-sufficiency.

Consumption Analysis

Year : 2025

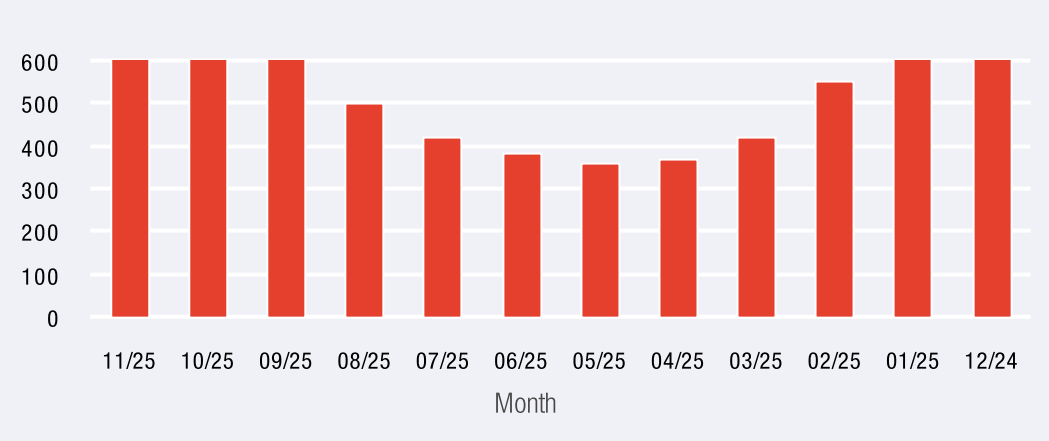
Total period : **6,470 kWh / 1,618 €**

Average day of the period : **18 kWh / 5 €**

Monthly average for the period : **540 kWh / 135 €**

Purchase price : **0.25 €**

Months	11	10	09	08	07	06	05	04	03	02	01	12
€	188	170	155	125	105	95	90	93	105	138	170	185
kWh / Months	750	680	620	500	420	380	360	370	420	550	680	740
kWh / Days	25	21	20	16	13	12	11	12	13	19	21	23
% Average	11.6 %	10.5 %	9.6 %	7.7 %	6.5 %	5.9 %	5.6 %	5.7 %	6.5 %	8.5 %	10.5 %	11.4 %



This analysis uses a method designed to evaluate energy consumption and its cost over a defined period, segmenting the data into monthly and daily averages.

- **Basic data :** The total annual energy consumption (kWh) is distributed by month to examine the variability of demand; the associated cost is determined based on a unit purchase rate.
- **Temporal breakdown :** Monthly and daily averages provide a detailed understanding of consumption fluctuations throughout the year; an average percentage reflects each month's relative contribution to the annual total.
- **Purpose :** This method helps identify periods of high or low consumption and plan strategies for energy optimization or cost management.

Provide a clear and actionable overview of energy consumption to improve the sizing of solar installations or storage systems while keeping energy costs under control.

Self-consumption analysis

Theoretical calculation of the financial economy per year

ANNUAL kWh consumption	100%	**6,470 kWh**
Average Consumption KWh WEEK	60%	**3,882 kWh**
Average Consumption KWh WE	40%	**2,588 kWh**

Total Annual kWh Consumption Day (7 a.m. - 5 p.m.) 2,316 kWh / 36% annual day consumption

	Week		Weekend	
Number of kWh DAY (7 a.m.-5 p.m.)	33%	**1,281 kWh**	40%	**1,035 kWh**
Number of kWh EVENING (5 p.m.-11 p.m.)	59%	**2,290 kWh**	54%	**1,398 kWh**
Number of kWh NIGHT (11 p.m.-7 a.m.)	8%	**311 kWh**	6%	**155 kWh**

Self-consumption potential per year 660 kWh *(6,470 kWh x 10.20%)*

Annual yield PVGIS	**10,795 kWh**	
Average productive hours per day	**2.96 h**	
% Average production hours per day	**29.58%**	*(2.96 h / 10 h)*
% Self-consumption potential per year	**10.20%**	*(29.58% x 36%)*

FINANCIAL ECONOMY SELF-CONSUMPTION PER YEAR **165 €** *(660 kWh x 0.25 €)*

This analysis is based on a theoretical approach aimed at estimating the financial savings associated with solar energy self-consumption, relying on annual consumption and photovoltaic production data.

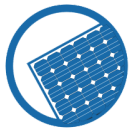
Energy consumption breakdown : The total consumption is segmented by time periods (weekdays, weekends, daytime, evening, nighttime) to assess the specific energy needs for each time slot. This approach helps identify daytime consumption, which reflects the potential for self-consumption.

Estimation of self-consumption potential: The solar production estimated by PVGIS is compared with daytime consumption. The coverage percentage indicates the portion of daytime consumption that can be directly supplied by solar energy.

Calculation of financial savings: Self-consumed kWh are valued based on the energy purchase tariff to calculate annual savings.

This analysis provides a quantitative basis for evaluating the financial benefits of self-consumption and optimizing the size of solar installations. This method also helps identify key periods to maximize the use of the energy produced.

Key figures



PHOTOVOLTAIC SYSTEM

Power : 10.0 kWp

Production year 1 : **10,795 kWh**
Annual drop in production : **0.5 %**
Grid Resale Price : **€ 0.2**
Revenue Resale year 1 : **€ 1,835**
Annual Increase in Feed-in Tariff : **2.0 %**

INVESTMENT

System Cost : € 9,000

Photovoltaic System Price :**€ 12,000**
Subsidy : **€ 1,800 / 15 %**
Bonuses : **€ 1,200 / 10 %**
Cost per Watt : **€ 1**

CONSUMPTION

Consumption Year 1 : 6,470 kWh

Annual increase in consumption : **1.0%**
Network Purchase Rate : **€ 0.3**
Network Purchase Invoice year 1 : **€ 1,618**
Annual increase in the Purchase Rate : **3.5%**

FINANCING

Cash : € 12,000

1st payment : **€ 6,000 / 50 %**

Performance Indices

Savings 20 years: € 31,114

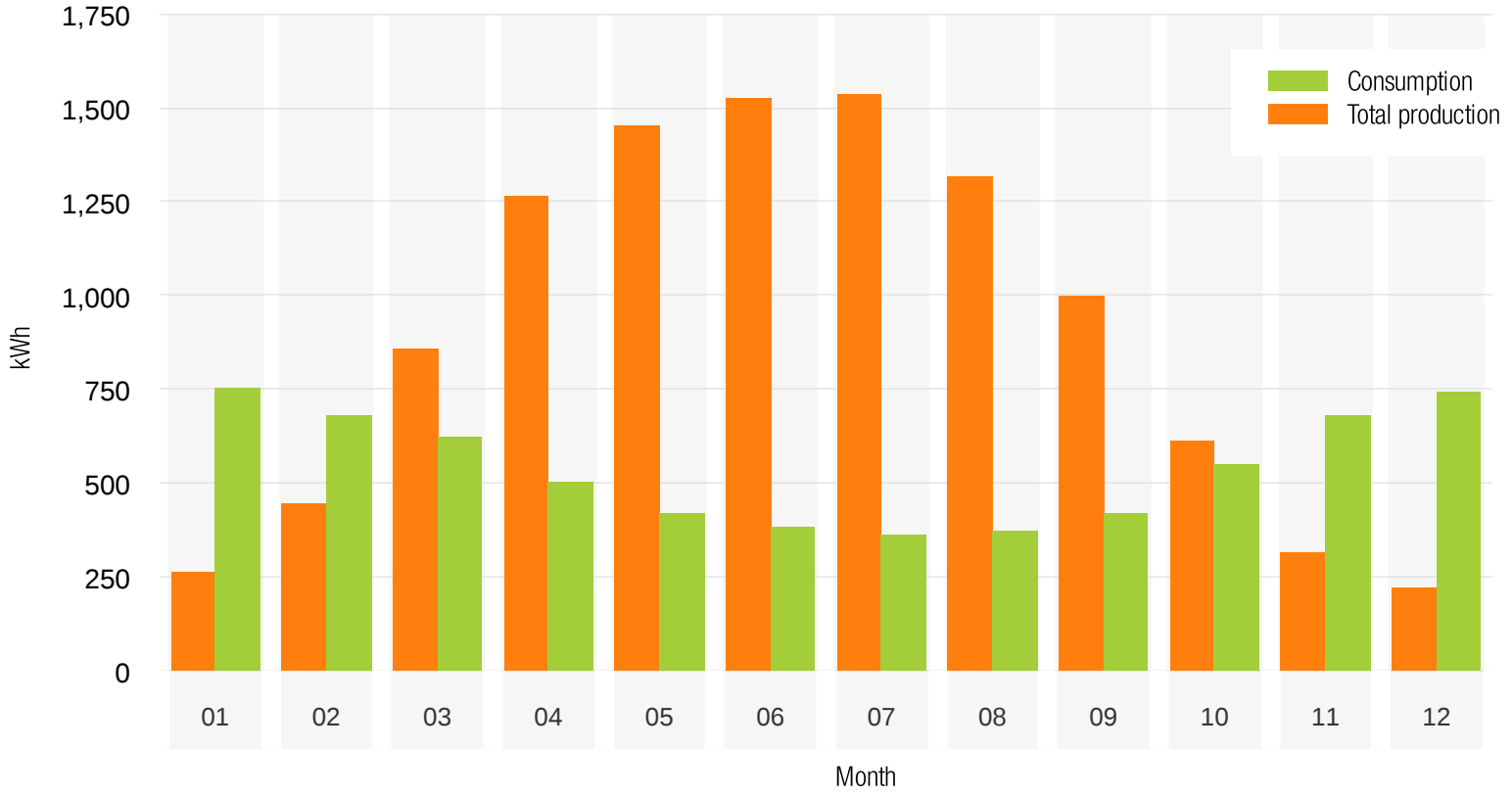
Self-consumption rate : 6%

Internal rate of return (IRR) : 15.35%

& Return on Investment - ROI : 6 ans

The IRR (Internal Rate of Return) is the internal profitability rate of an investment for a series of negative and positive cash flows.

Production and Consumption



A histogram comparing solar production and energy consumption offers several advantages for analysis and decision-making, especially in the context of energy optimization.

Comparison of Financing: Cash / Loan / Leasing

SYSTEM PRICE	**12,000 €**
SUBSIDY AND BONUS	**1,800 €**
NET COST	**9,000 €**

Cash

Cash Deposit	**12,000 €**

Cash financing

TRI 15.35%	**PROFIT 31,114 €**

TREASURY	**9,000 €**

1st Payment 50 %	**6,000 €**
4 checks of 10 %	**1,200 €**

Production kWh PVGIS	**10,795 kWh**
Resale Rate	**0.17 €**
Annual resale revenue	**1,835 €**

Loan (CONSO)

Cash Deposit	**1,200 €**	**3 €/Day**

4-Year Loan Financing / 0.17%

TRI 28.63%	**PROFIT 29,916 €**

The difference between the cost of the loan and the resale proceeds is:

1,164€/years	**97€/month**	**3€/day**

TREASURY	**(1,800) €**

Monthly loan cost	**250 €**
Annual loan cost	**2,999 €**

Production kWh PVGIS	**10,795 kWh**
Resale Rate	**0.17 €**
Annual resale revenue	**1,835 €**

Leasing

Cash Deposit	**3,600 €**	**0 /Day**

6-Year Loan Financing / 0.17%

TRI 21.71%	**PROFIT 28,156 €**

The difference between the cost of the leasing and the resale proceeds is:

58€/years	**5€/month**	**0€/day**

TREASURY	**600 €**

Monthly loan cost	**158 €**
Annual loan cost	**1,893 €**

Production kWh PVGIS	**10,795 kWh**
Resale Rate	**0.17 €**
Annual resale revenue	**1,835 €**

To maximize profits: Cash financing is ideal but requires mobilizing funds immediately.
To preserve capital: A Loan offers a good solution, with moderate financial costs, with or without an initial contribution.
To facilitate financing: Leasing is a quick and balanced option; however, despite a slightly lower IRR, high interest reduces the profit.

Grid Bill / Depreciation of purchasing power

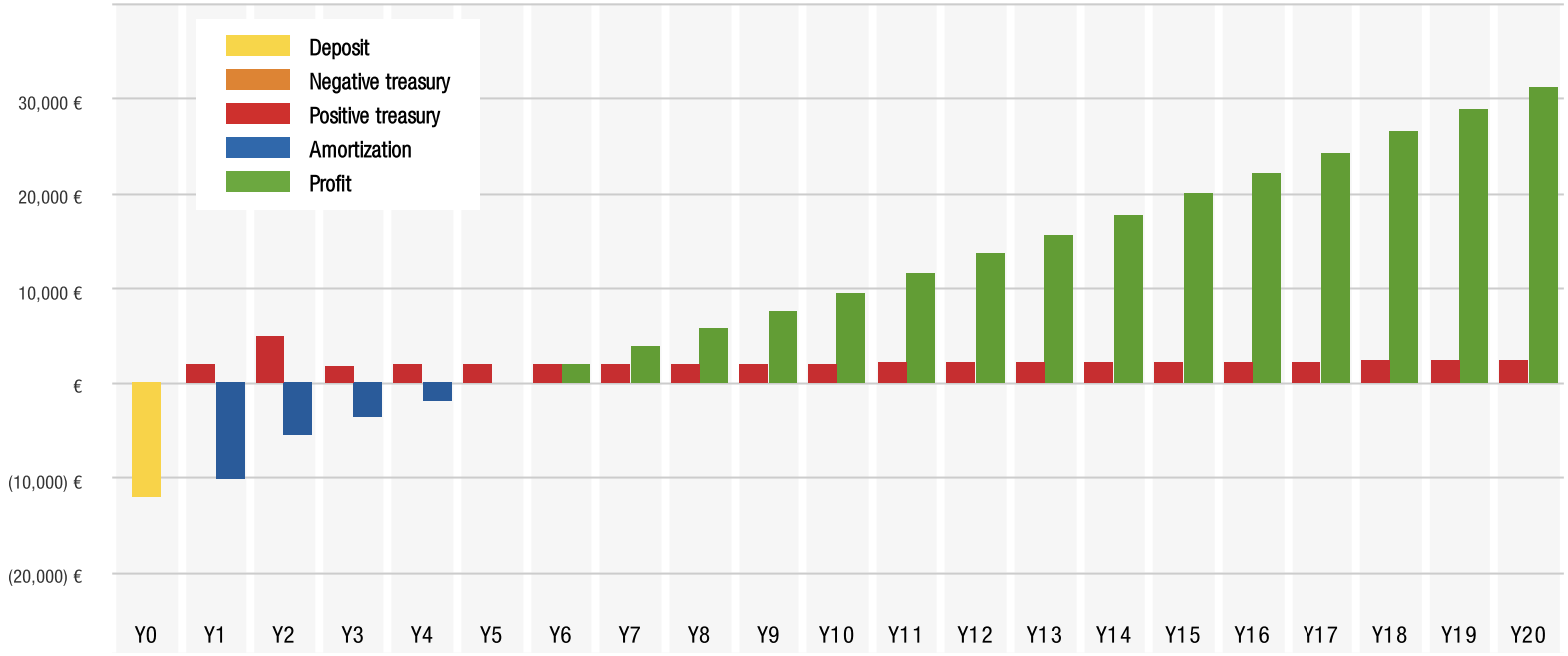
	Grid Pricing	kWh	Grid invoices
	3.50 %	1 %	50,930 €
Y1	0.25 €	6,470	1,618 €
Y2	0.26 €	6,535	1,691 €
Y3	0.27 €	6,600	1,768 €
Y4	0.28 €	6,666	1,848 €
Y5	0.29 €	6,733	1,931 €
Y6	0.30 €	6,800	2,019 €
Y7	0.31 €	6,868	2,111 €
Y8	0.32 €	6,937	2,206 €
Y9	0.33 €	7,006	2,306 €
Y10	0.34 €	7,076	2,411 €
Y11	0.35 €	7,147	2,520 €
Y12	0.36 €	7,218	2,635 €
Y13	0.38 €	7,291	2,754 €
Y14	0.39 €	7,363	2,879 €
Y15	0.40 €	7,437	3,010 €
Y16	0.42 €	7,511	3,146 €
Y17	0.43 €	7,587	3,289 €
Y18	0.45 €	7,662	3,438 €
Y19	0.46 €	7,739	3,594 €
Y20	0.48 €	7,816	3,757 €

Deterioration of purchasing power		
Year	Inflation 10%	Depreciation
Y1	9,000 €	
Y2	8,100 €	10%
Y3	7,290 €	19%
Y4	6,561 €	27%
Y5	5,905 €	34%
Y6	5,314 €	41%
Y7	4,783 €	47%
Y8	4,305 €	52%
Y9	3,874 €	57%
Y10	3,487 €	61%
Y11	3,138 €	65%
Y12	2,824 €	69%
Y13	2,542 €	72%
Y14	2,288 €	75%
Y15	2,059 €	77%
Y16	1,853 €	79%
Y17	1,668 €	81%
Y18	1,501 €	83%
Y19	1,351 €	85%
Y20	1,216 €	86%

Internal Rate of Return (IRR) & Return on Investment (ROI)

	Production 0.5%	Self-cons -€	Resale Rate 2%	Grid Resale 42,394€	Balance on bills	Savings 83%	Cash -	Cash Economy 12,000€		ROI
Y1	10,795 kWh	- kWh - €	0.17 €	10,795kWh 1,835€	(218) €	100%	-	1,835 €	(10,165) €	Y1
Y2	10,741 kWh	- kWh - €	0.17 €	10,741kWh 1,862€	(172) €	100%	-	4,742 €	(5,422) €	Y2
Y3	10,687 kWh	- kWh - €	0.18 €	10,687kWh 1,890€	(123) €	100%	-	1,770 €	(3,652) €	Y3
Y4	10,634 kWh	- kWh - €	0.18 €	10,634kWh 1,918€	(71) €	100%	-	1,798 €	(1,854) €	Y4
Y5	10,581 kWh	- kWh - €	0.18 €	10,581kWh 1,947€	(16) €	100%	-	1,827 €	(27) €	Y5
Y6	10,528 kWh	- kWh - €	0.19 €	10,528kWh 1,976€	43 €	98%	-	1,856 €	1,829 €	Y6
Y7	10,475 kWh	- kWh - €	0.19 €	10,475kWh 2,005€	105 €	95%	-	1,885 €	3,715 €	Y7
Y8	10,423 kWh	- kWh - €	0.20 €	10,423kWh 2,035€	171 €	92%	-	1,915 €	5,630 €	Y8
Y9	10,371 kWh	- kWh - €	0.20 €	10,371kWh 2,066€	241 €	90%	-	1,946 €	7,576 €	Y9
Y10	10,319 kWh	- kWh - €	0.20 €	10,319kWh 2,096€	315 €	87%	-	1,976 €	9,552 €	Y10
Y11	10,267 kWh	- kWh - €	0.21 €	10,267kWh 2,128€	393 €	84%	-	2,008 €	11,560 €	Y11
Y12	10,216 kWh	- kWh - €	0.21 €	10,216kWh 2,159€	475 €	82%	-	2,039 €	13,599 €	Y12
Y13	10,165 kWh	- kWh - €	0.22 €	10,165kWh 2,192€	563 €	80%	-	2,072 €	15,671 €	Y13
Y14	10,114 kWh	- kWh - €	0.22 €	10,114kWh 2,224€	655 €	77%	-	2,104 €	17,775 €	Y14
Y15	10,063 kWh	- kWh - €	0.22 €	10,063kWh 2,257€	752 €	75%	-	2,137 €	19,912 €	Y15
Y16	10,013 kWh	- kWh - €	0.23 €	10,013kWh 2,291€	855 €	73%	-	2,171 €	22,083 €	Y16
Y17	9,963 kWh	- kWh - €	0.23 €	9,963kWh 2,325€	964 €	71%	-	2,205 €	24,288 €	Y17
Y18	9,913 kWh	- kWh - €	0.24 €	9,913kWh 2,360€	1,078 €	69%	-	2,240 €	26,528 €	Y18
Y19	9,864 kWh	- kWh - €	0.24 €	9,864kWh 2,395€	1,199 €	67%	-	2,275 €	28,803 €	Y19
Y20	9,814 kWh	- kWh - €	0.25 €	9,814kWh 2,431€	1,326 €	65%	-	2,311 €	31,114 €	Y20

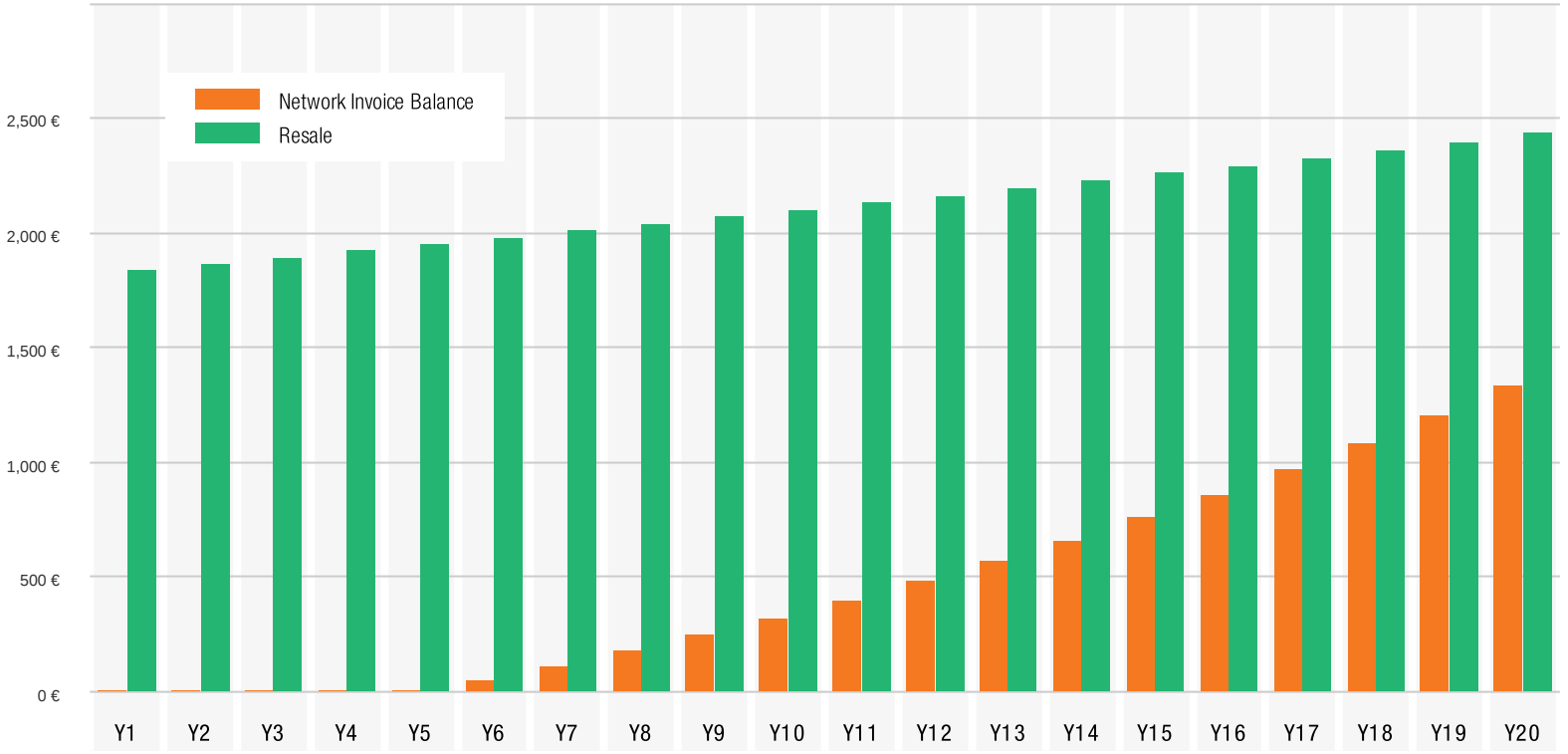
Cash Flow Chart & Return on Investment - ROI



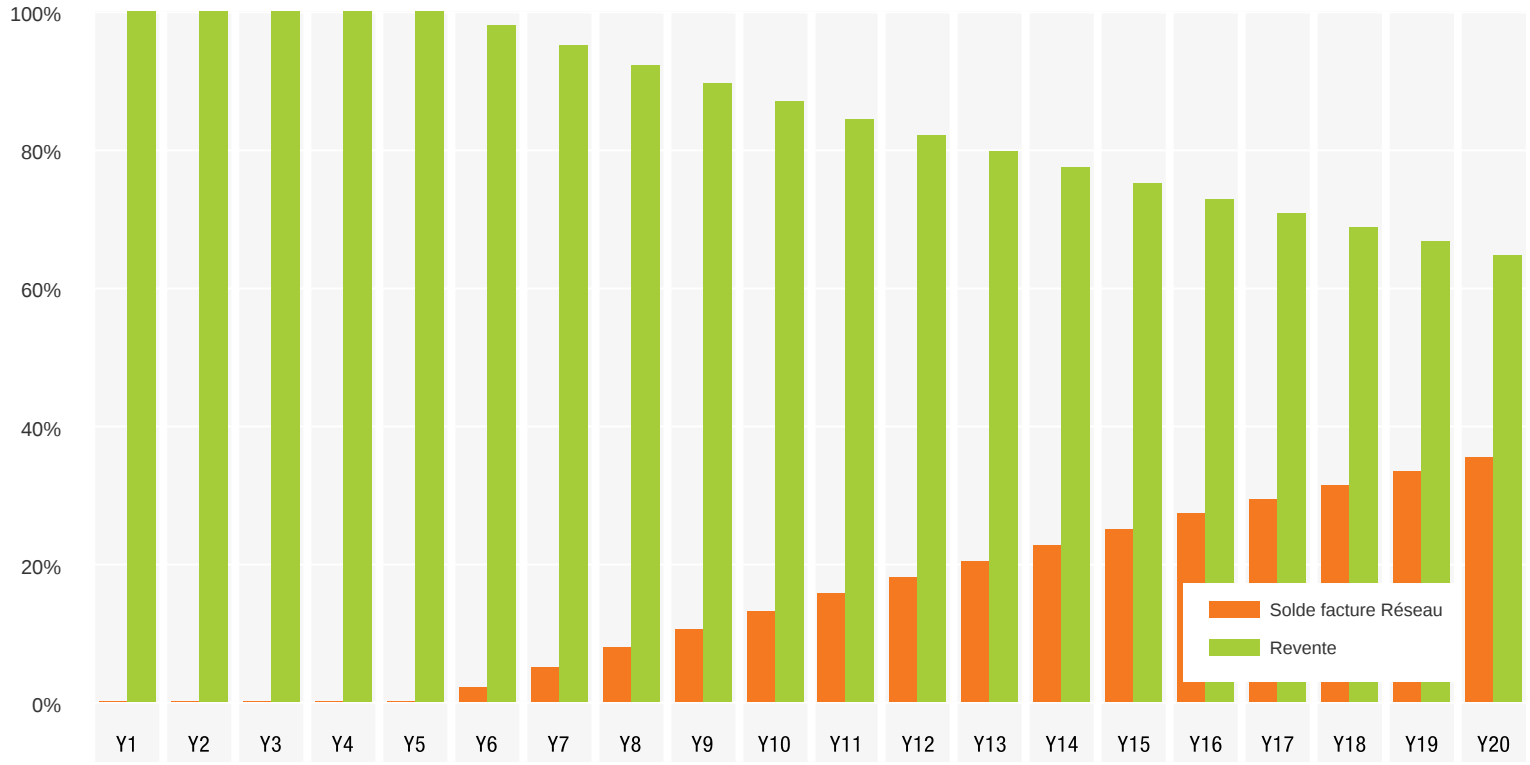
This histogram, representing cash flows and the return on investment (ROI), allows to:

- Visualize financial movements over a specified period, distinguishing between positive bars (income) and negative bars (expenses).
- Identify the point where ROI becomes positive, indicating the recovery of the initial investment.
- Track the evolution of net gains to evaluate the long-term profitability of the project. It is a clear tool for understanding financial performance and a decision-making aid for investors.

Network Economy Chart & Network bill



Graph Economy in % & Network bill



Carbon Footprint

France

https://www.iea.org/countries/france

IEA Electricity Production Sector
Production in GWh

Energy Sources.	GWh	%
Coal	2,038.0	0.4%
Fuel	7,004.0	1.2%
Gas	17,711.0	3.1%
Biomass	7,775.0	1.4%
Waste	4,452.0	0.8%
Solar Thermal	-	-%
Géothermie	128.0	0.0%
Solar PV	23,623.0	4.2%
Wind	47,245.0	8.3%
Nuclear	380,451.0	66.9%
Hydroelectricity	77,461.0	13.6%
Other sources	1,159.0	0.2%
GWh 569,047.0		

CO^2 Content per kWh in Production
in grams of CO^2 per kWh produced and consumed

Energy Sources.	CO^2 Coefficient	CO^2 emission
Coal	1,060.0	3.8
Fuel	730.0	9.0
Gas	418.0	13.0
Biomass	230.0	3.2
Waste	-	-
Solar Thermal	-	-
Géothermie	-	-
Solar PV	20.0	0.8
Wind	12.0	1.0
Nuclear	-	-
Hydroelectricity	24.0	3.3
Other sources	-	-
34.0 g de CO2 par kWh		

The calculation of a country's carbon footprint allows for:

- Evaluating the total greenhouse gas (GHG) emissions generated by its activities, including industry, transportation, agriculture, and energy consumption.
- Identifying the main sources of emissions to prioritize reduction efforts.
- Taking into account factors such as the carbon footprint of imports and exports to gain a comprehensive overview.
- It is an essential tool for monitoring progress toward climate goals and guiding public policies toward a sustainable transition.

Carbon footprint self-consumption simple

Photovoltaic System

Carbon footprint 20 years	-3.03 T CO^2
Annual Production of Photovoltaic System	10,795.00 kWh
Gramme CO^2 annuel supprimés	367,442.37 Gr CO^2
Annual CO^2 emission avoided	0.37 T CO^2
Annual CO^2 emission of Photovoltaic system	215,900.00 Gr CO^2
Annual CO^2 emission of Photovoltaic system	0.22 T CO^2
Annual Carbon Balance	0.15 T CO^2

The calculation of the carbon balance of a solar installation allows to :

- Evaluate the emissions avoided through the production of renewable energy, compared to conventional supply via the grid (often based on fossil fuels).
- Quantify the positive environmental impact, particularly in terms of tons of CO_2 saved throughout the system's lifespan.
- Highlight that each kWh of self-consumed solar energy directly contributes to reducing the household's carbon footprint.
- It is a tangible demonstration of the future solar energy producer's commitment to a more sustainable lifestyle.