Backing the European PV industry

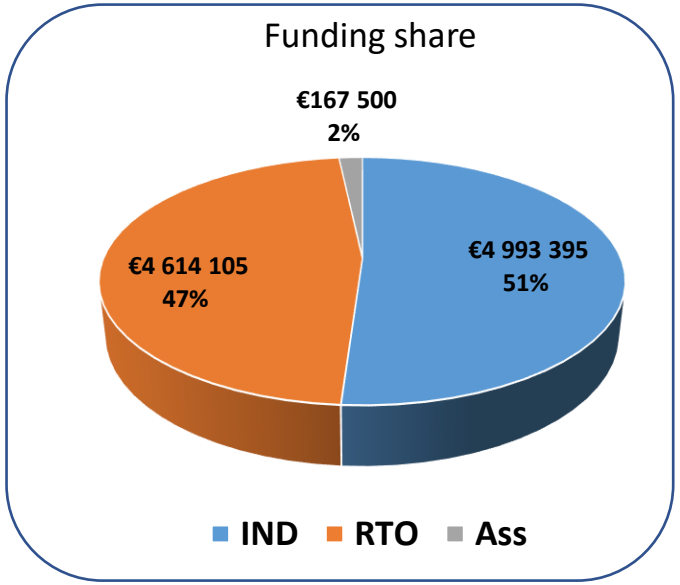
Contact/Coordinator: stephane.guillerez@cea.fr

GLOBAL OPTIMIZATION OF
INTEGRATED PHOTOVOLTAICS SYSTEM
FOR LOW ELECTRICITY COST

ID Card

Grant agreement N° 792059
11 partners
Budget: 11,915 k€
Funding: 9,775 k€
Start date: 01/04/2018
Duration : 48 months

IND	RTO	Assoc.
Enel green Power (IT)	CEA (FR)	INES-PFE (FR)
GXC coatings (DE)	EPFL (CH)	
Mondragon Assembly (ES)	LEITAT (ES)	
REFU Elektronik (DE)	TECNALIA (ES)	
Convert Italia (IT)	RSE (IT)	



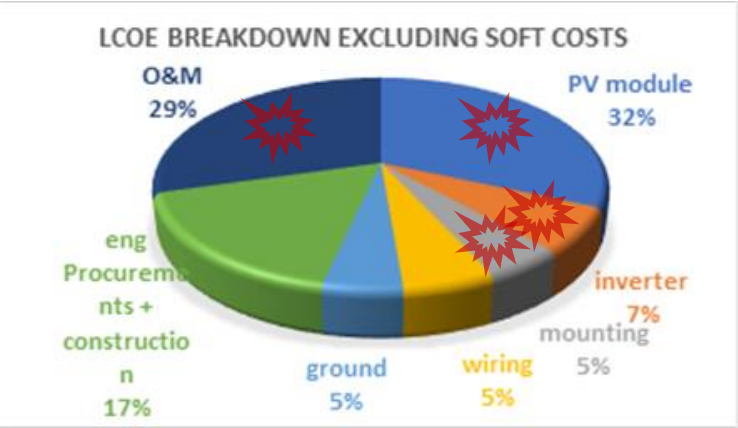
Main objectives

General/societal objectives

Reduction of the cost of PV electricity for increasing its competitiveness and its share in the European electricity mix
Creation of added value for European industrial players to be competitive on the global market

Techno-economic objectives

→ Higher efficiency, longer lifetime, lower cost components



Estimated Breakdown of LCOE for PV plants > 100 kW in EU and US

PV plant cost element	GOPV developed component	Main characteristics	Targeted cost	Targeted lifetime
Module	Bifacial HJT modules	400W + bifaciality ≥ 90%	0,22€/W	35 years
Tracker	1 axis tracker	Built with alternative materials to hot dip galvanized Steel	0,11€/W	35 years
Inverter	Current source string inverter	125 kVA + Energy efficiency ≥ 99%	0,05€/W	20 years
O&M	Advanced fault detection & diagnostics tool	Energy availability ≥ 99.5%	10k€/MW/Year	-

STEPWISE DEVELOPMENT UP TO LARGE SCALE DEMONSTRATOR

April 2018 — T0 — 3 years development and validation — From laboratory testing (TRL5) to prototype system verified (TRL6) — March 2021 — 1 year field demonstration — To integrated pilot system demonstrator (TRL7) — M48 — March 2022

WP2 (MASS) — 400 W

LIGHT MANAGEMENT

MATERIAL EFFICIENCY

enel Green Power — MONDRAGON ASSEMBLY — GXC Coatings

WP4 (CONVERT) — 1 axis

LIGHT MANAGEMENT

MATERIAL EFFICIENCY

CONVERT

WP3 (REFU) — 125 kVA

ENERGY EFFCIENCY

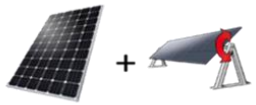
MATERIAL EFFICIENCY

REFU Elektronik

Validation of advanced features of PV single components

M18 — MS1

WP6 (EGP) — 20 kW



ENERGY EFFCIENCY

SYSTEM RELIABILITY

Validation of advanced features of PV dual component

M24 — MS2

WP5 (TECNALIA)
WP6 (EGP) — 500 kW (4x125)

Electricity cost 0.020 €/kWh

D6.4

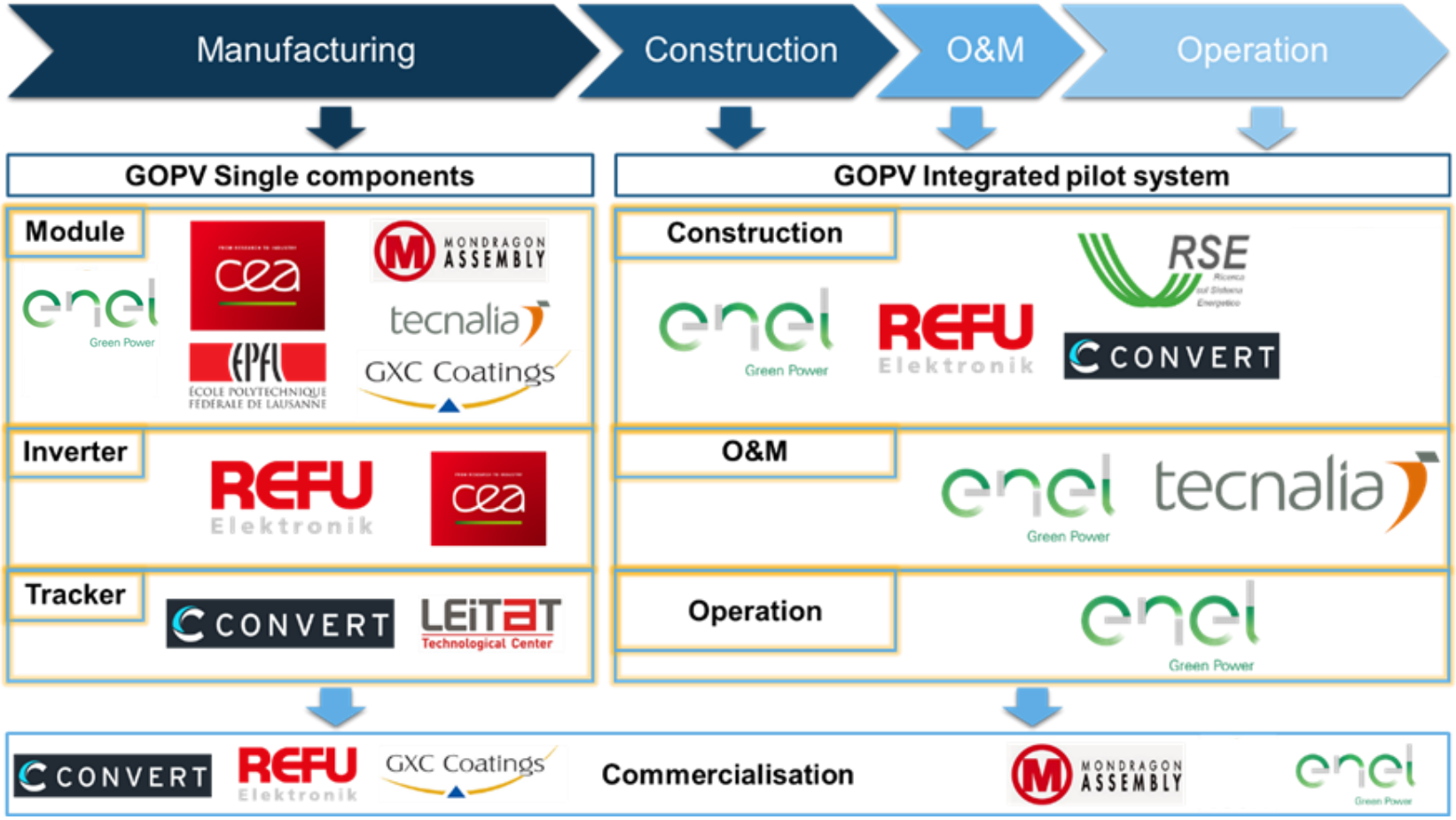
SYST. CONFIG. And O&M

SYSTEM RELIABILITY

Site acceptance of integrated PV system

M36 — MS3

Partners in the value chain



Added value & exploitation potential for industrial partners
To stay in the race

	Product	access to market	turnover (k€)	
			2022	2027
MONDRAGON ASSEMBLY	New advanced stringing equipment with advanced features in line with foreseen market evolution	2022	580	4 800
enel Green Power	HET bifacial modules with lower cost (€/W) and longer lifetime (vs Ampere)	2022	15 000	18 000
	PV plants integrating GOPV developments	2023	24 000	420 000
	Improvement of O&M strategy to reduce operation cost	2023		
	Knowledge about future products emerging on the market for biding: continuous	continuous		
GXC Coatings Transparent Performance	Diversification of technology portfolio with access to the fast growing PV market: Creation of a new BU 'PV coating'	2022	11	5 250
REFU Elektronik	String Inverter with CSI technology (lower cost, longer lifetime vs VSI)	2022	1 200	54 320
CONVERT THE PV TRACKER COMPANY	1 axis tracker optimised for bifacial modules with materials less costly than HDG steel	2022	30 800	165 000

From GOPV prototypes to products: very short time to market

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Thank you for your attention!

@GoPVproject

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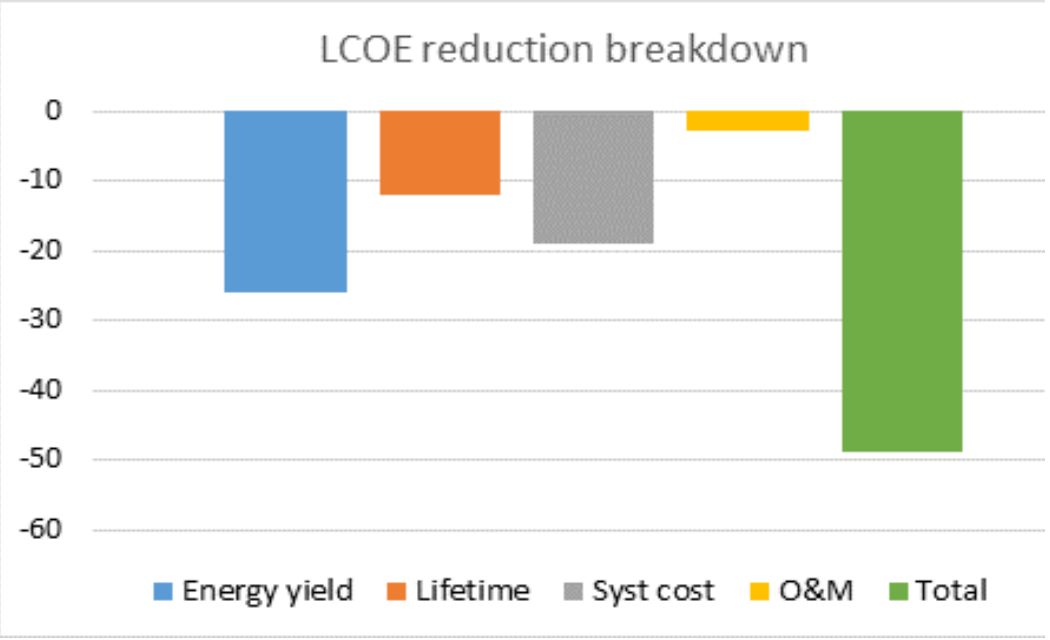
GOPV has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement N° 792059

CONTRIBUTIONS TO LCOE REDUCTION



Main assumptions used for LCOE calculations:
PV plant: 10 MW, insolation= 1900kWh/m²/year (southern Europe) **Financial conditions**: WACC=7%, Equity ratio 20 %, Debt interest rate 5% on 15 years duration. **Reference scenario for 2017:** PERC+ monofacial module (60 cells,300Wp) at 0,33€/W, Fix mounting at 0.08 €/W, inverter at 0.06€/W + replacement cost, O&M at 0,012€/W/year. **GOPV scenario for 2022**: 'GOPV' module (72 cells, 400Wp) at 0.22€/W, GOPV 1 axis tracker at 0.11€/W, inverter at 0.05 €/W + replacement cost, O&M at 0.010€/W/year.