

**Due Diligence, Environmental and Financial Report
for the 50 MW Solar PV Project Based in Lisbon,
Portugal.**

Key Figures
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

Key Figures

Waterfall	Dec 2022 - Nov 2042
	€ (EUR)
CFADS	91,584,239.72
Interest	(7,492,355.39)
Fees	(-0.0)
Principal	(26,890,360.0)
Tax Facility	(11,440,304.87)
Net Profit (CFADS)	45,761,219.46
Cash Available to Equity	45,761,219.46

Client
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

Company: PVDATA
Email: k.mbuk14@gmail.com
Project Name: Alcamo Solar Farm
Project Site: Lisbon, Portugal
Irradiance/yr.: 1,634.66 kWh/m2/yr
Analysis Currency: European Euro €

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50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

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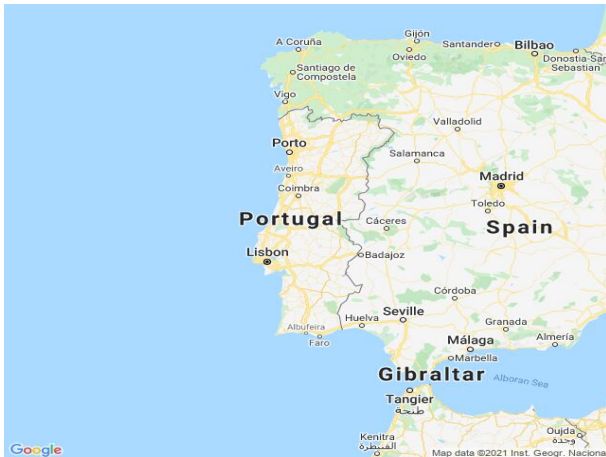
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Important Note
50 MW Solar PV Project based in Lisbon, Portugal.
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This document is a comprehensive report assessing the viability of your 50 MW Solar PV Project based in Lisbon, Portugal.

Data and information is derived from selected public sources. PvData, in providing the data and information, believe that the information it uses comes from reliable sources, but do not guarantee the accuracy or completeness of this information, which is subject to change without notice, and nothing in this document shall be construed as such a guarantee. The statements in this document reflect the current judgment of the author of the relevant articles or features. PvData disclaims any liability arising from use of this document, its contents and/or this service. Nothing herein shall constitute or be construed as an offering of financial instruments or as investment advice or recommendations by PvData of an investment or other strategy (e.g., whether or not to “buy”, “sell”, or “hold” an investment). The information available through this document is not based on consideration of a subscriber’s individual circumstances and should not be considered as information sufficient upon which to base an investment decision. You should determine on your own whether you agree with the content. This service should not be construed as financial advice or as a service designed to facilitate any subscriber’s compliance with its accounting or other legal obligations.

Country Overview
50 MW Solar PV Project based in Lisbon, Portugal.
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Population:	10,283,822
Language:	Portuguese
Local Currency:	EUR European Euro
Exchange Rate:	1 USD to 0.88 EUR

Power Market

In Portugal, electricity from renewable sources from registered plants until 7 November 2012 is promoted mainly through a feed-in tariff (FiT). Until then, funding can be given to new RES plants via a general scheme (i.e., wholesale electricity market) or through the guaranteed remuneration programme. The latter depends on the resources allocated through the initiative of a public tender. Nevertheless, tender RES rules were never written, nor was any auction initiative launched. Therefore, new RES plants will only be paid via the wholesale electricity market as of November 2012.

A specific pay scheme for electricity generated from small-scale production (UPP) and self-consumption (UPAC) units entered into force in January 2015 and is based on a bidding model where producers give discounts on a reference tariff. UPPs and UPACs have common regulations and distinctive features. There is actually no framework for direct funding or fiscal incentives in place for RES-H (as of November 2018); only indirect support. The main incentives in the transport sector are a quota scheme for biofuels and a tax exemption for small biofuel producers (PPDs).

Access to the grid for electricity from renewable sources shall be granted in compliance with the principle of non-discrimination and priority shall be given to electricity generated from RES (except for installed hydropower plants of more than 30 MW). In recent years, the requirement to buy the electricity produced from renewable sources during the time that they benefit from the FiT has provided favourable conditions for the implementation of RES-E. Generally, grid operators are obligated to build grid networks. But plant operators have no right to claim expansion of the grid.

Project Parameters
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

1. Project Background

The primary purpose of this report is to measure the financial viability and identify the social and environmental risk(s) associated with your 50 MW Solar PV Project based in Lisbon, Portugal. You have selected to enter into a 20yr. Power Purchase Agreement at a wholesale PPA price of € 0.075/kWh with the utility, Energias de Portugal.

2. Parameters

	Notes	Input
Dates		
Financial Close		01 December, 2021
Project Start	1yr const.	01 December, 2022
Contract Expiration	20yrs	30 November, 2042
<hr/>		
General		
Project Size		50 MW
PPA Price	Fixed	€ 0.075/kWh
Irradiance		1,634.66 kWh/m2/yr
<hr/>		
Capital Expenditure		
Project Cost		€ 38,414,800
Loan Value	70.0 %	€ 26,890,360
Equity Value	30.0 %	€ 11,524,440
<hr/>		
Debt Financing		
Repayment Type		Fixed P+I/Mortgage
Loan Tenure		12 yrs
Interest rate		4%
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Discount Rate		8.0%
Tax		20.0%
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Financial Summary
50 MW Solar PV Project based in Lisbon, Portugal.
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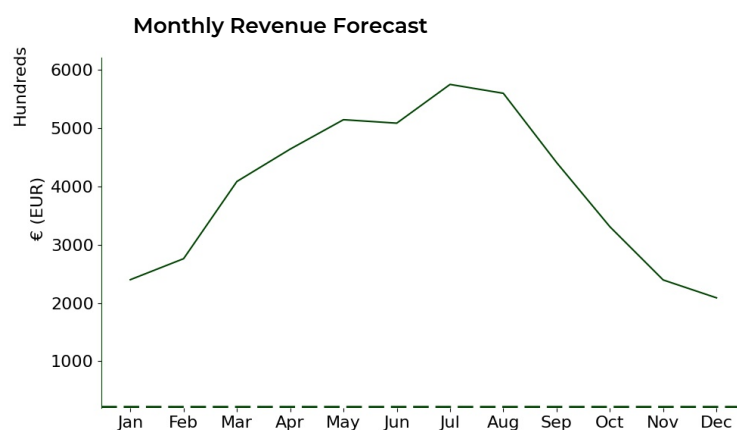
3. Financial Summary

	Notes	Output
Maturity	12 yrs	01 December, 2034
Draw Down		01 December, 2021
NPV		€ 6,116,691.21
NPV of Annual Cost		- € 561,335.57
Salvage Value		€ 7,682,960.0
Profitability		1.23
IRR at the end of project		12.7%
Revenue Forecast		€ 88,316,279.72
Levelized COE		€ 0.08/kWh
Generation Forecast		1,177,550,396.21 kWh

Financial Summary
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

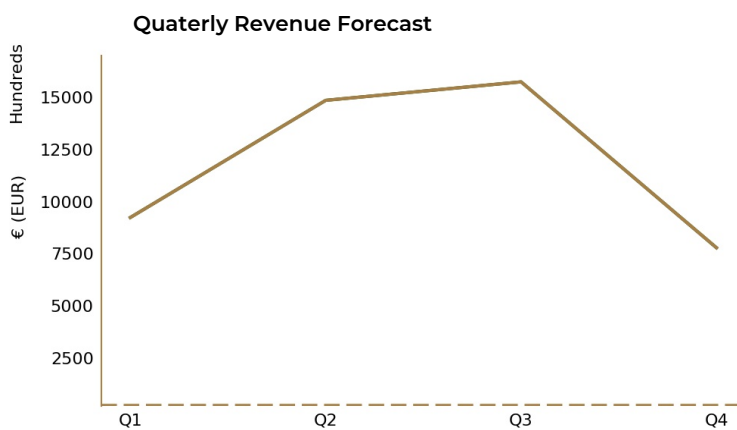
4. Monthly returns

The graphical illustrations shown in this section represents the revenue forecast for the first year of generation.



Monthly Returns

Highest: Jul € 574,720.6
Lowest: Dec € 208,801.84



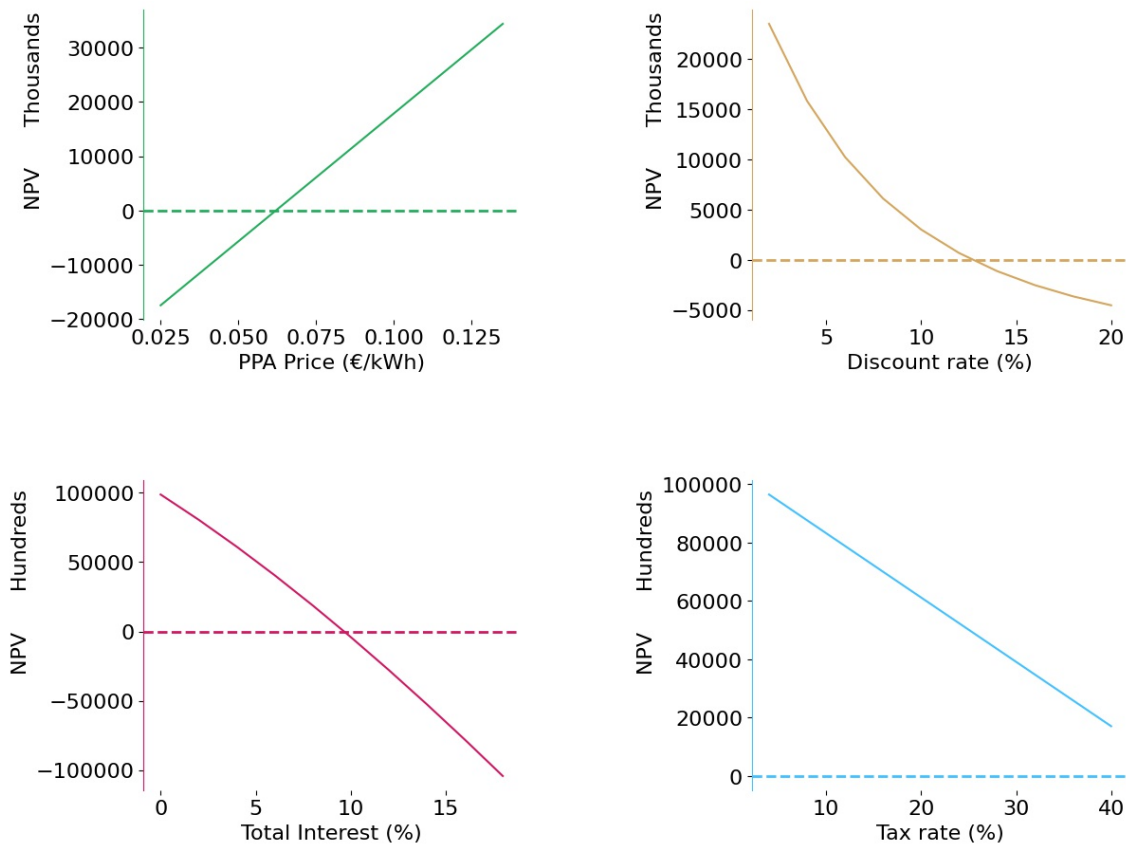
Quarterly Returns

Highest: Q3 € 1,574,955.66
Lowest: Q4 € 778,934.03

Sensitivity Analysis
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

5. Sensitivity Analysis

This section uses sensitivity analysis to account for future uncertainty of the proposed €38,414,800 solar PV Project in Lisbon, Portugal. This analysis will look at four different variables (i.e., PPA, discount rate, total interest rate and tax rate), relative to Net Present Value (NPV).



Results

The results show that for every €0.01/kWh increase in the PPA price, the NPV increases by €4,710,061.49. In this instance, a positive NPV is achieved at a PPA price of €0.065/kWh. Results also show that for every 2% increase in the discount rate and total interest, their NPV values decrease by an average of €3,118,374.41 and €1,819,399.95 respectively. The sensitivity analysis for corporate tax rate shows that the NPV value falls by €882,056.56 for every 4% decrease in tax.

Site Overview
50 MW Solar PV Project based in Lisbon, Portugal.
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6. Additional Information

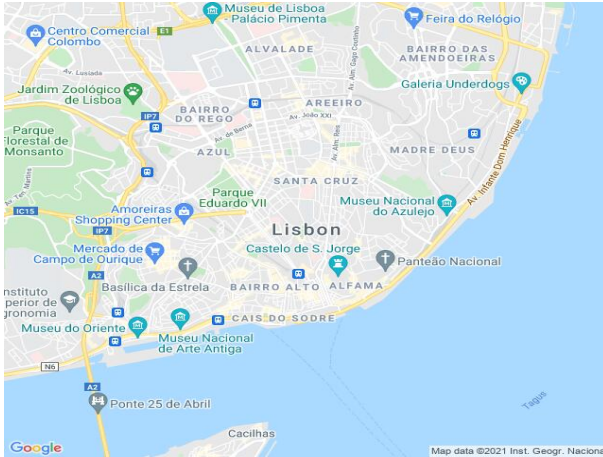
Location Data

Capacity Factor	17.4 %
Homes Supplied	17,920.0 Homes
Rainfall	1,666.0 Millimetres/yr
CO2 Savings	23,551.01 Tonnes Co2/yr

Land

Land Agreement	Full ownership
Land Size	112.5 Hectares
Land Lease cost	No Lease Agreement

Environmental and Social Analysis
50 MW Solar PV Project based in Lisbon, Portugal.
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Project site: Lisbon, Portugal
Coordinates: lat: 38.7227 N long: 9.1449 W
ESG Risks: 1 identified

Risk Warning(s)

Flood Risk

i. Flood Risk

For most part of the year 2021, Lisbon, Portugal will face heavy rains and gusty winds. In 2021, Lisbon will receive approximately 1,666.0 mm of rain, which rates as one of Lisbon's heaviest rain showers over the last decade. As the wiring system, inverters and panels may be exposed to water damage, this heavy shower over the year can lead to the destruction of your 50 MW solar infrastructure.

Mitigation 1

Relocate project site to an area in Portugal where the flood risk is low.

Mitigation 2

Invest in sustainable drainage measures on the project site, such as swales and infiltration trenches.

Mitigation 3

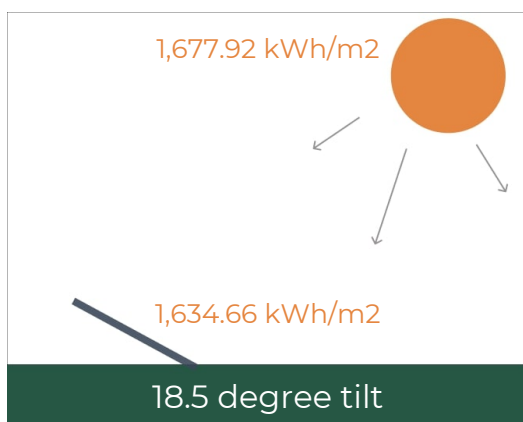
Raise the height of the solar mounting system and key electrical infrastructure above 5.5 feet.

Technical & Design Report
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

Project Name: Alcamo Solar Farm
Location: Lisbon, Portugal
Size: 50 MW

Irradiance/yr: 1,634.66 kWh/m²/yr
Nb of Modules: 147,058 PV Modules
Meteor Data: NASA

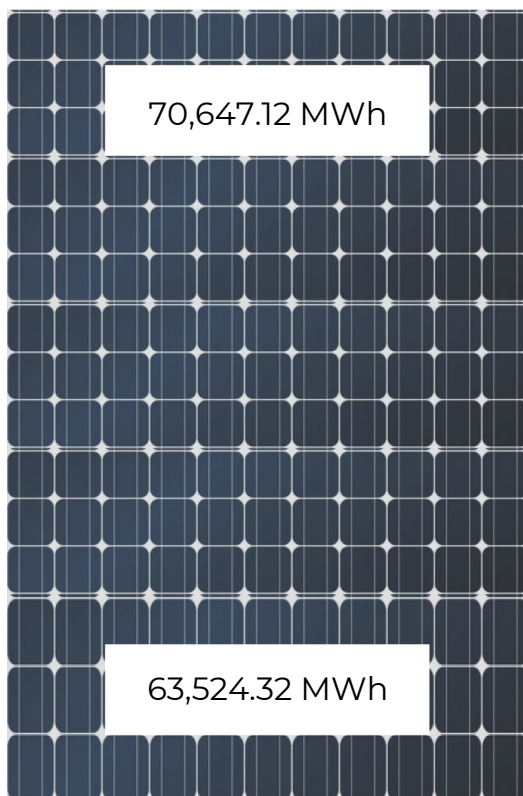
Loss diagram over the whole year - Solar tilt summer



Irradiance loss: 2.6 %

Horizontal global irradiance

Irradiation on collectors



System's loss: 14.0 %

Array nominal energy

PV temp and irradiance loss

Light induced degradation

Modules and strings

Ohmic wiring loss

Inverter efficiency loss

Other losses

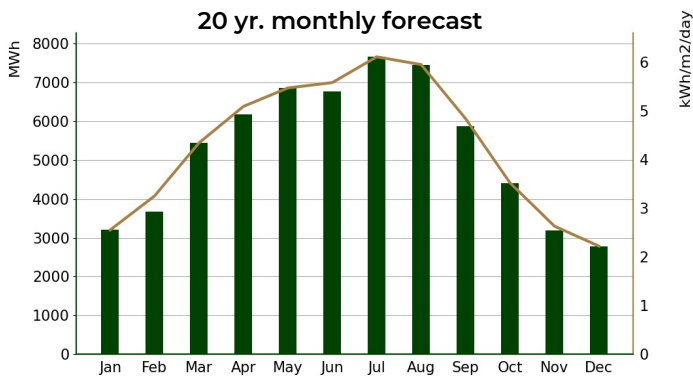
Electricity injected to grid

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Meteor Data: NASA

Generation Forecast and Daily Irradiance-Monthly Over-Time



Yr. 1 Electricity Yield: **63,524.32 MWh/year**

Production Probability

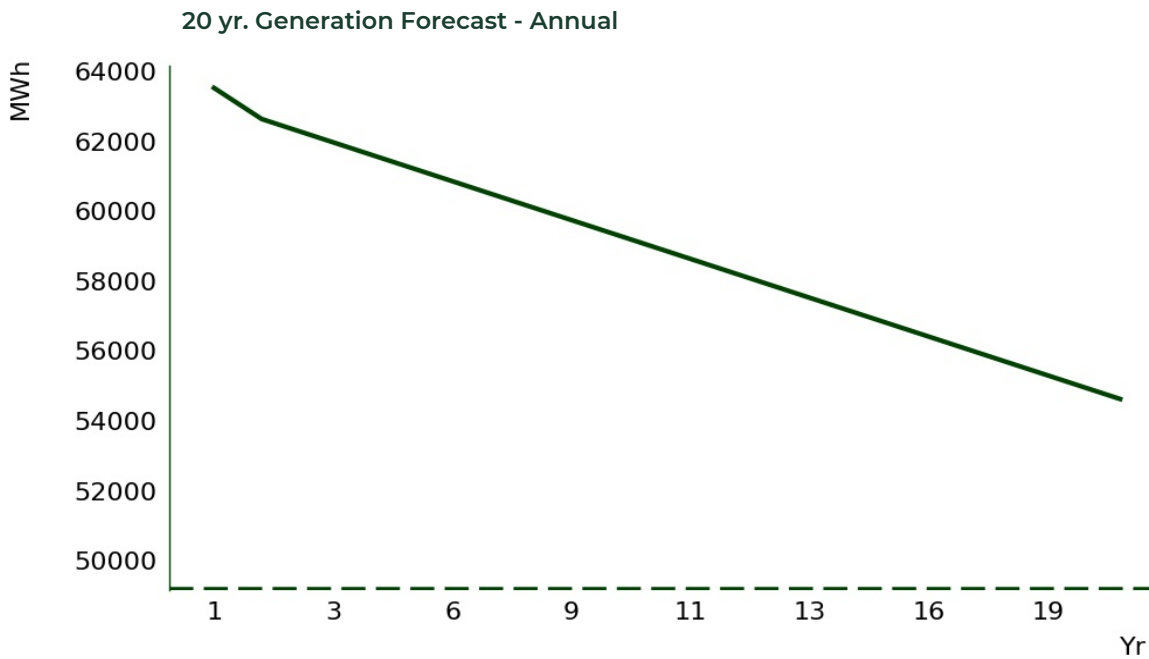
P50: 67,507.25 MWh/year
P90: 63,524.32 MWh/year
P95: 62,444.21 MWh/year

	Irradiance kWh/m ² /day	Ambient Temperature °C	E_Grid MWh
Jan	2.55	9.28	3198.747
Feb	3.25	10.3	3679.039
Mar	4.34	12.68	5443.937
Apr	5.09	14.33	6183.863
May	5.47	17.1	6856.274
Jun	5.58	20.54	6777.269
Jul	6.11	22.56	7662.941
Aug	5.95	22.73	7460.117
Sep	4.84	20.9	5876.35
Oct	3.52	17.17	4409.203
Nov	2.63	12.7	3192.559
Dec	2.22	10.22	2784.025

Technical & Design Report
50 MW Solar PV Project based in Lisbon, Portugal.
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Technology: Monocrystalline Silicon
PV Module Watt Peak: 340 Wp
PV Degradation: 0.7 %

PV Module Efficiency: 17.0 %
Land Area: 112.5 Hectares
Rainfall: 1,666.0 Millimetres

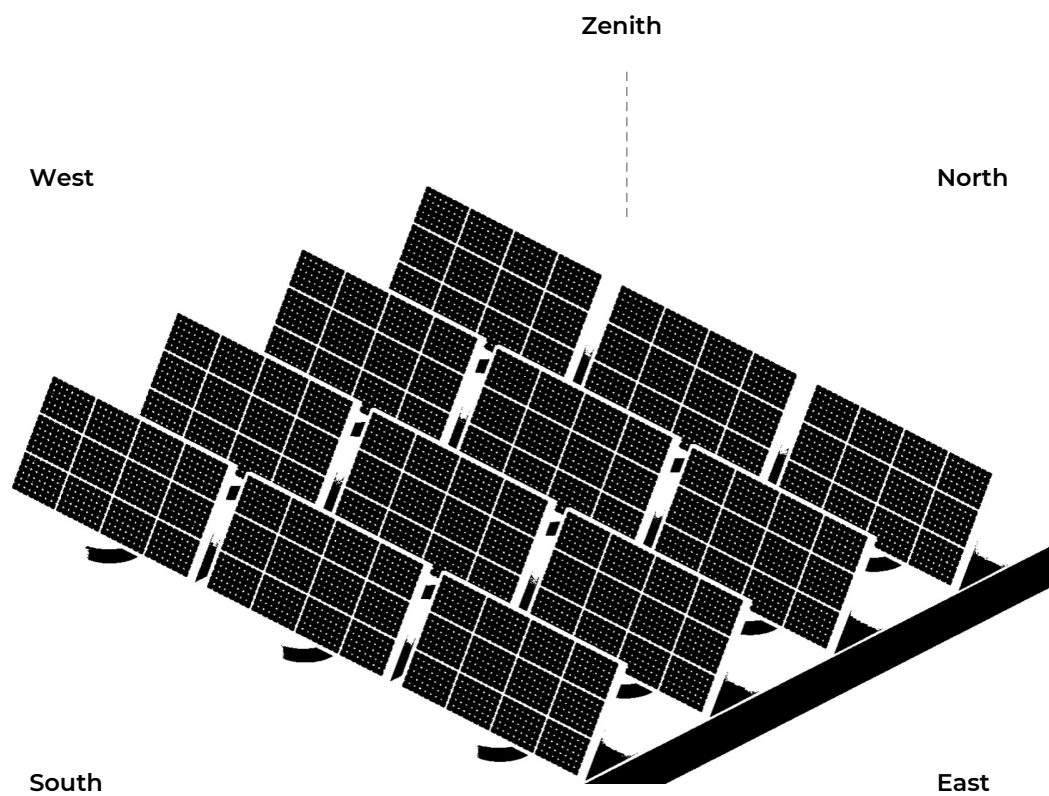


Year	E_Grid MWh	Year	E_Grid MWh
1	63524.32	13	57743.61
2	62634.98	14	57298.94
3	62190.31	15	56854.27
4	61745.64	16	56409.6
5	61300.97	17	55964.93
6	60856.3	18	55520.26
7	60411.63	19	55075.59
8	59966.96	20	54630.92
9	59522.29		
10	59077.62		
11	58632.95		
12	58188.28		

Technical & Design Report
50 MW Solar PV Project based in Lisbon, Portugal.
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Project Name:	Alcamo Solar Farm	Irradiance/yr:	1,634.66 kWh/m ² /yr
Location:	Lisbon, Portugal	Nb of Modules:	147,058 PV Modules

Perspective of the PV-Field (Fixed Tilt)



Balance Sheet
50 MW Solar PV Project based in Lisbon, Portugal.
December, 2021

Balance Sheet

		Dec 2022 - Nov 2042
	Notes	€ (EUR)
Project Cost	(38,414,800)	
Total Revenue		88,316,279.72
Operation and Maintenance		(4,415,000.0)
Adjustments		7,682,960.0
EBITDA		91,584,239.72
CFADS		91,584,239.72
Interest		(7,492,355.39)
Fees		(-0.0)
Principal		(26,890,360.0)
Cash Sweep		0.0
Tax Facility		(11,440,304.87)
Net Profit (CFADS)		45,761,219.46
Cash Available to Equity		45,761,219.46

Balance Sheet
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20 yr. Operational Lifecycle (€)

Year	CFADS	Expenditure	Expected Cashflow
Dec 2022-Nov 2023	4,543,574.31	3,200,895.89	1,342,678.42
Dec 2023-Nov 2024	4,476,873.77	3,187,555.78	1,289,317.99
Dec 2024-Nov 2025	4,443,523.5	3,180,885.73	1,262,637.77
Dec 2025-Nov 2026	4,410,173.23	3,174,215.67	1,235,957.56
Dec 2026-Nov 2027	4,376,822.96	3,167,545.62	1,209,277.34
Dec 2027-Nov 2028	4,343,472.69	3,160,875.56	1,182,597.12
Dec 2028-Nov 2029	4,310,122.42	3,154,205.51	1,155,916.91
Dec 2029-Nov 2030	4,276,772.15	3,147,535.46	1,129,236.69
Dec 2030-Nov 2031	4,243,421.88	3,140,865.4	1,102,556.48
Dec 2031-Nov 2032	4,210,071.61	3,134,195.35	1,075,876.26
Dec 2032-Nov 2033	4,176,721.34	3,127,525.29	1,049,196.04
Dec 2033-Nov 2034	4,143,371.07	3,120,855.24	1,022,515.83
Dec 2034-Nov 2035	4,110,020.8	822,004.16	3,288,016.64
Dec 2035-Nov 2036	4,076,670.53	815,334.11	3,261,336.42
Dec 2036-Nov 2037	4,043,320.26	808,664.05	3,234,656.21
Dec 2037-Nov 2038	4,009,969.99	801,994.0	3,207,975.99
Dec 2038-Nov 2039	3,976,619.72	795,323.94	3,181,295.77
Dec 2039-Nov 2040	3,943,269.45	788,653.89	3,154,615.56
Dec 2040-Nov 2041	3,909,919.18	781,983.84	3,127,935.34
Dec 2041-Nov 2042	11,559,528.91	2,311,905.78	9,247,623.12

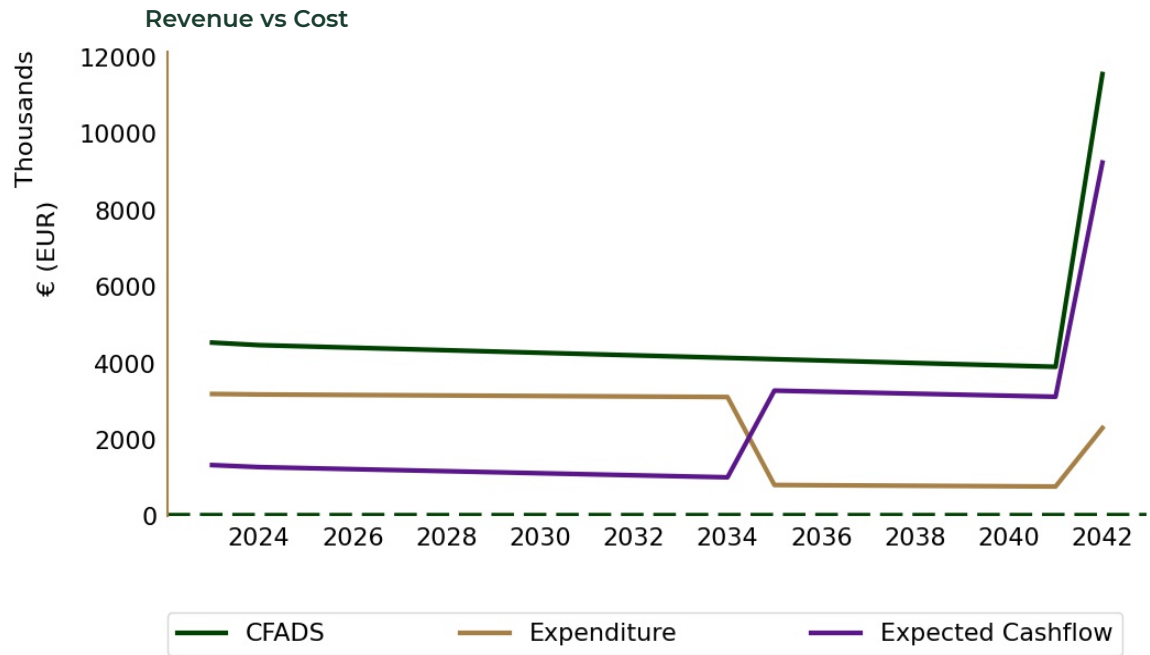
General Information

Expenditure represents Interest, fees, principal and tax.

Expenditure
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Graphical Representation

The graphical illustration shown in this section represents the Revenue vs Cost forecast for the entire project lifecycle.



Cash Available to Equity

This is what an investor or company expects to realize from the solar project after all expenses have been deducted.

Electricity Regulatory Fee

Electricity regulatory are charges usually issued by the electricity regulatory board or electricity distribution company responsible for transmitting your electricity.

Financial Close

Financial close occurs when all the project and funding agreements have been signed, all the terms of such agreements have been met, and the private party to the PPP will start drawing up the financing to start construction on the project.

Irradiance

The amount of sunlight energy (also known as solar radiant energy) incident on per unit area at a specific time is called solar irradiance. Solar irradiance delivered to the earth is both intermittent and differs from place to place, thus some areas of the earth receive a higher solar irradiance values compared to others.

Levelized Cost of Energy

The levelized energy cost (LCOE) is a measure of a power source which allows a consistent comparison of different methods of generating electricity. Additionally, the LCOE may be viewed as the minimum constant price at which energy must be sold to break even over the lifetime of the plant. This can be measured as the net present value of all asset lifetime costs divided by a suitably discounted average of the asset's energy output over that lifetime.

LIBOR

LIBOR, the acronym for the London Interbank Offer Rate, is the global reference rate for unsecured short-term borrowing on the interbank market.

Maturity Date

Maturity date refers to a finite time period at the end of which the financial instrument will cease to exist and the principal is repaid with interest.

P50, P90 and P95 Electricity Generation

P50, P90 and P95 represent different electricity yield levels, for which the probability that the production of a particular year is over this value is 50%, 90% and 95% respectively.

Salvage Value

Salvage value is an estimated amount that is expected to be received at the end of an asset's useful life.

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