



HELLENIC ASSOCIATION
OF PHOTOVOLTAIC
COMPANIES

ΣΥΝΔΕΣΜΟΣ ΕΤΑΙΡΕΙΩΝ ΦΩΤΟΒΟΛΤΑΪΚΩΝ

PV & Storage opportunities for Western Macedonia

(from World Bank Technical Meeting)

Dr. Sotiris Kapellos

Chairman

Hellenic Association of Photovoltaic Companies

24th IENE Conference

Athens, November 22nd 2019

An ever growing PV portfolio in WM

- ✓ Installed PV capacity up to now: 120 MWp
- ✓ Already authorized projects: 420+ MWp
- ✓ New applications: ~2,450 MWp (more to come in next application rounds)

Total: ~ **3 GWp of PV** most of which not constructed yet.

Almost 25% of current PV pipeline for Greece (~12 GWp pending applications).

An ever growing PV portfolio in WM

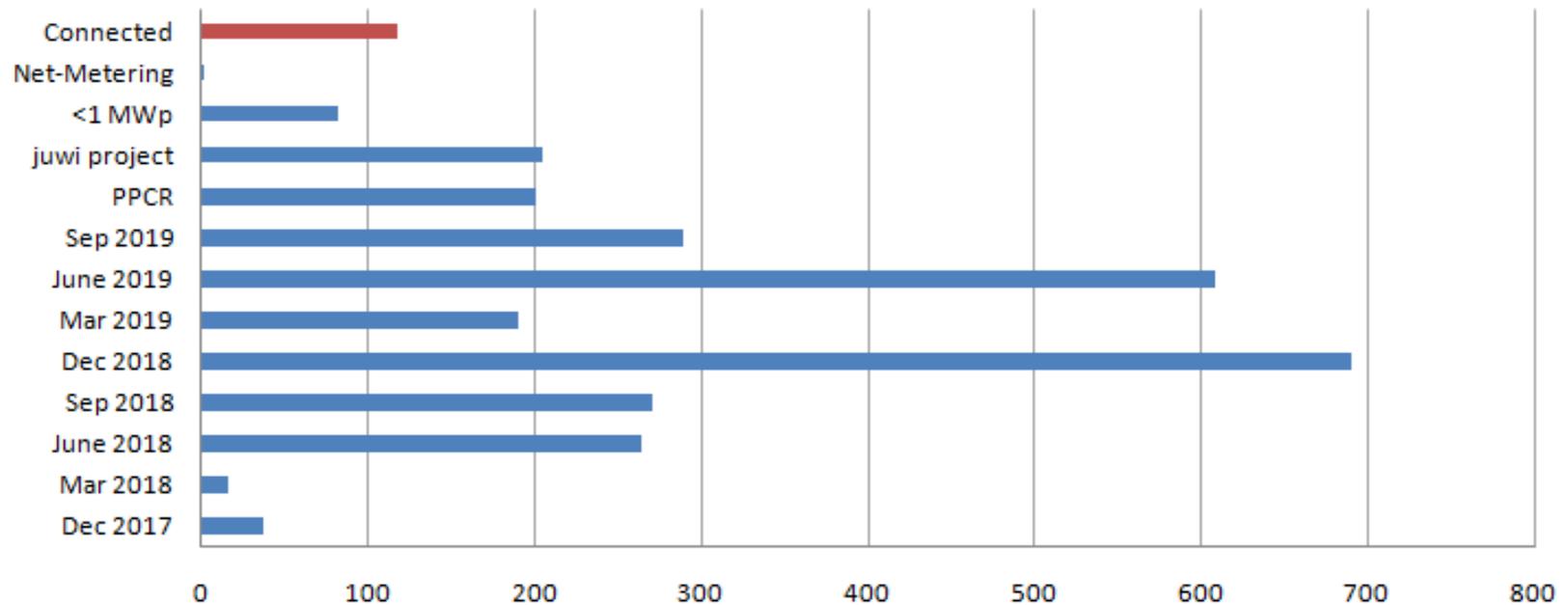
Investment cost: Average for next decade €0.35-€0.4 bn per GWp.

A 1 GWp PV portfolio can satisfy ~2.7% of Greece's electricity demand.



An ever growing PV portfolio in WM

Pipeline of PV projects in Western Macedonia

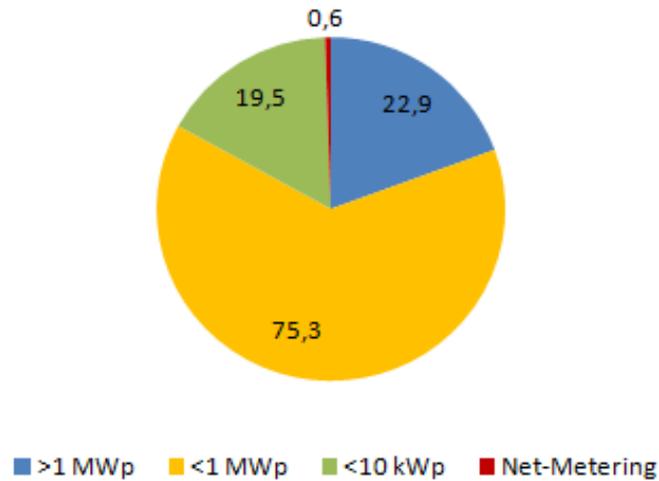


	Dec 2017	Mar 2018	June 2018	Sep 2018	Dec 2018	Mar 2019	June 2019	Sep 2019	PPCR	juwi project	<1 MWp	Net-Metering	Connected
■ MWp	37	16	264	271	690	190	609	289	200	204	82	1,58	118



Scaling up PV in WM

Installed PV (MWp) in Western Macedonia



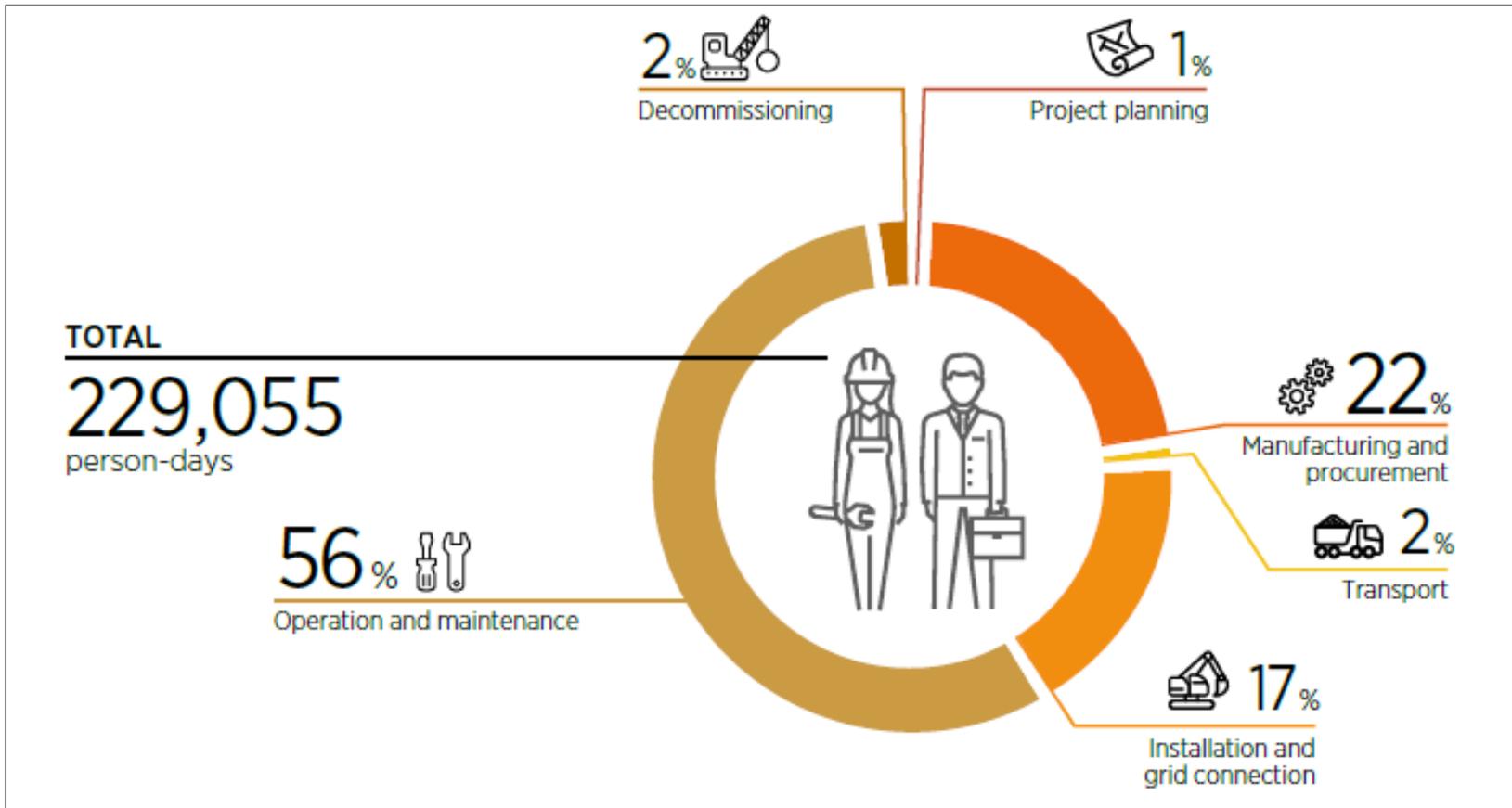
From small
to mega size



HELLENIC ASSOCIATION
OF PHOTOVOLTAIC
COMPANIES

ΣΥΝΔΕΣΜΟΣ ΕΤΑΙΡΕΙΩΝ ΦΩΤΟΒΟΛΤΑΪΚΩΝ

Job creation potential



Distribution of human resources required along the value chain for the development of a 50 MW solar PV plant, by activity
(Source: IRENA, 2017)

Job creation potential



Source: Direct and indirect jobs supported by the solar industry in the EU in 2016. SOURCE: EY & SolarPower Europe, 2017

Job creation potential

If part of this portfolio is realized in the next decade, the impact on job creation is as follows for the period **2020-2030**:

Average direct jobs sustained per year: 1,720/GWp

Average indirect and induced jobs sustained per year: 2,065/GWp

Average total jobs sustained per year: 3,785/GWp

Assuming 75% of the development & installation jobs and most of O&M jobs are **local**, we have:

Average direct jobs sustained per year in WM: 1,320/GWp

Average indirect & induced jobs sustained per year in WM: 1,580/GWp

Average total jobs sustained per year in WM: 2,900/GWp

Plus 535 jobs per GWp per year (245 direct + 290 indirect & induced) in O&M for the period 2031-2045

A battery cell manufacturing facility for WM

Driven by the ongoing clean energy transition, demand for batteries is expected to grow very rapidly in the coming years, making this market an increasingly strategic one at global level.

Batteries have therefore been identified by the Commission as a strategic value chain, where the EU must step up investment and innovation in the context of a strengthened industrial policy strategy aimed at building a globally integrated, sustainable and competitive industrial base.

*Huge investments are needed to this end. **It is estimated that 20-30 gigafactories for battery cells production alone will have to be built in Europe** and their related ecosystem will need to be considerably strengthened.*

Brussels, 9.4.2019 COM(2019) 176 final



A battery cell manufacturing facility for WM

A Number of New Lithium-ion Factories Planned in Europe

And...

BYD is looking at launching battery production in Europe

金沙江资本 GSR Capital signed a deal to build a factory that would launch production in 2023

Blackstone Resources to invest \$230M in German EV battery factory plan

to develop a consortium to develop cell production with companies including Saft (Total) and PSA



ASX: INF



A battery cell manufacturing facility for WM

A Number of New Lithium-ion Factories Planned in Europe

And...

BYD is looking at launching battery production in Europe

金沙江资本 GSR Capital signed a deal to build a factory that would launch production in 2023

Blackstone Resources to invest \$230M in German EV battery factory plan

to develop a consortium to develop cell production with companies including Saft (Total) and PSA



No plans for SE Europe yet

Opportunity for WM

A battery cell manufacturing facility for WM

Typical investment costs

Samsung completed a US\$358m plant in Hungary during 2018 (estimated 3 GWh) → **€108m per GWh**

SK Innovation is planning to invest US\$859m in a new plant (7.5 GWh) in Hungary → **€105m per GWh**

Farasis is planning to invest EUR600m to build a plant in Germany capable of producing 6 GWh → **€100m per GWh**

BMZ has promised EUR300m of investment for the first phase to produce 4 GWh of cells in Germany → **€75m per GWh**

A battery cell manufacturing facility for WM

A proposal for WM

Build a **2 GWh battery cell manufacturing plant.**

Where? **Kozani industrial area** would be a good candidate.

Investment cost: €115m - €200m

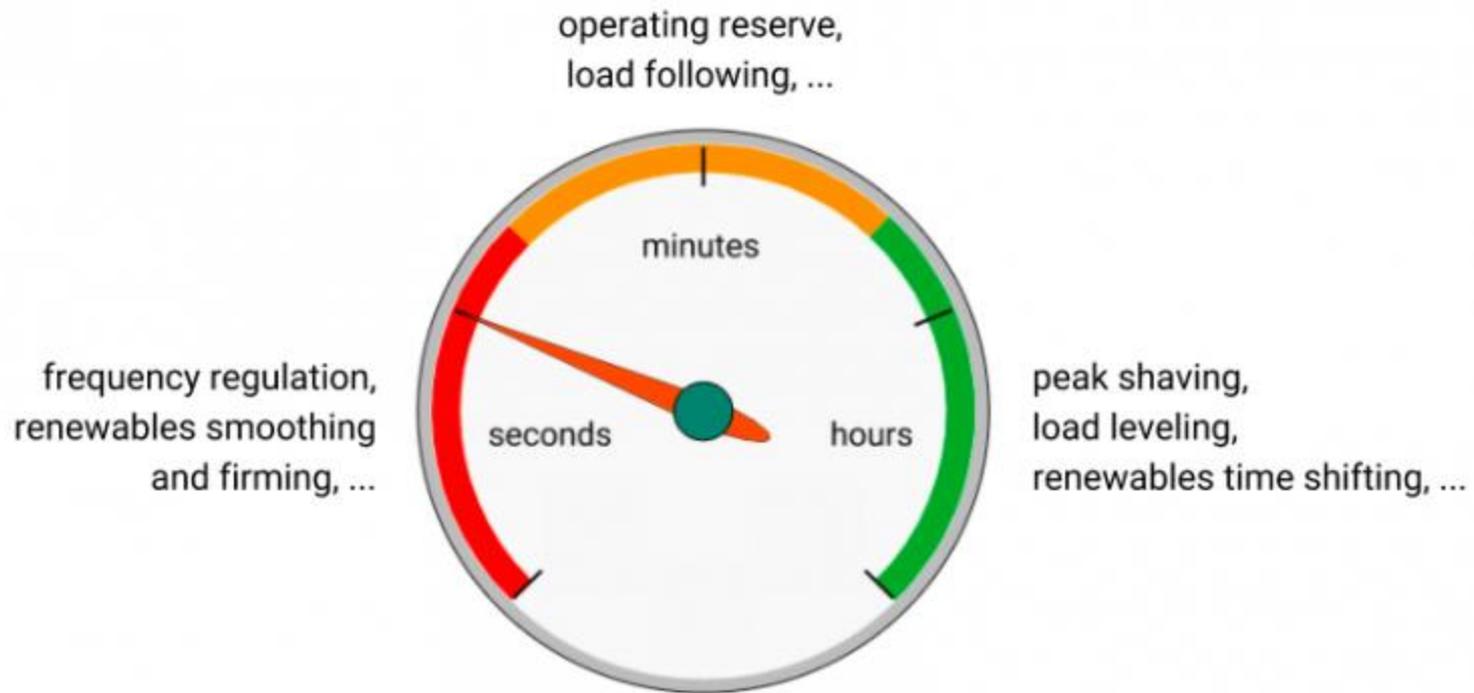
€115m is a realistic budget, as costs of other similar projects are unduly high.

735 jobs will be created (335 direct plus 400 indirect and induced).

Energy Storage opportunities for WM



Energy Storage opportunities for WM



Opportunity for exporting green energy



HELLENIC ASSOCIATION
OF PHOTOVOLTAIC
COMPANIES

ΣΥΝΔΕΣΜΟΣ ΕΤΑΙΡΕΙΩΝ ΦΩΤΟΒΟΛΤΑΪΚΩΝ

What hinders energy storage in Greece?

Lack of appropriate regulations for storage.

This however is expected in 2020.



Nothing is more powerful than an idea whose time has come

