



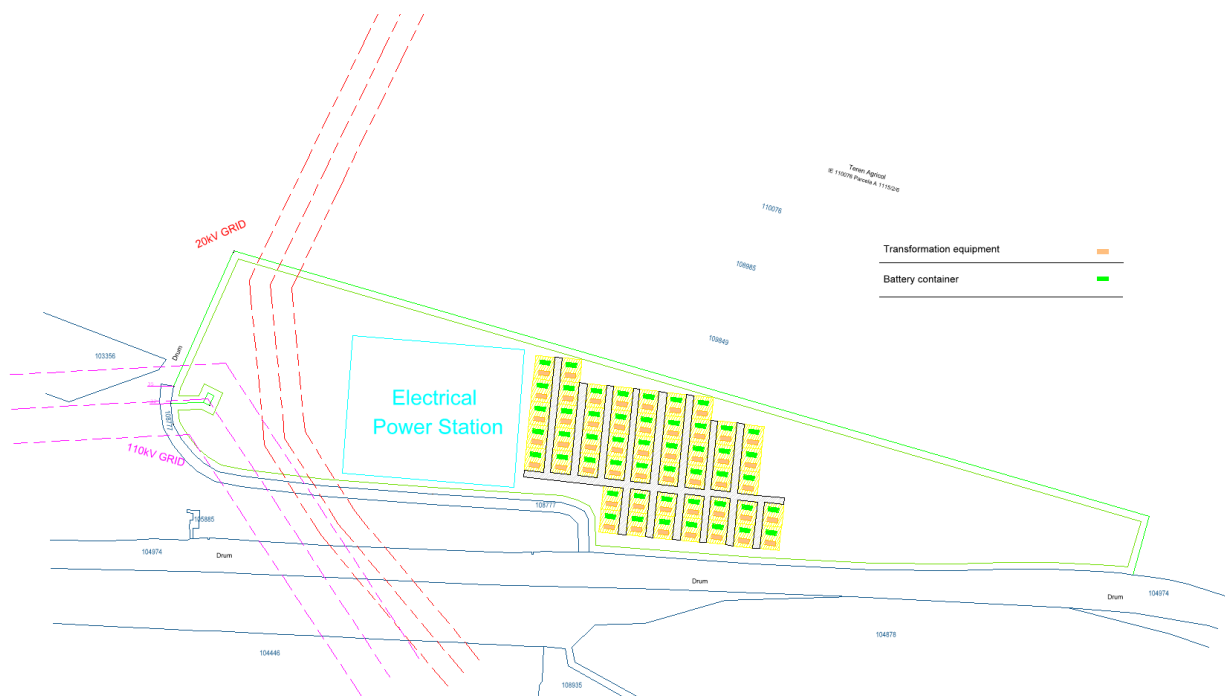
BESS

Project: Medgidia, CT
Total surface: 5 Ha
Storage capacity: 100,3 MWh





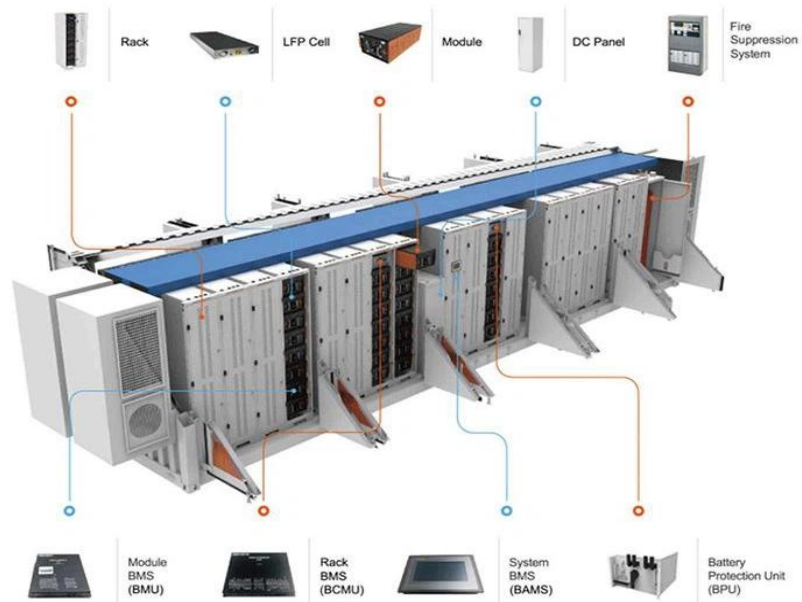
Layout





Technical description of the storage facility

- (Battery container)**



- Transformation unit - (MV SKID)**





1. Investment cost

	Storage Capacity 100 MWh	
Investment	EUR	20.000.000,00

2. Income

For a storage facility, there are several opportunities through which the electricity storage capacity can be used, including:

- Balancing market:

Revenues: 800-1000 €/MWh;

Charge/discharge cycles per day: ~ 0.2;

- DAM Arbitrage (Day-After Market):

Revenues: ~€100/MWh;

Charge/discharge cycles per day: ~ 1;

- IDM Arbitrage (Intra-Day Market):

Revenues: ~ 200 €/MWh;

Charge/discharge cycles per day: ~ 0.5-1;

For a combined scenario of using the storage facility, the following calculation will result, per MWh:

Combined scenario usage per MWh of storage			
	Cycles per day	Price [€/MWh]	Daily income [€]
Balancing market arbitrage	0,2	850	170
DAM arbitrage	0,7	100	70
IDM Arbitrage	0,75	166	124,5
Total			364,5



Revenues produced by the storage facility

Year		1	2	3	4	5	6	7	8	9	10
100 MWh 1.5 Cycles Charge/Discharge	Income	EUR 13.111.200,00	EUR 12.848.976,00	EUR 12.586.752,00	EUR 12.324.528,00	EUR 12.062.304,00	EUR 11.800.080,00	EUR 11.307.098,88	EUR 11.275.632,00	EUR 11.013.408,00	EUR 10.751.184,00
	Operational costs	EUR 917.784,00	EUR 899.428,32	EUR 881.072,64	EUR 862.716,96	EUR 844.361,28	EUR 826.005,60	EUR 791.496,92	EUR 789.294,24	EUR 770.938,56	EUR 752.582,88
	Profits	EUR 12.193.416,00	EUR 11.949.547,68	EUR 11.705.679,36	EUR 11.461.811,04	EUR 11.217.942,72	EUR 10.974.074,40	EUR 10.515.601,96	EUR 10.486.337,76	EUR 10.242.469,44	EUR 9.998.601,12

Cashflow

An	1	2	3	4	5	6	7	8	9	10
100 MWh 1.5 Cycles Charging/discharging	-7.806.584,00 €	4.142.963,68 €	15.848.643,04 €	27.310.454,08 €	38.528.396,80 €	49.502.471,20 €	60.018.073,16 €	70.504.410,92 €	80.746.880,36 €	90.745.481,48 €



Economic Data

Project assumptions		
Project name	Medgidia, Constanta	
PV Installed Capacity	-	MWp
Annual energy production AC/MWp	1.398	MWh/MWp/year
Annual PV pannel degradation	0,5%	p.a.
Installed Storage Capacity	100,3	MWh
Charge-Discharge Battery cycles/days	2	hours
Annual BESS degradation	3%	a
Energy produced base price	70	€/MWh
Balancing Market energy price	900	€/MWh
DAM energy price	100	€/MWh
IDM energy price	200	€/MWh
Inflation rate	3%	p.a.
Project cost		
Storage equipment cost	150.000	€/MWh
Other cost related to storage (connection et	50.000	€/MWh
Cost PV park per MWp	595.000	€/MWp
Cost Storage Batteries (BESS)	20.060.000	€
Cost PV park	-	€
Customer-Side Works Tu	1.093	€
Grid Connection Installations Tr	645.700	€
Grid Reinforcement Ti specific	40.095	€
Grid Connection Route	4.000	€
TOTAL COST PV park + Storage	20.750.887	€
Operational cost		
Land lease	3.000	€/MWp/year
Insurance/ MW/year	3.000	€/MWp/year
Operation& Maintenance/ MW/year	3.000	€/MWp/year
Balancing & forecasting services	1.000	€/MWp/year
Accounting, bank, legal, Opcom fees etc	6.000	€/year
Utilities (energy and water)	2.000	€/MWp/year
Contingencies/year	5%	p.a.
Security services	1.000	€/MWp/year
Tax on land and construction	2.500	€/year
Financial assumptions		
Equity	6.225.266	€
Loan Amount	14.525.621	€
Leverage	70%	%
VAT credit line (21% of CAPEX hard cost)	4.357.686	€
Interest rate loan - Euribor 1 M	2,68	%
Interest Margin	4,00	%
Loan Maturity	10	years
Grace period	12	months
Monthly Instalments	108	months
Nominal cost of equity	15%	% p.a.
Cost of debt	6,4%	% p.a.
Tax rate	16%	% p.a.
WACC	8,3%	% p.a.
Financial ratios project		
IRR project	38%	%
IRR equity	128%	%
NPV project	21.389.767	€
Payback period	2	years

According to the approved Engineering Solution Study, the indicative cost of grid reinforcement works (TI) is estimated at approximately 220.626,58€. This value will be reassessed at the commissioning stage, and experience from similar projects shows that the final reinforcement costs tend to decrease significantly.

