



## Trends in PV Markets

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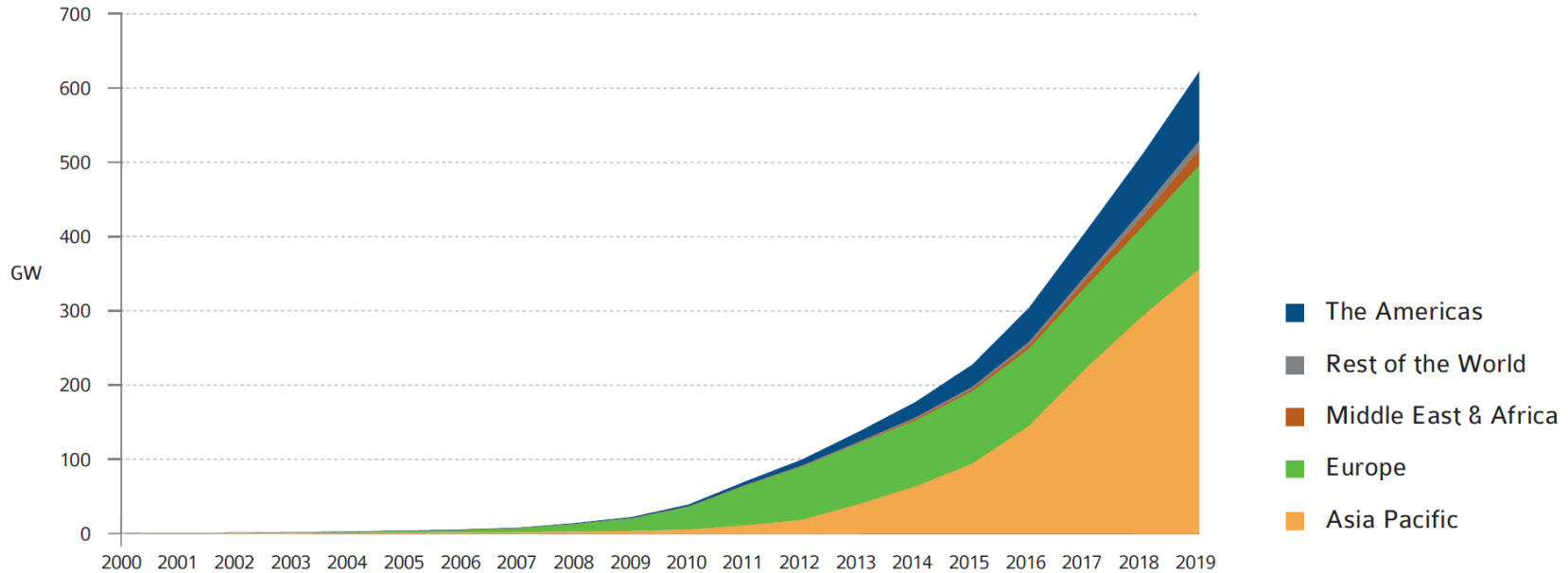
# What is IEA PVPS?



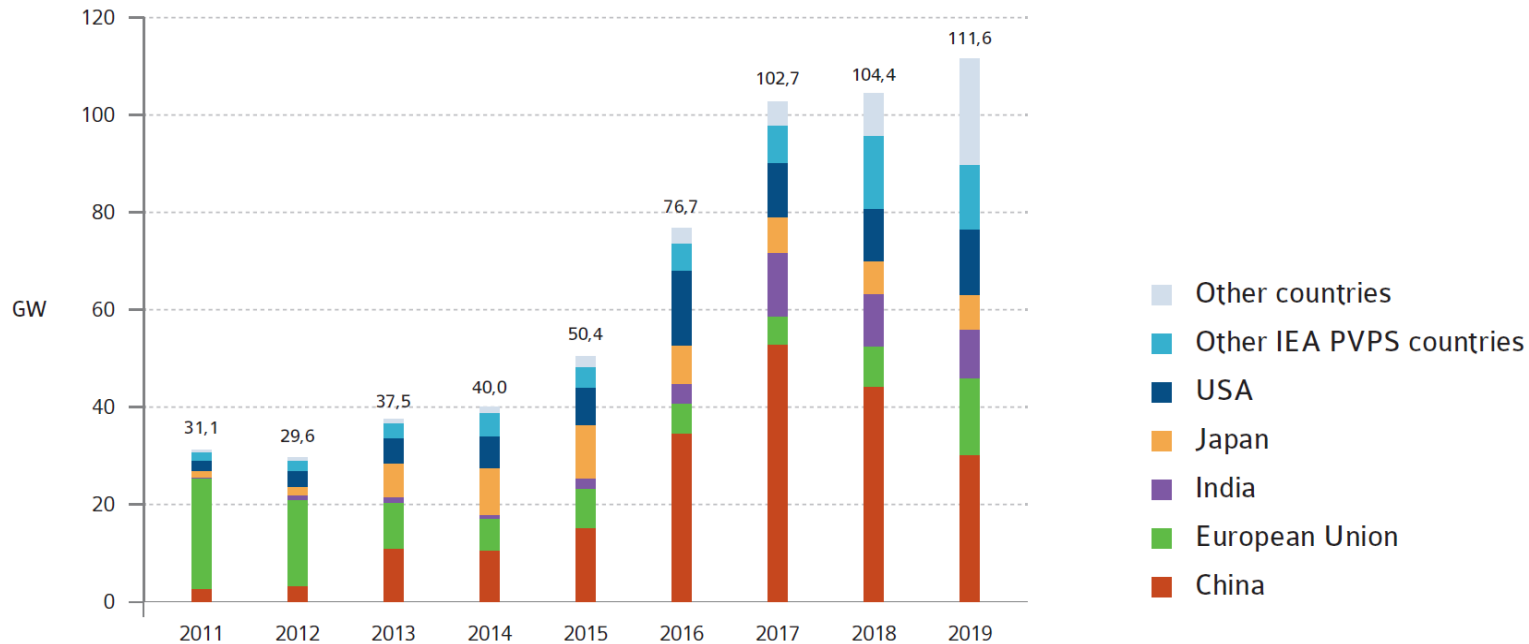
- The IEA Photovoltaic Power Systems Programme (PVPS) is one of the Technology Collaboration Programmes established within the International Energy Agency
- Established in 1993
- 32 members - 27 countries, European Commission, 4 associations
- *“To enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems”*
- *Active in market and industry research, sustainability, reliability, grid integration, BIPV, solar resource, VIPV and off-grid applications.*
- *Task 1 is the task devoted to market, policies and industry analysis and the think tank of IEA-PVPS.*



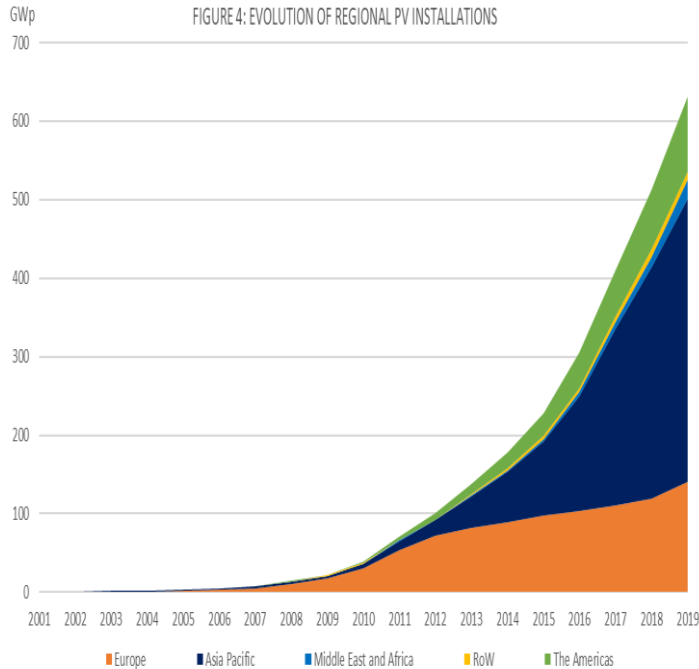
# Total installed capacity rising above 620 GW



# A stable PV market in 2018 and growing in 2019



# From Europe to Asia



- Europe fueled PV development in Spain, Germany, Italy and other markets followed (BE, CZ, BG, GR...)
- Then Asia took the lead with China, Japan, Thailand and now Australia, Korea, Vietnam and more.
- The American markets are following the Asian trend with some delay but remain small compared to the Asian one.
- The Middle-East and Africa start to appear
- Europe is back in 2019























# Top 10 at the end of 2019



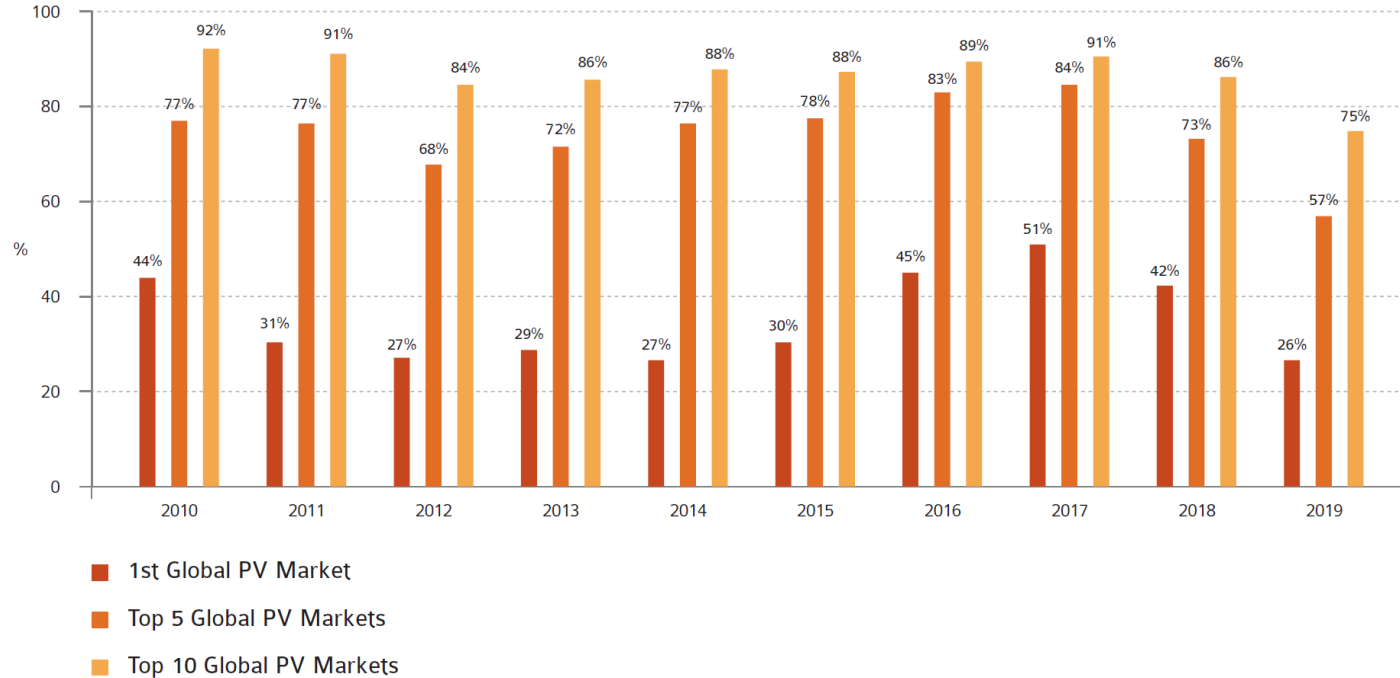
TABLE 1: TOP 10 COUNTRIES FOR INSTALLATIONS AND TOTAL INSTALLED CAPACITY IN 2019

FOR ANNUAL INSTALLED CAPACITY

FOR CUMULATIVE CAPACITY

FOR ANNUAL INSTALLED CAPACITY				FOR CUMULATIVE CAPACITY			
1		China	30,1 GW	1		China	204,7 GW
(2)		European Union	16,0 GW	(2)		European Union	131,7 GW
2		United States	13,3 GW	2		United States	75,9 GW
3		India	9,9 GW	3		Japan	63 GW
4		Japan	7,0 GW	4		Germany (EU)	49,2 GW
5		Vietnam	4,8 GW	5		India	42,8 GW
6		Spain (EU)	4,4 GW	6		Italy (EU)	20,8 GW
7		Germany (EU)	3,9 GW	7		Australia	14,6 GW
8		Australia	3,7 GW	8		UK (EU in 2019)	13,3 GW
9		Ukraine	3,5 GW	9		Korea	11,2 GW
10		Korea	3,1 GW	10		France (EU)	9,9 GW

# Trends key findings 2020

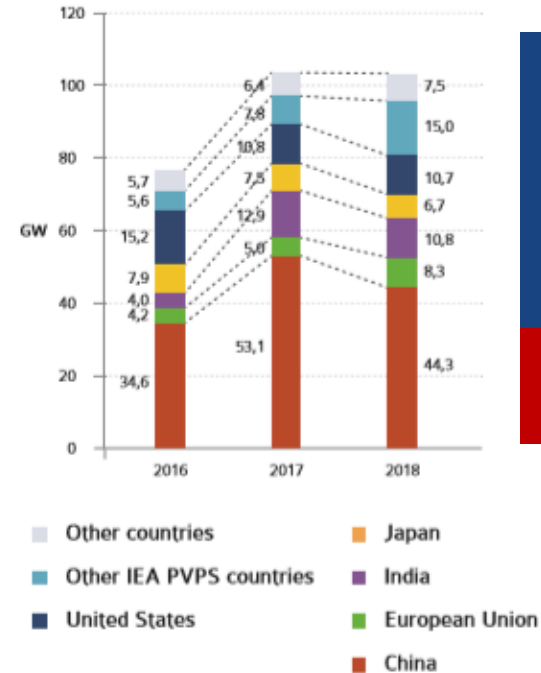


# Countries / regions shaping the PV global market



- The decline of the chinese PV market in 2018 and 2019 led to market losses but the rest of the market grew significantly.
- Outside China, the market grew up to 85 GW in 2019.
- 2019 saw with growth outside of China compensating the decline in China and more.

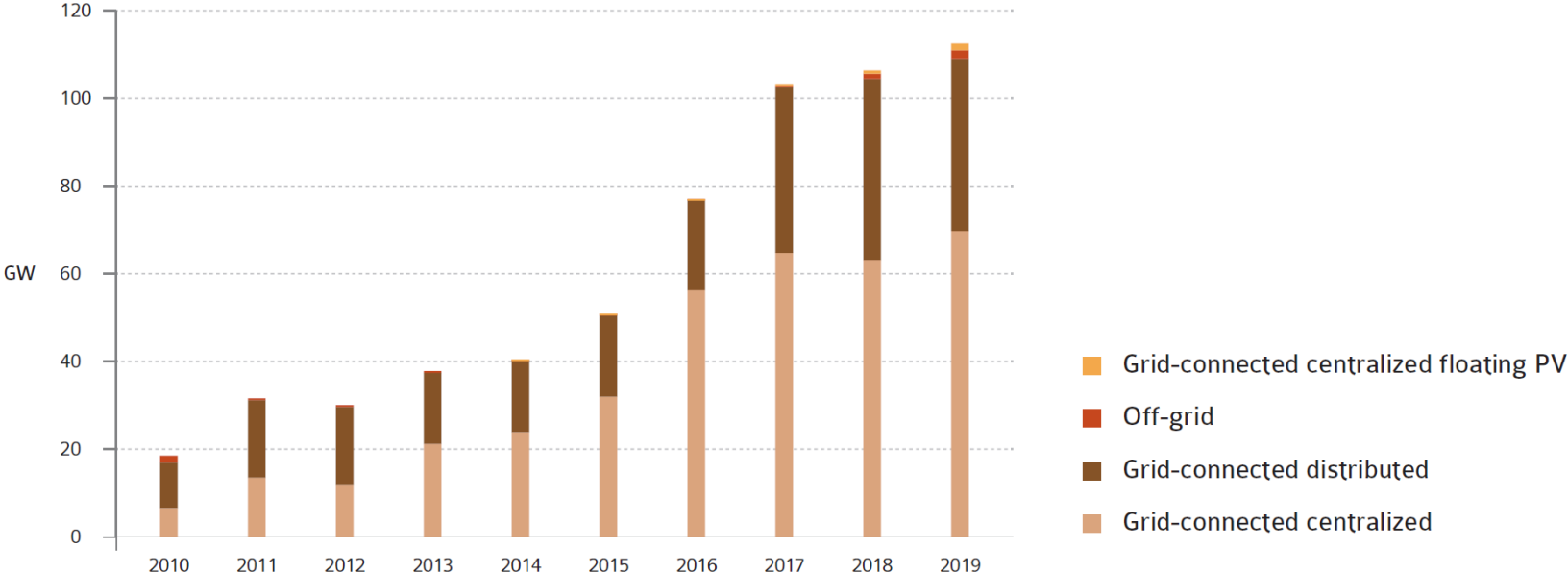
FIGURE 2.8: 2016 - 2018 GROWTH PER REGION



SOURCE IEA PVPS & OTHERS.



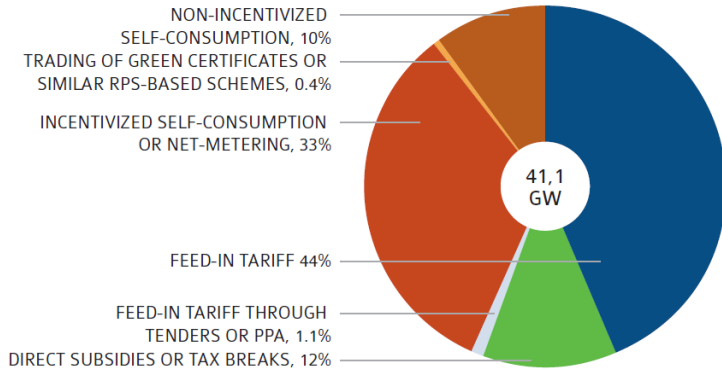
# Decentralized PV is stable in a growing market



# Different drivers per segment

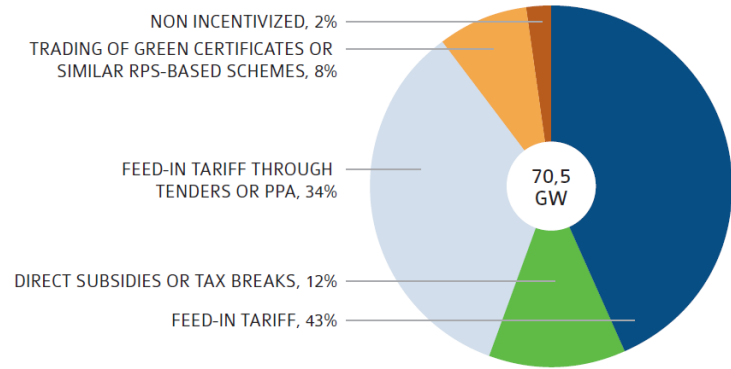


**FIGURE 3.1A:** MAIN DRIVERS OF THE DISTRIBUTED PV MARKET IN 2019



SOURCE IEA PVPS & OTHERS.

**FIGURE 3.1B:** MAIN DRIVERS OF THE CENTRALIZED PV MARKET IN 2019



SOURCE IEA PVPS & OTHERS.

# Some key evolutions



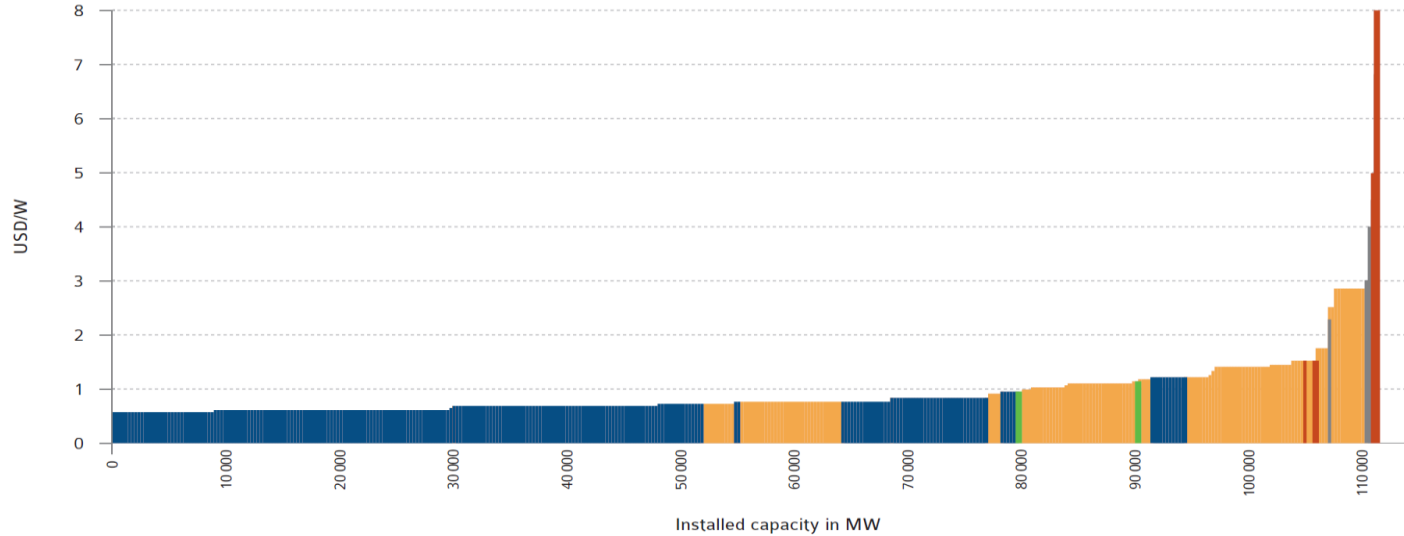
## Distributed PV

- 40+ GW installed in 2019
- Less incentives, more regulations
- Self-consumption becomes collective, delocalized, virtual
- Energy communities
- Need for advanced regulations
- Punishment taxes and grid costs in some countries
- « Fear » from incumbents
- BIPV, small agroPV, etc.

## Centralized PV

- 70+ GW installed in 2019
- Super competitive tenders
- Easy to develop segment
- Storage requirements for large-scale plants are increasing
- Merchant PV is there and business models are changing
- Competitive enough for green hydrogen production ?
- Large agroPV
- Floating PV

# More than 70 GW below 1 USD/Wp



- Distributed PV on Rooftops
- Utility-scale PV Ground-mounted
- Off-Grid PV
- Distributed PV as Building Integrated
- Floating PV

# Most competitive tenders



Traditional PV  
business  
model

0,0157 USD/kWh in Qatar

Could be achieved with 2500  
kWh/kW/Y – Capex at 0.5 EUR  
) 3% WACC etc.

PVPS

In theory: doable

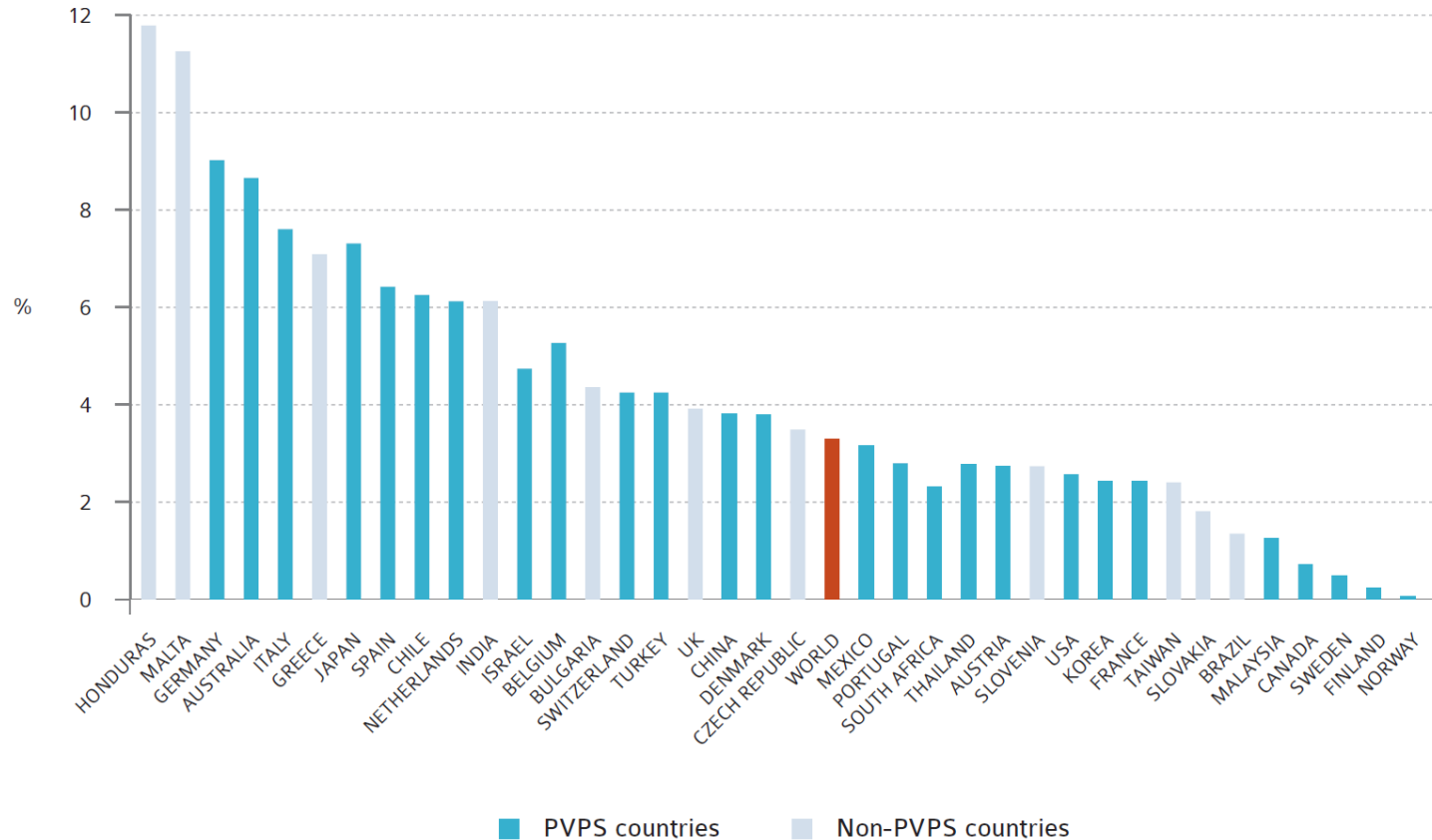


Future PV  
business  
model ?

0,0112 EUR/kWh in Portugal

Out of reach without additional grid  
revenues, storage revenues and  
permanent grid connection after the 15  
years of the tariff.

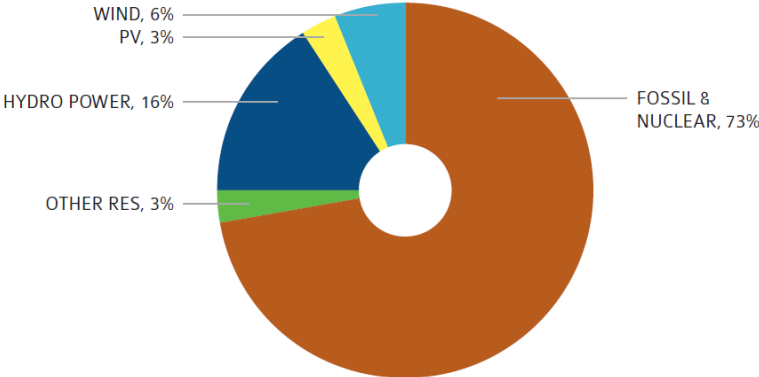
# PV penetration in the electricity demand



# RES in the electricity & energy mix

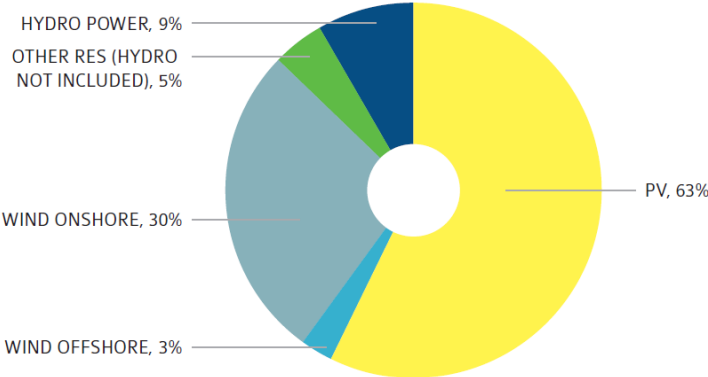


**FIGURE 7.2:** SHARE OF RENEWABLE IN THE GLOBAL ELECTRICITY PRODUCTION IN 2019



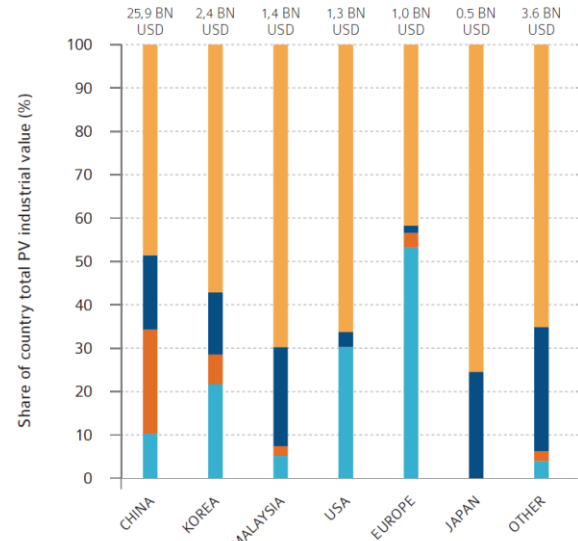
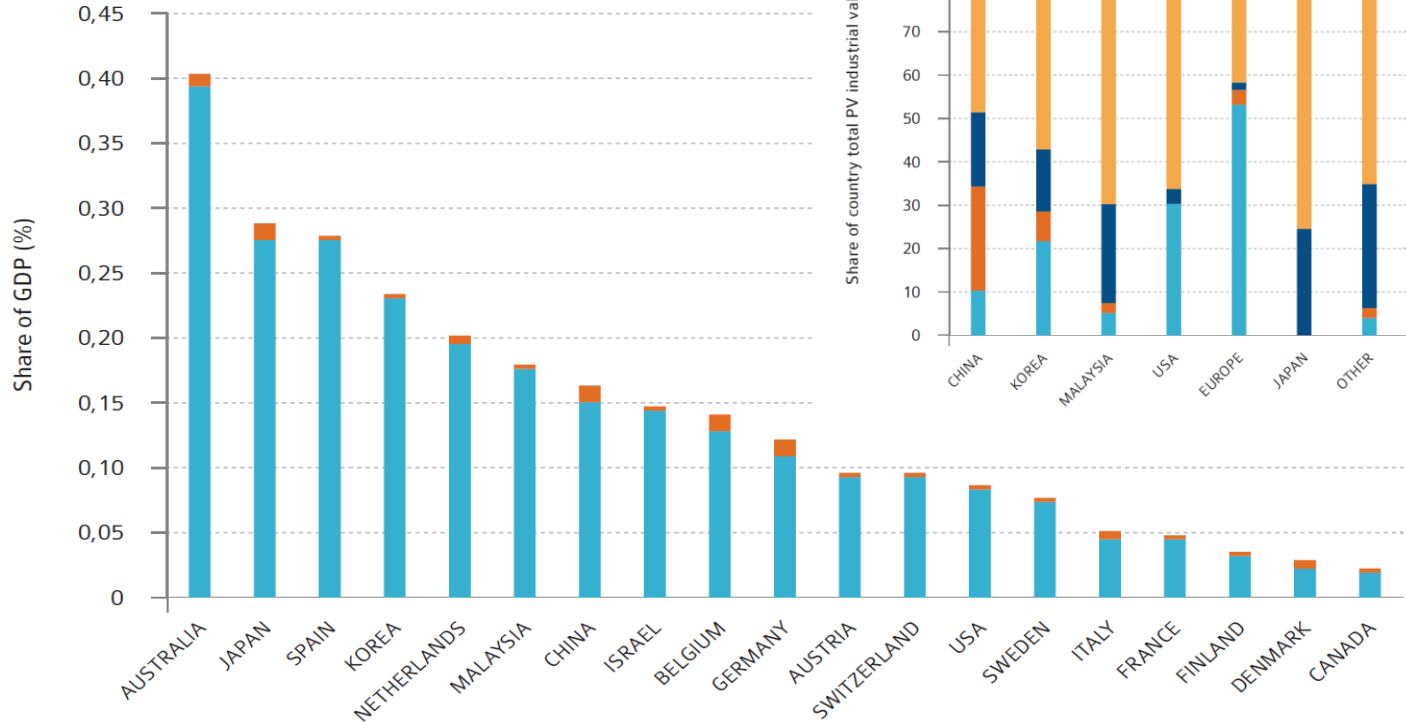
SOURCE REN21, IEA PVPS.

**FIGURE 7.3:** NEW RENEWABLE INSTALLED CAPACITY IN 2019



SOURCE REN21, IEA PVPS.

# Business value from PV



■ Business value of PV installation

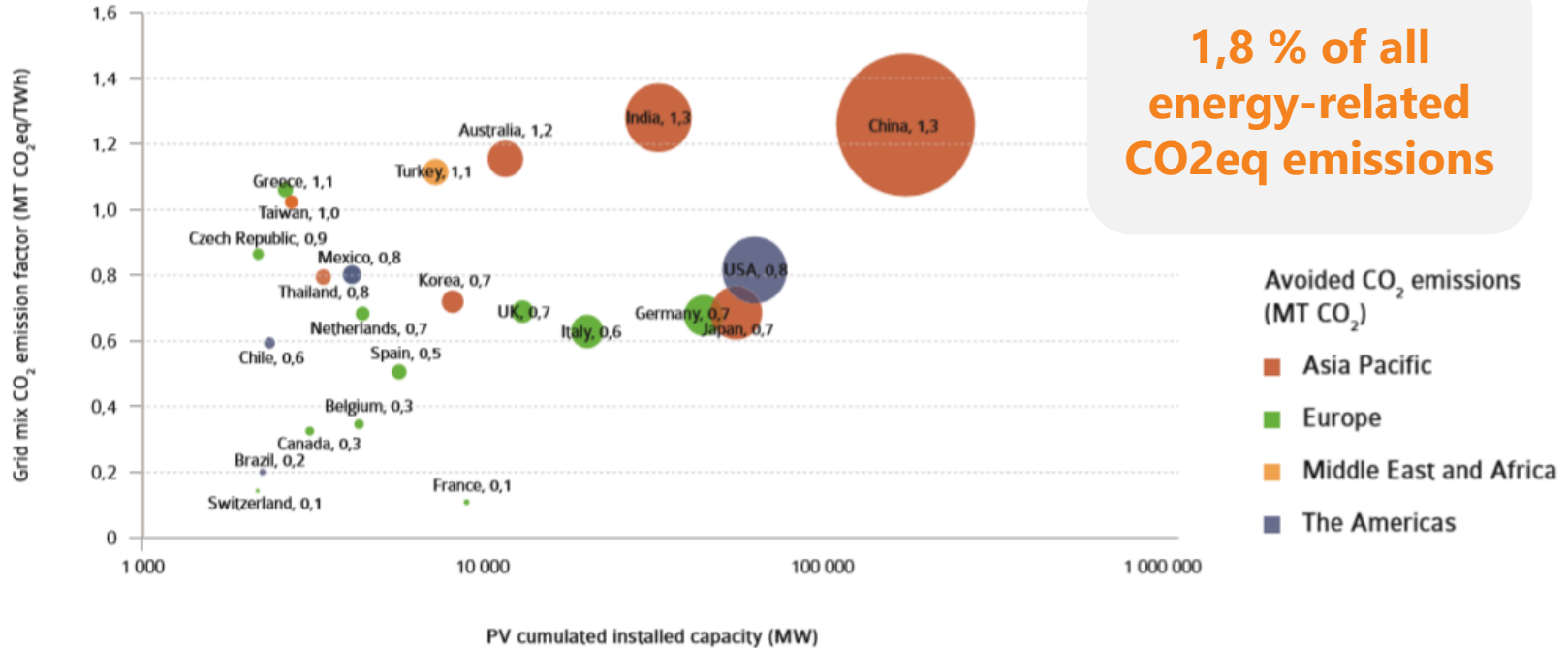
■ Business value of PV Operating and Maintenance



# CO<sub>2</sub> avoided emission; 720 Mtons of CO<sub>2</sub>eq



FIGURE 5.3: CO<sub>2</sub> EMISSIONS AVOIDED BY PV



# What to expect ?



- COVID might have slowed down the growth but it has not stopped PV development.
- Some positive news recently in the USA
- Probably a roughly stable market in 2020 but growing afterwards
- 150 / 200 / 250 GW ? And more ?
- Cost competitiveness is now a given under specific circumstances
  - But costs must continue going down
- Local manufacturing is a must to accelerate the transition
- Hybridisation of the PV market
  - Transport, buildings, industry, green hydrogen, IoT, ...
- PV is a real tool to fight climate change and reduce CO<sub>2</sub>eq emissions
  - But it requires the right policy framework with a vision (grid development, self-consumption regulations, and more)

Thank you for your attention

Trends report is coming soon

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