



CERTIFIED  
EXECUTIVE  
TRAINING  
ON GREEN ECONOMY

WGEO EXECUTIVE TRAINING COURSE  
ON SCALING UP TRANSITION TO  
A GREEN ECONOMY ON A PATH TOWARDS IMPLEMENTING THE UNITED NATIONS  
2030 SUSTAINABLE DEVELOPMENT AGENDA

MODULE DELIVERED BY



# FOSTERING GREEN INNOVATION

## MODULE “FI”

25-26 July 2019  
Fortaleza, Brazil



Paris Declaration: Launched at COP 21 as a India's proposal for a common platform for cooperation among solar rich countries lying fully or partially between the Tropics of Cancer and Capricorn.



# VISION & MISSION

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To provide a global platform for cooperation among solar resource rich to help achieve the common goals of increasing the use of solar energy in a safe, convenient, affordable, equitable and sustainable manner.

## Governance

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- Assembly of the ISA; President-India; Co-President-France
- Eight Committees of the ISA:
  - Standing Committee
  - Programmes; General and Legal; and Finance Committee
  - Four Regional Committee- Asia and Pacific; Latin America and the Caribbean; Africa; and Europe and others
- 6 Taskforces and 2 Working Groups
- Corporate Partners



## GOALS

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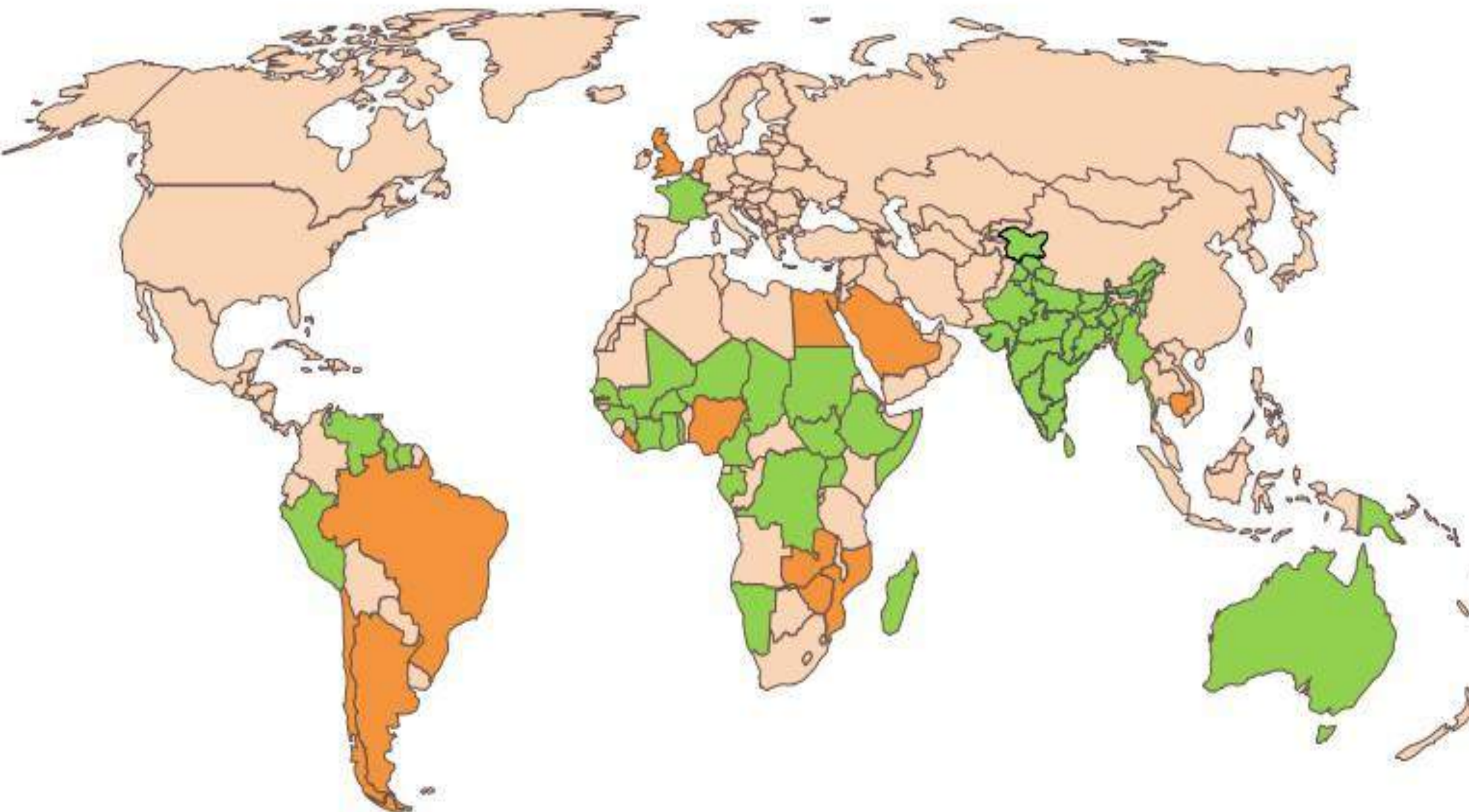
- Lowering **cost of financing** while scaling-up volumes of financing
- Mobilize more than **USD 1000 billion** of investments by 2030
- Bringing **reliable and affordable solar energy** to all



# OUR PRESENCE

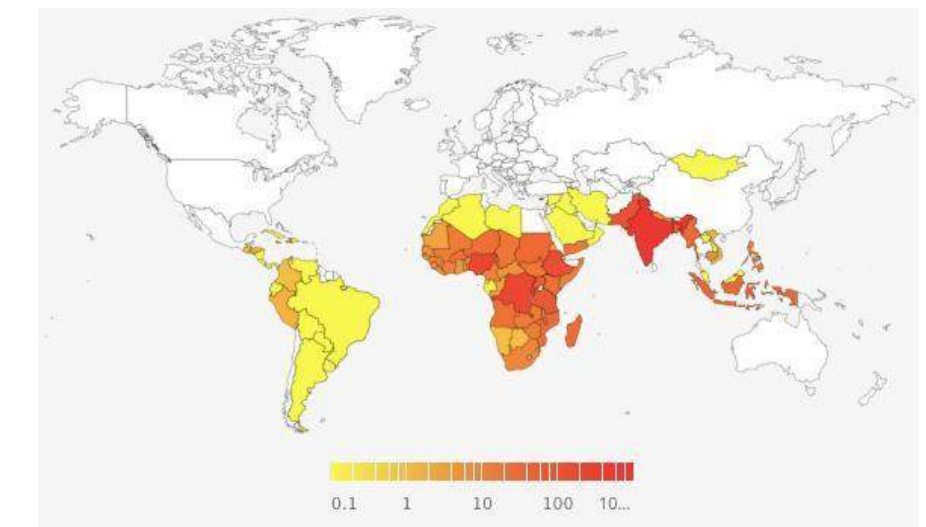


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 Signed     Ratified     Prospective

**Population without access to electricity**



**75 Signatory Countries**  
**54 Countries Ratified**



An **online platform** dedicated to the dissemination of information, best-practices and knowledge on Solar Energy:

- To be completed by June 2019
- Launch in October 2019
- Supported by the **European Union**



- **Country counters** : A dedicated space on the Online Platform for each Member Country to present the most complete solar energy profile



- **Solar Information Hub** : Aggregating solar projects in a central database for best practice sharing among Member countries



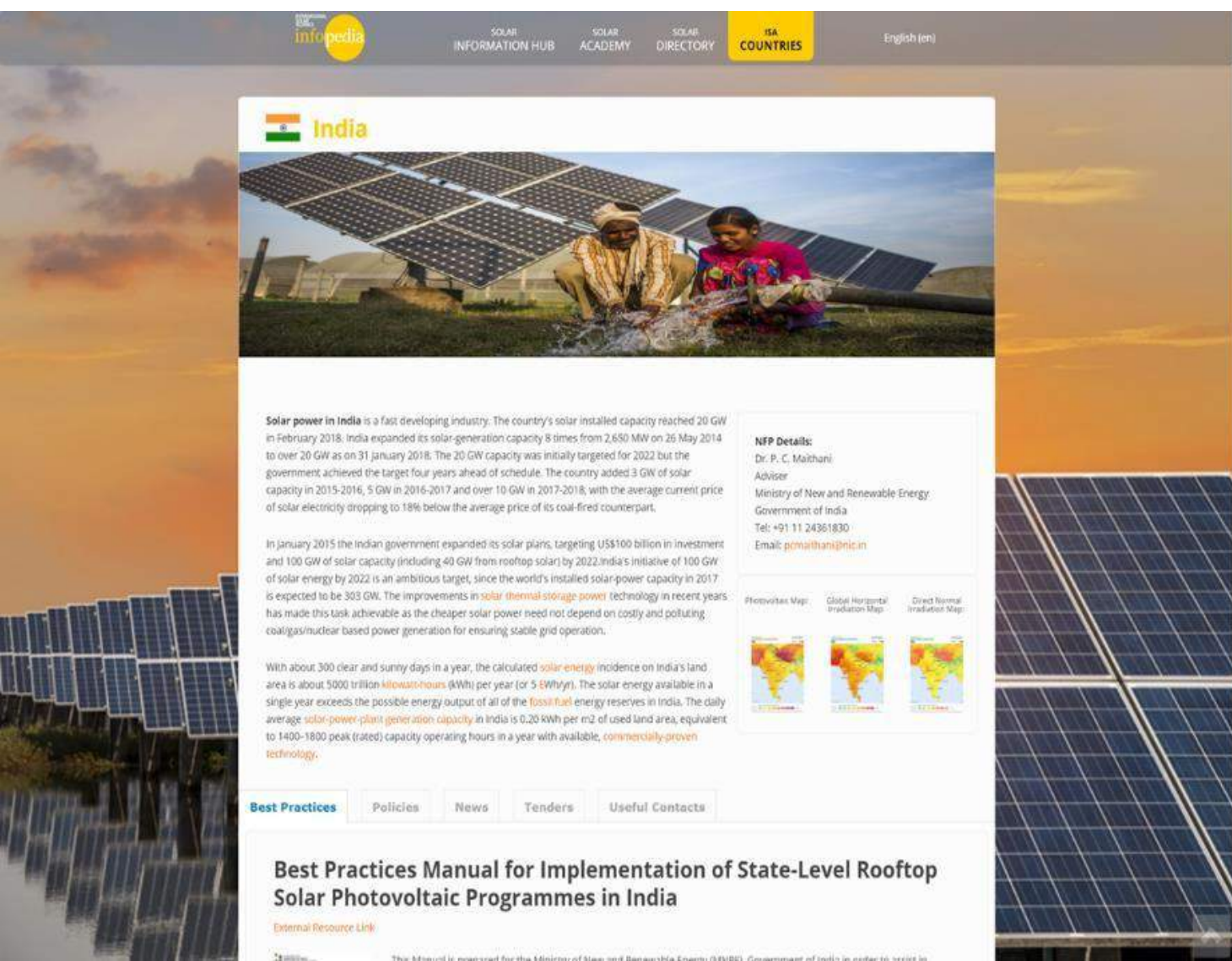
- **Solar Academy**: A full-fledged Learning Management System allowing ISA and its partners to create and host courses on solar technology



- **ISA Communication Tools** : Tools and methodologies to facilitate communication among Member countries



- **Solar Directory**: An self-registration directory for the Solar Industry, NGOs, Research Centers and Financing institutions



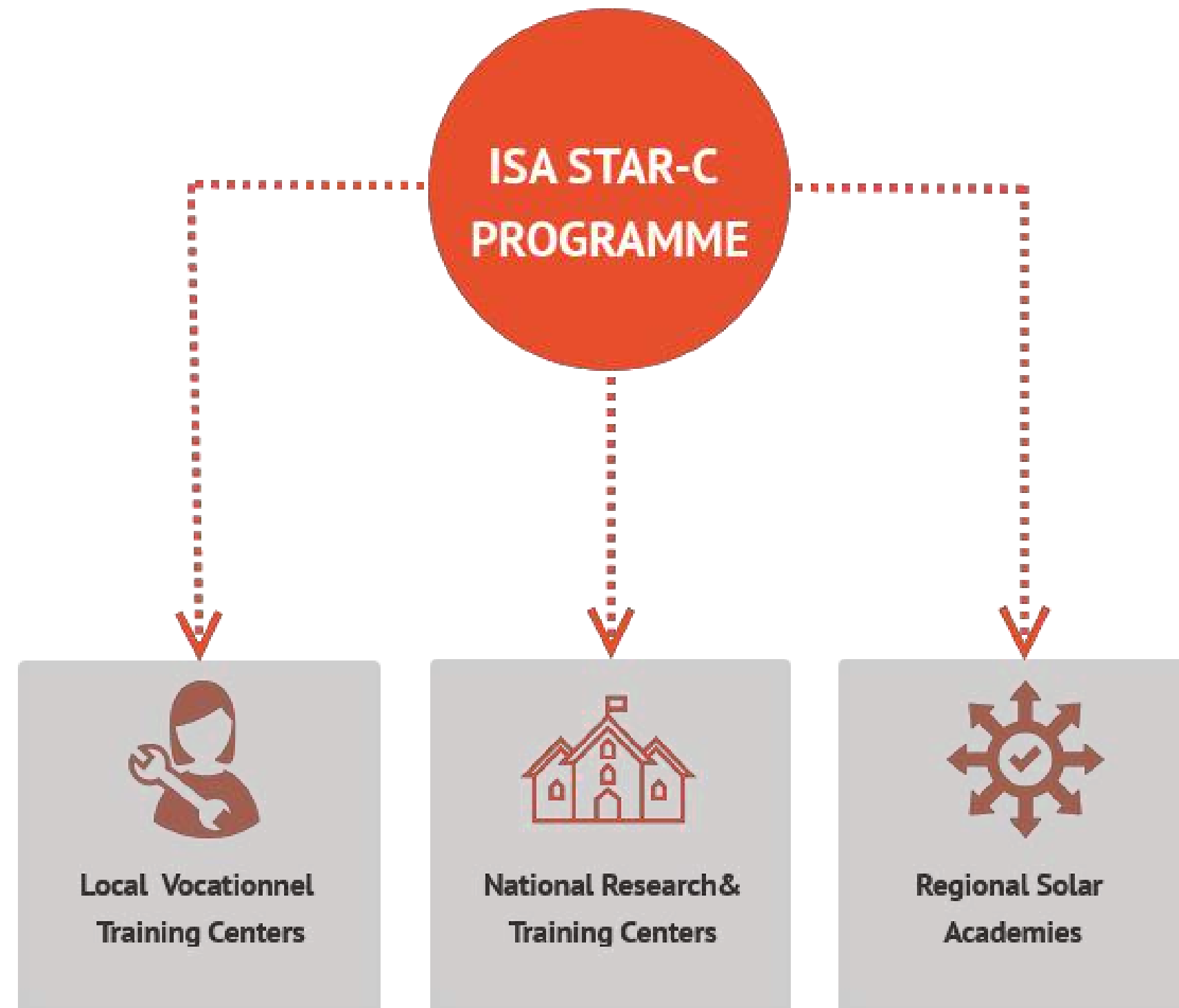
# STAR-C



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The goals of STAR-C include the following:

- To build a network of training / R&D / standardization / Entrepreneurship STAR-centers working on solar energy
- To develop and disseminate training programs (online and in-personne) for all solar energy stakeholders (technicians, master trainers, project developers, engineers, policy makers, etc), via STAR-Centers & Regional Solar Academies (UNIDO centers for EE & RE)
- To provide testing and technical certification capabilities to key STAR-centers

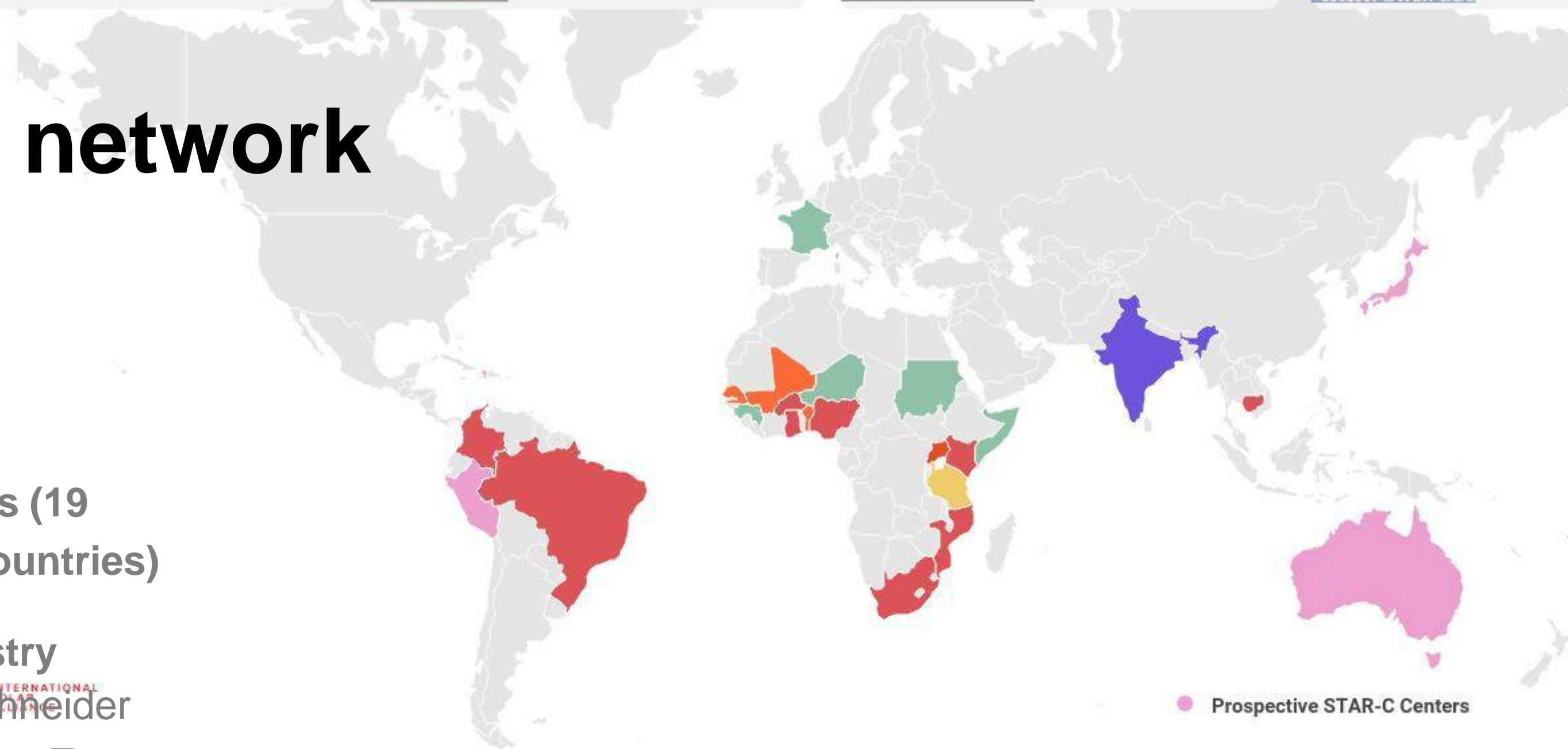






# STAR-C network

- 65 STAR-Centers (19 designated by countries)
- Support of industry Foundations (Schneider Electric Foundation, Tata Trust, Philips Foundation, etc.)





# Table of contents

1. Why solar energy ?
2. Solar energy : For what purposes ?
3. How to start solar energy implementation ?
4. Organisational innovation
5. Financing



# WHY solar energy ?



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## 1. Setting the context of solar energy

Potential

Costs

Markets

Sustainability

# Solar energy is available everywhere

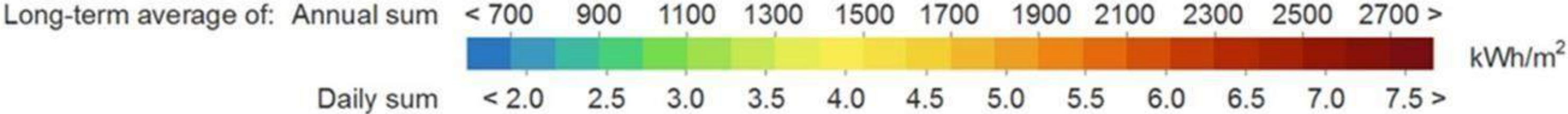
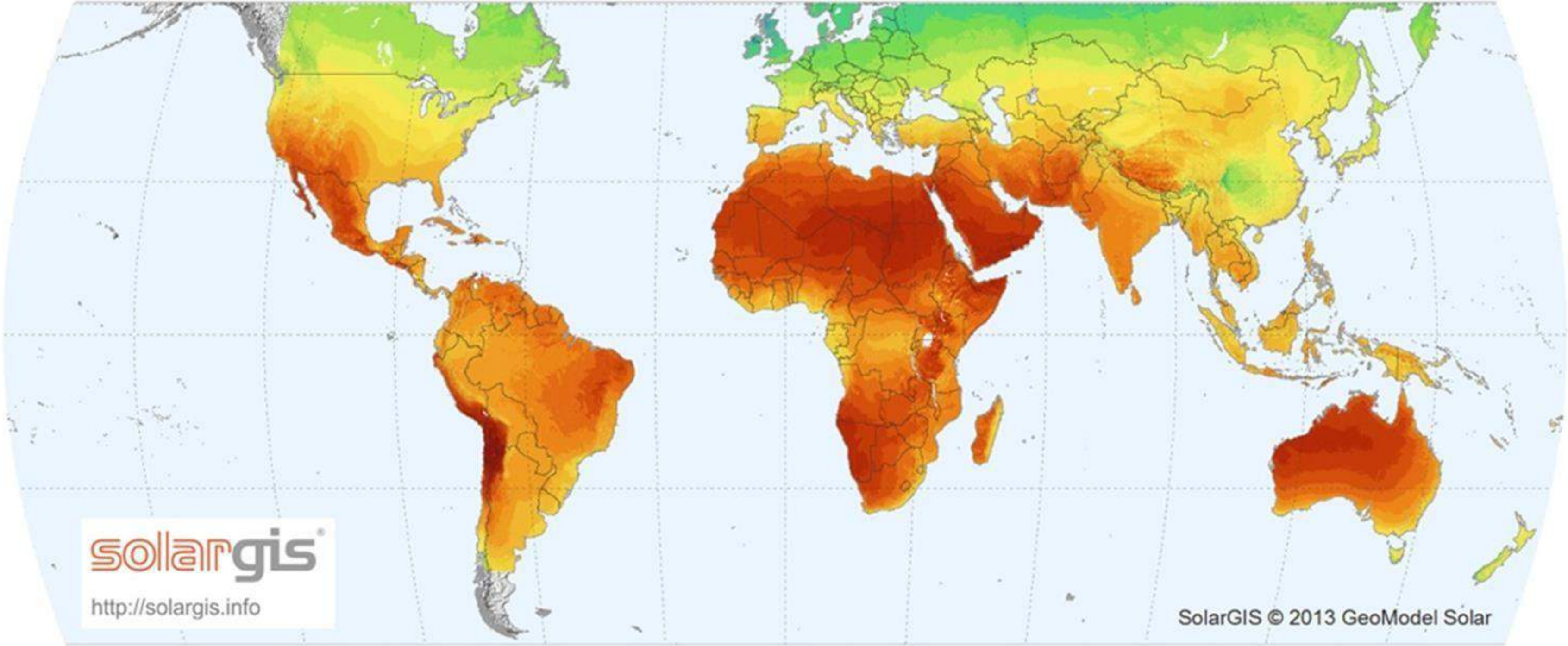


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A maximum ratio of 3 between « sun-rich » countries and « no-sun countries »

WORLD MAP OF GLOBAL HORIZONTAL IRRADIATION

GeoModel  
SOLAR

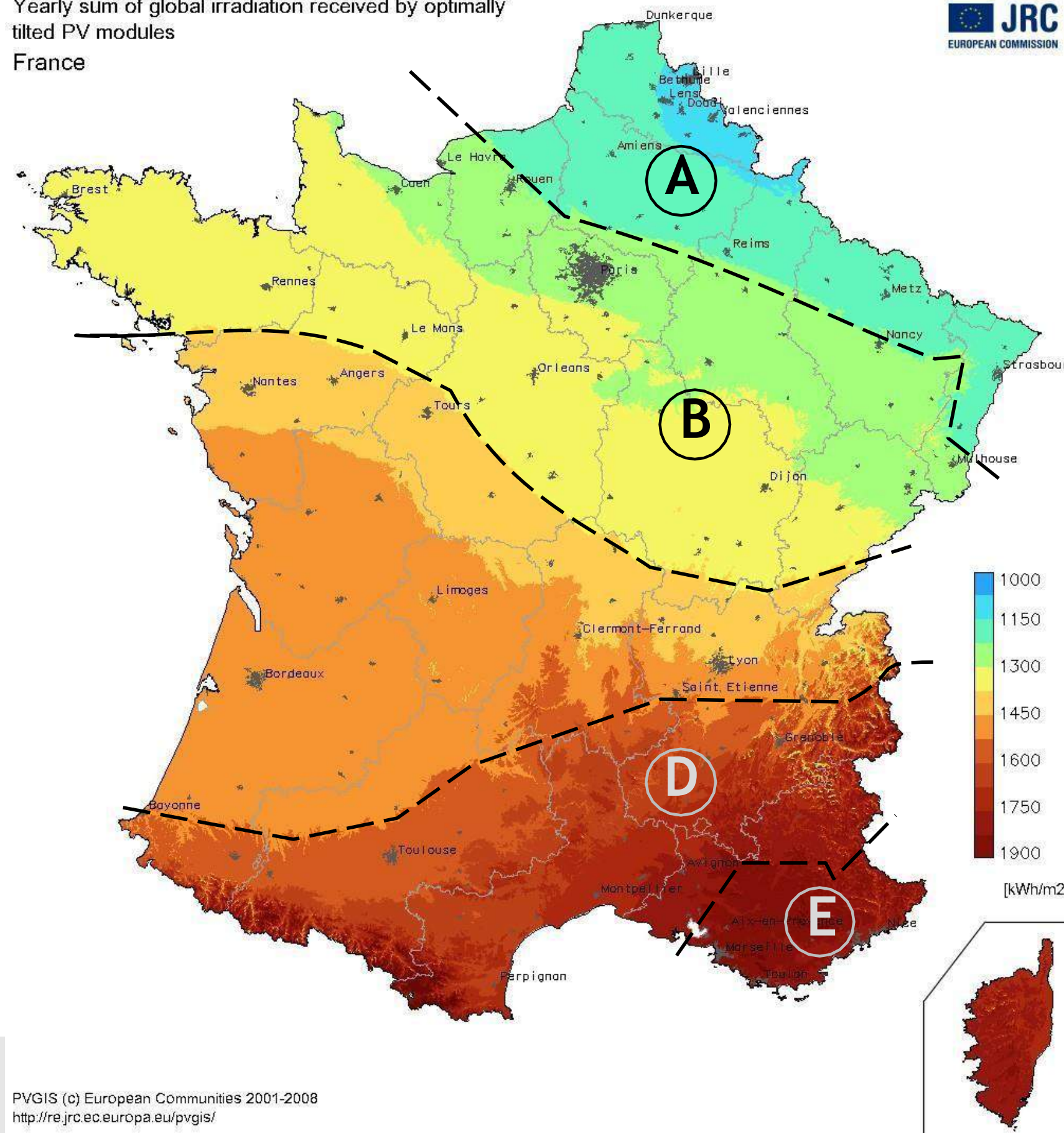




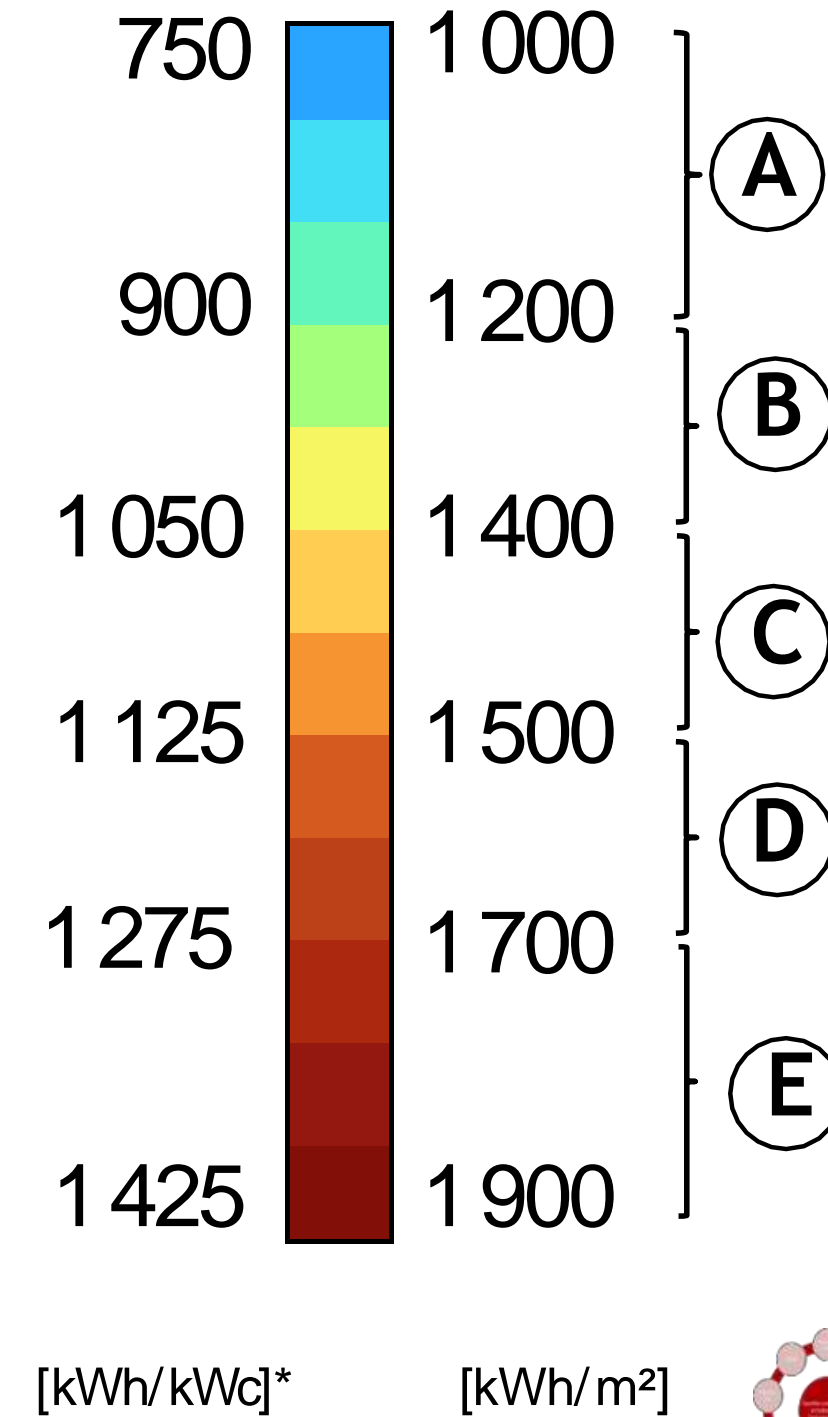
# The energy output is proportional to the irradiation



Yearly sum of global irradiation received by optimally tilted PV modules  
France



Production □ Irradiation



PVGIS (c) European Communities 2001-2008  
<http://re.jrc.ec.europa.eu/pvgis/>

**(orientation et inclinaison optimum) en kWh/m<sup>2</sup> par an**

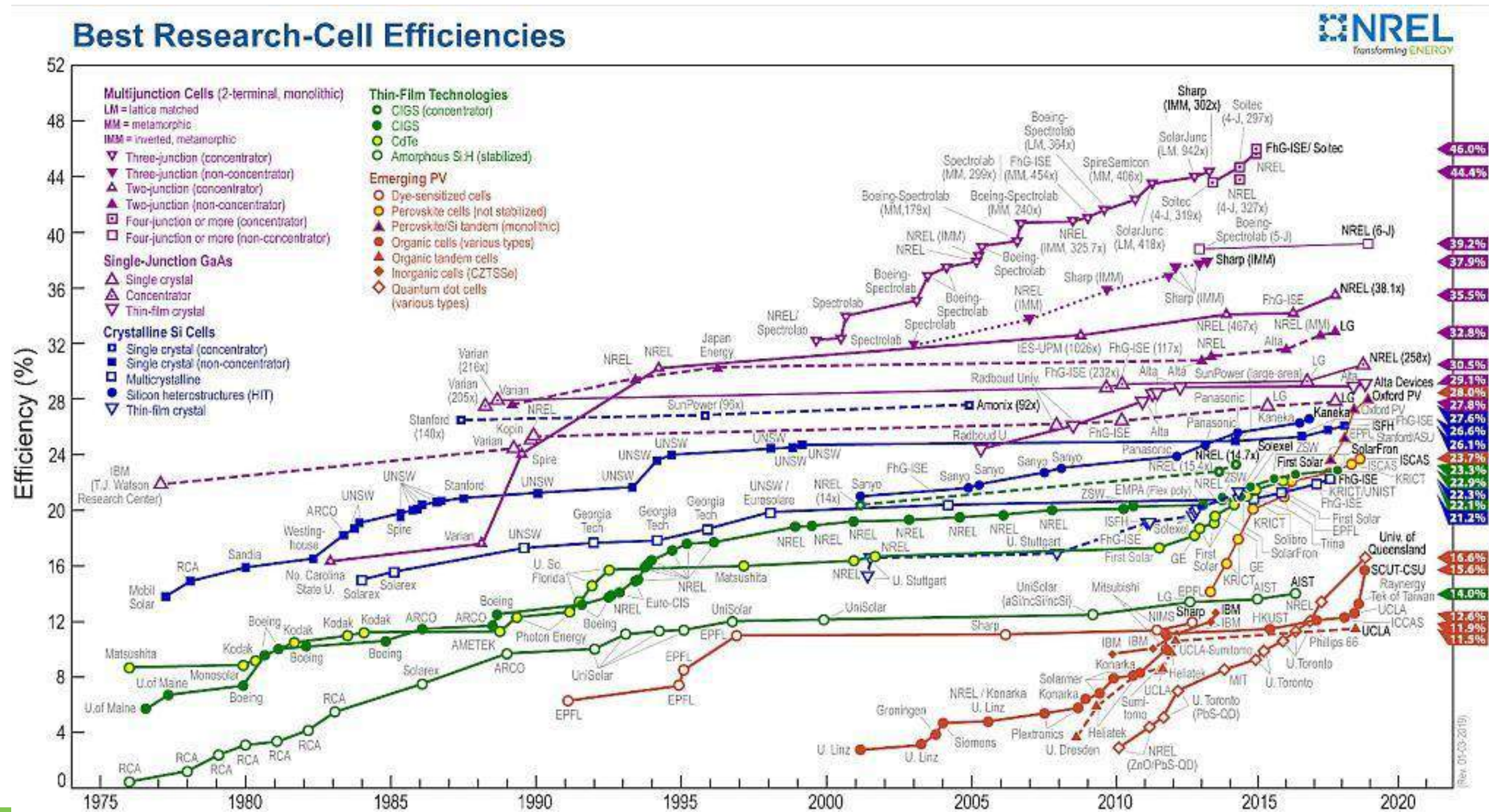




# A technology with many potential materials and designs, all under progress



Four decades of gradual efficiency improvement, with still new candidates on the horizon :

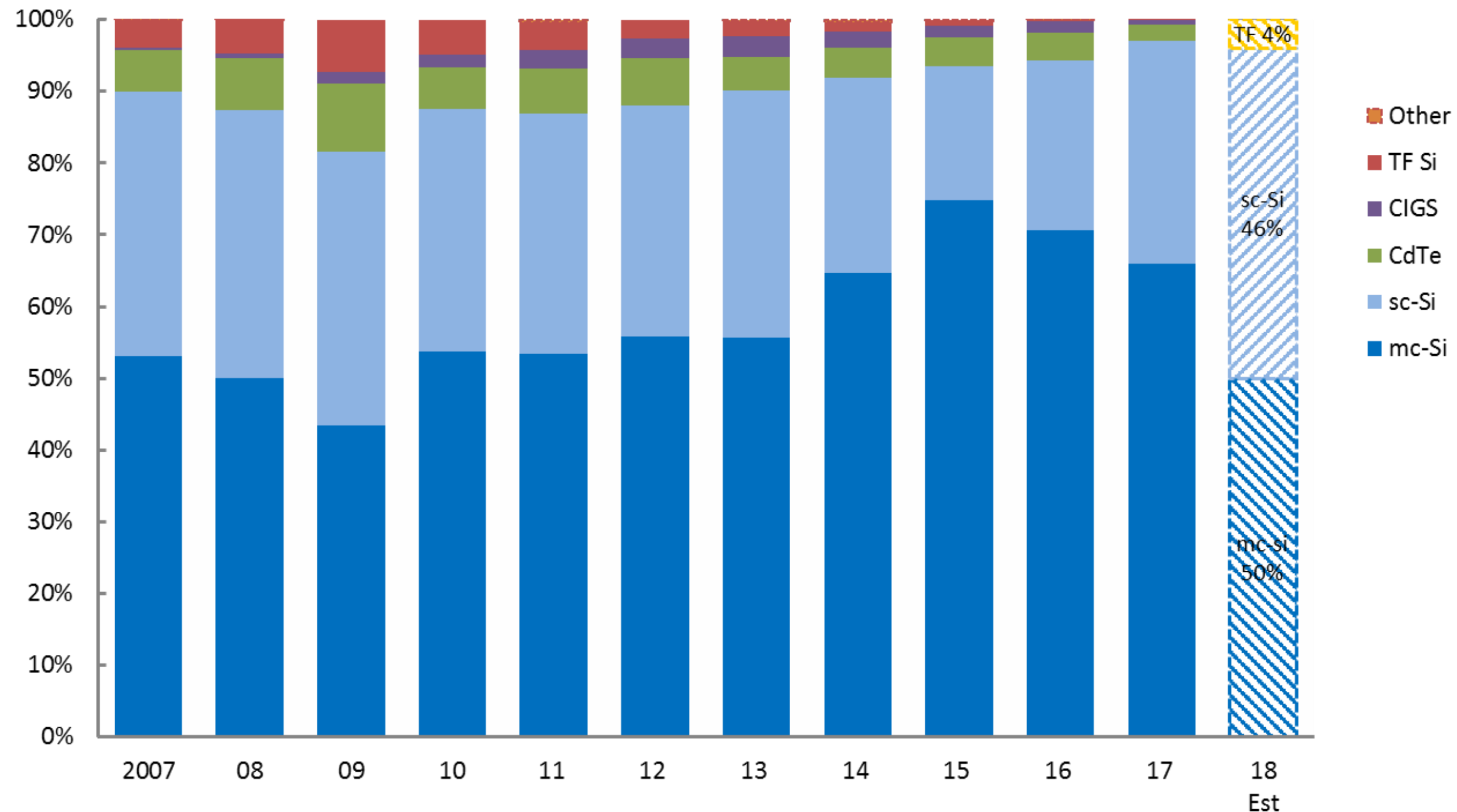




# PV module production by technology



From the market side, silicon technologies are dominating all others





# The silicon technology value chain

From silicon to modules and systems



Silica

Purified Silicon

Ingot

Wafer

Cell

Module

Systems

Various processes

Cast or Cz

Sawing

Surface treatment

Lamination

Mounting, wiring

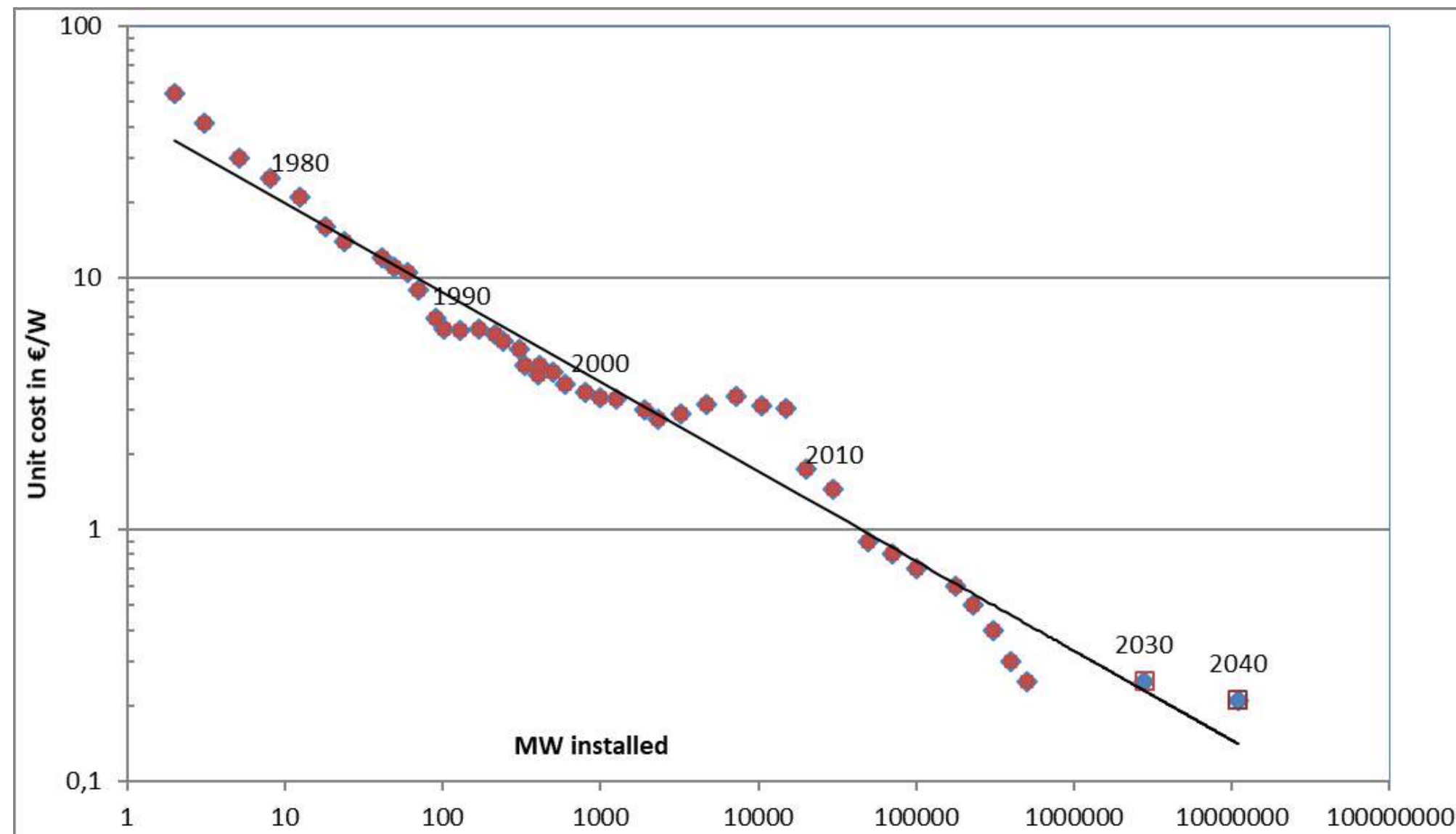
Silica is the second abundant material on earth, (28%) after oxygen (47%).  
Around 900 000 tons of silicon are used by industry.



# Costs of PV modules and PV electricity : an impressive decreasing trend



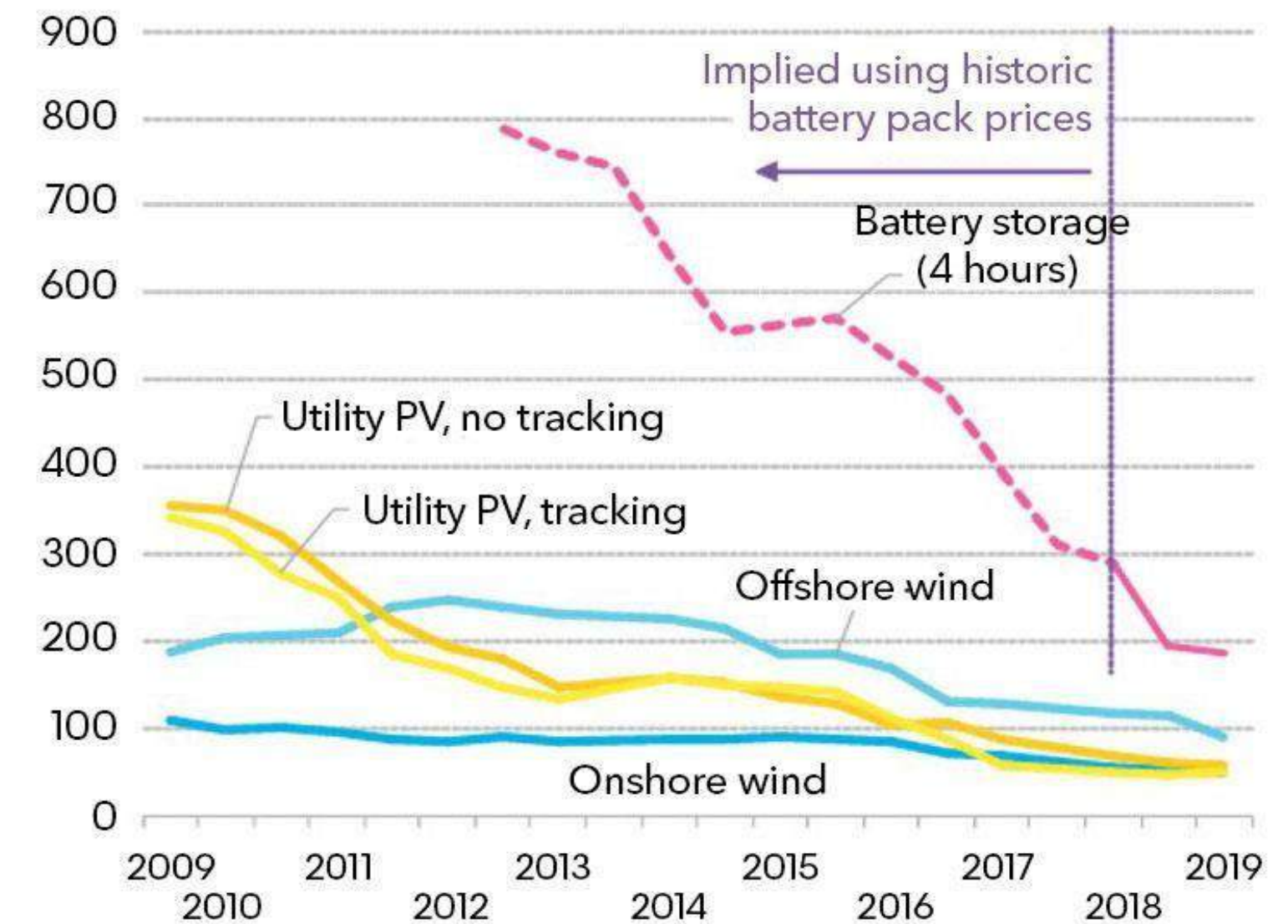
## The PV module learning curve



## Levelized Cost of Electricity (LCOE)

### Global benchmarks - PV, wind and batteries

LCOE (\$/MWh, 2018 real)



The LCOE is now the cheapest one :

- 2c/kWh in sun-rich countries (Chile, UAE, etc.)
- Up to 5c/kWh in other countries (Germany)

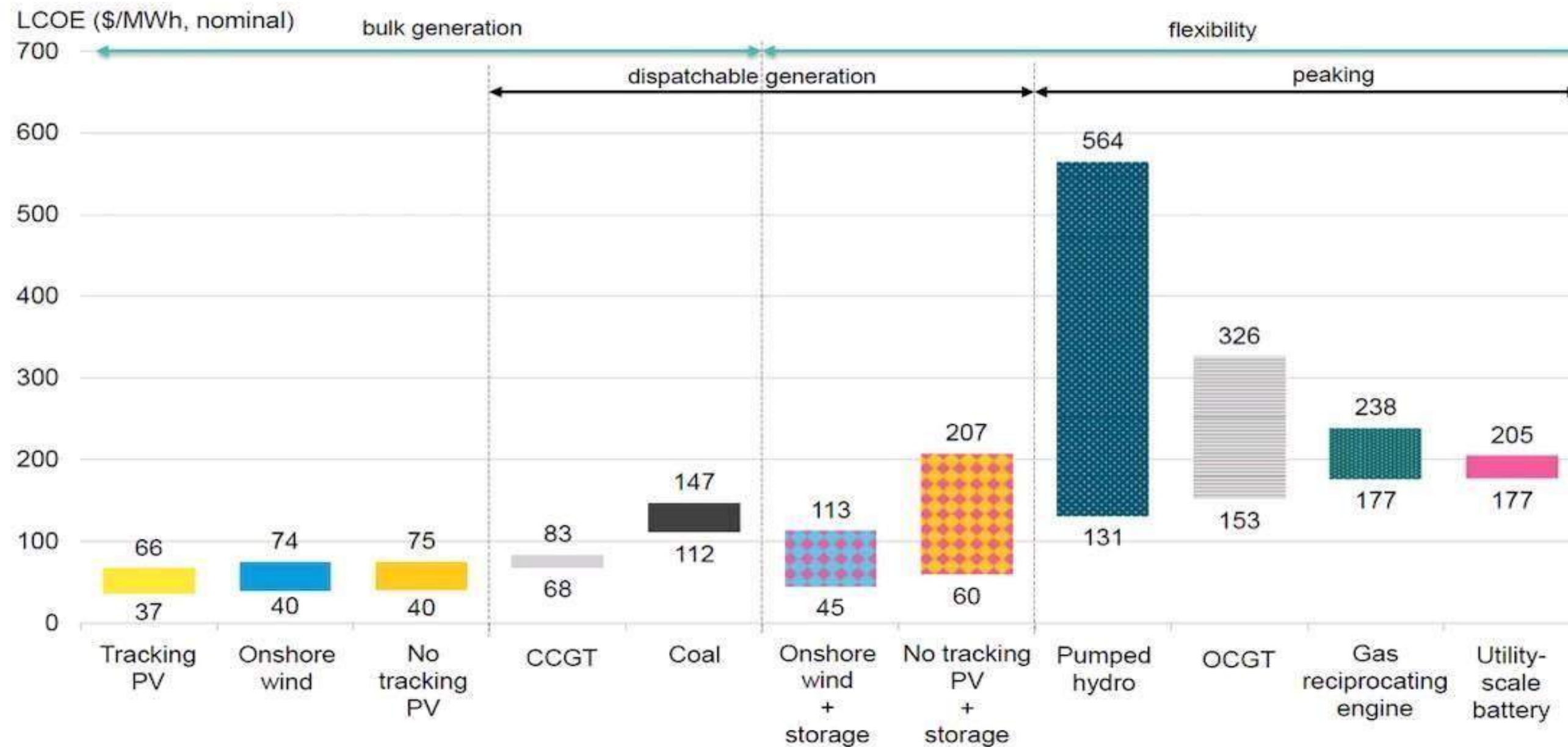
Source: BloombergNEF. Note: The global benchmark is a country weighed-average using the latest annual capacity additions. The storage LCOE is reflective of a utility-scale Li-ion battery storage system running at a daily cycle and includes charging costs assumed to be 60% of whole sale base power price in each country.

# The cheapest source of electricity in many countries



Australia

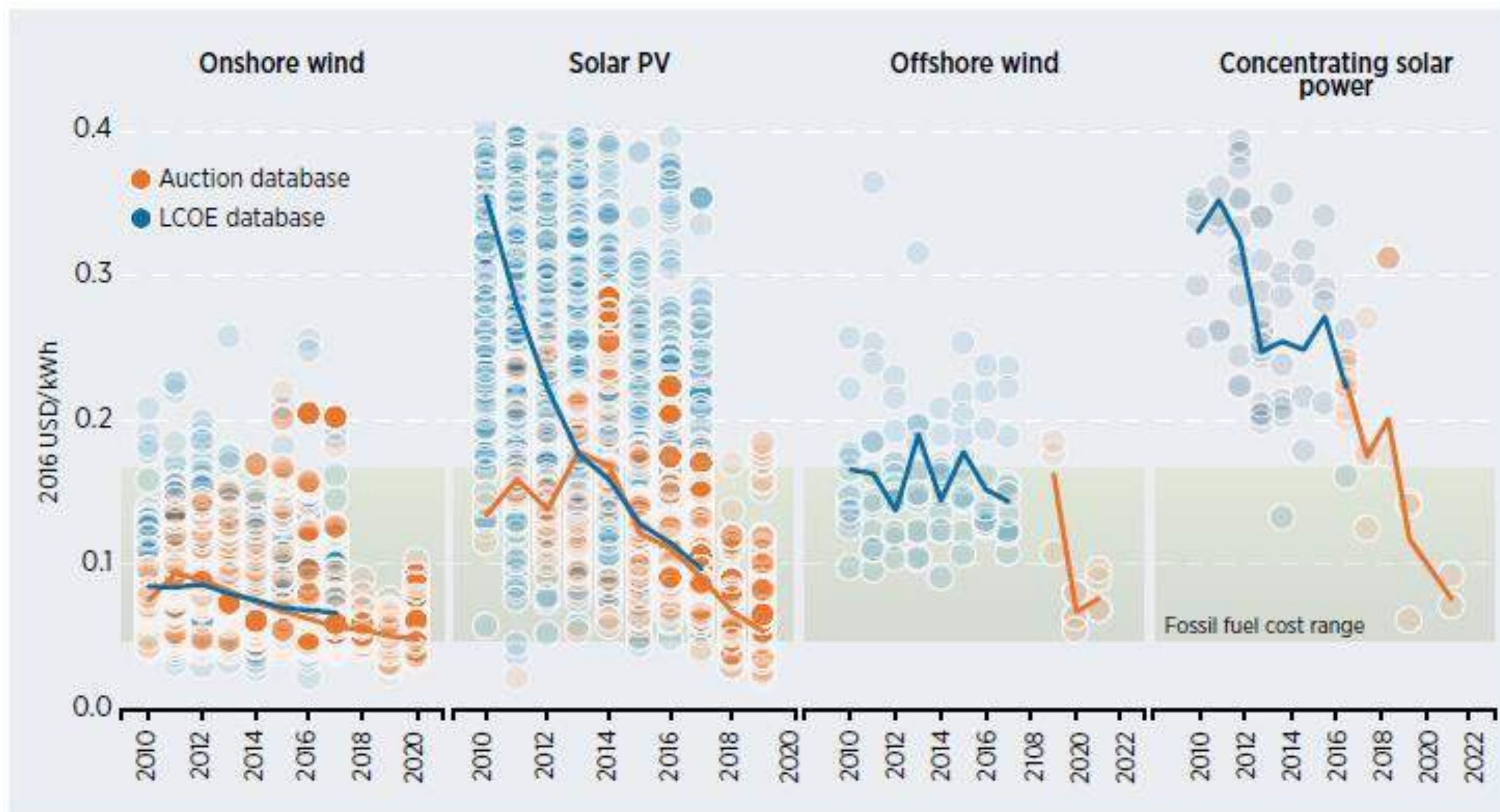
## Levelized cost of electricity



Source: BloombergNEF. Note: The LCOE range represents a range of costs and capacity factors. Battery storage systems (co-located and stand-alone) presented here have four-hour storage. In the case of solar- and wind-plus-battery systems, the range is a combination of capacity factors and size of the battery relative to the power generating asset (25% to 100% of total installed capacity). All LCOE calculations are unsubsidized. Categorization of technologies is based on their primary use case.



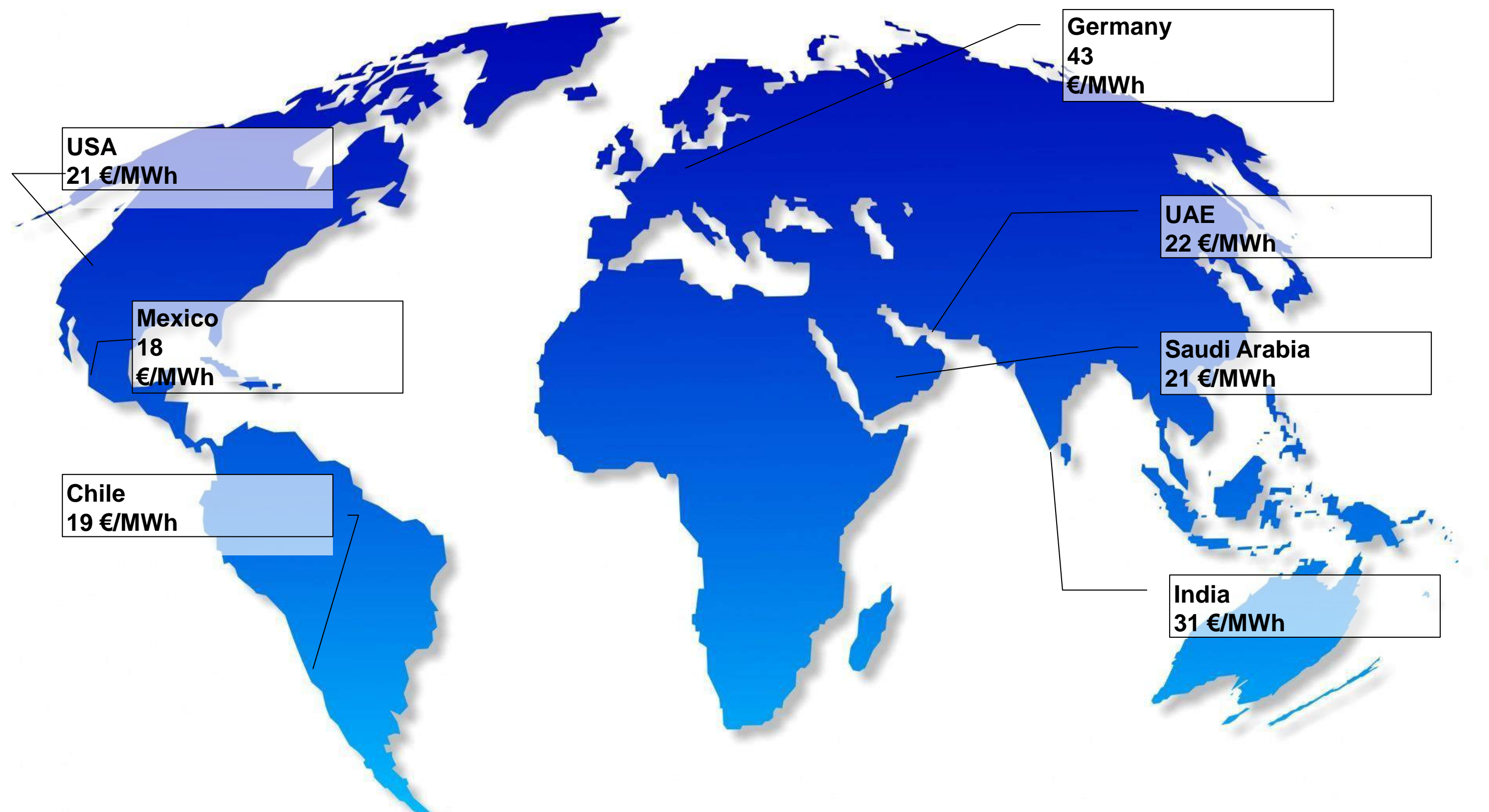
# The cheapest source among renewables



Source: IRENA Renewable Cost Database and Auctions Database.



# Current records : long-term contract prices recently announced







# System cost structure

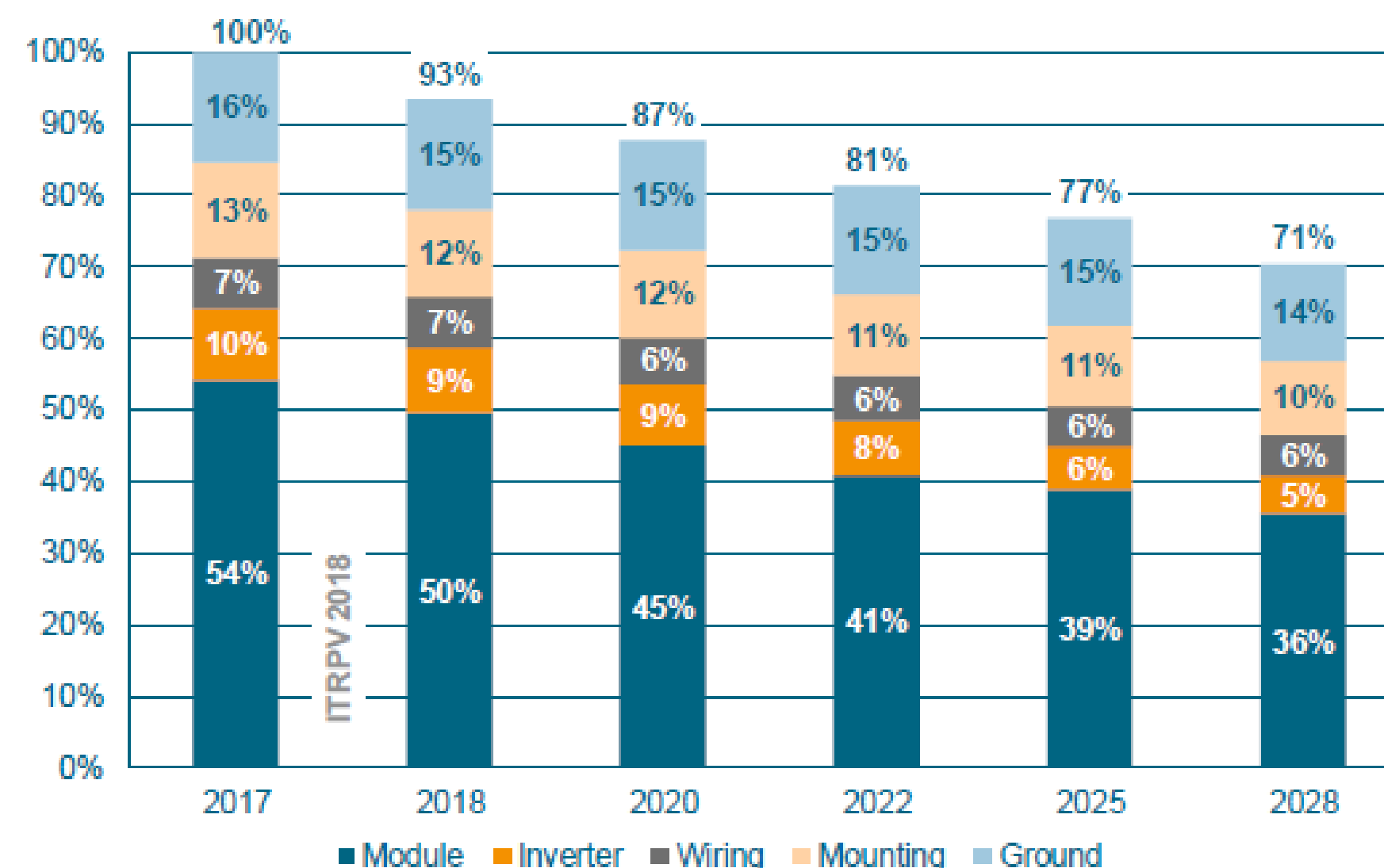
The system cost depends on :

- The type of system :
  - On / off-grid,
  - with or without storage, etc.
- The size
- The location
- The type of integration

On average, on-grid system cost is double the module cost

## Cost elements of PV System in Asia

For Systems > 100 kW

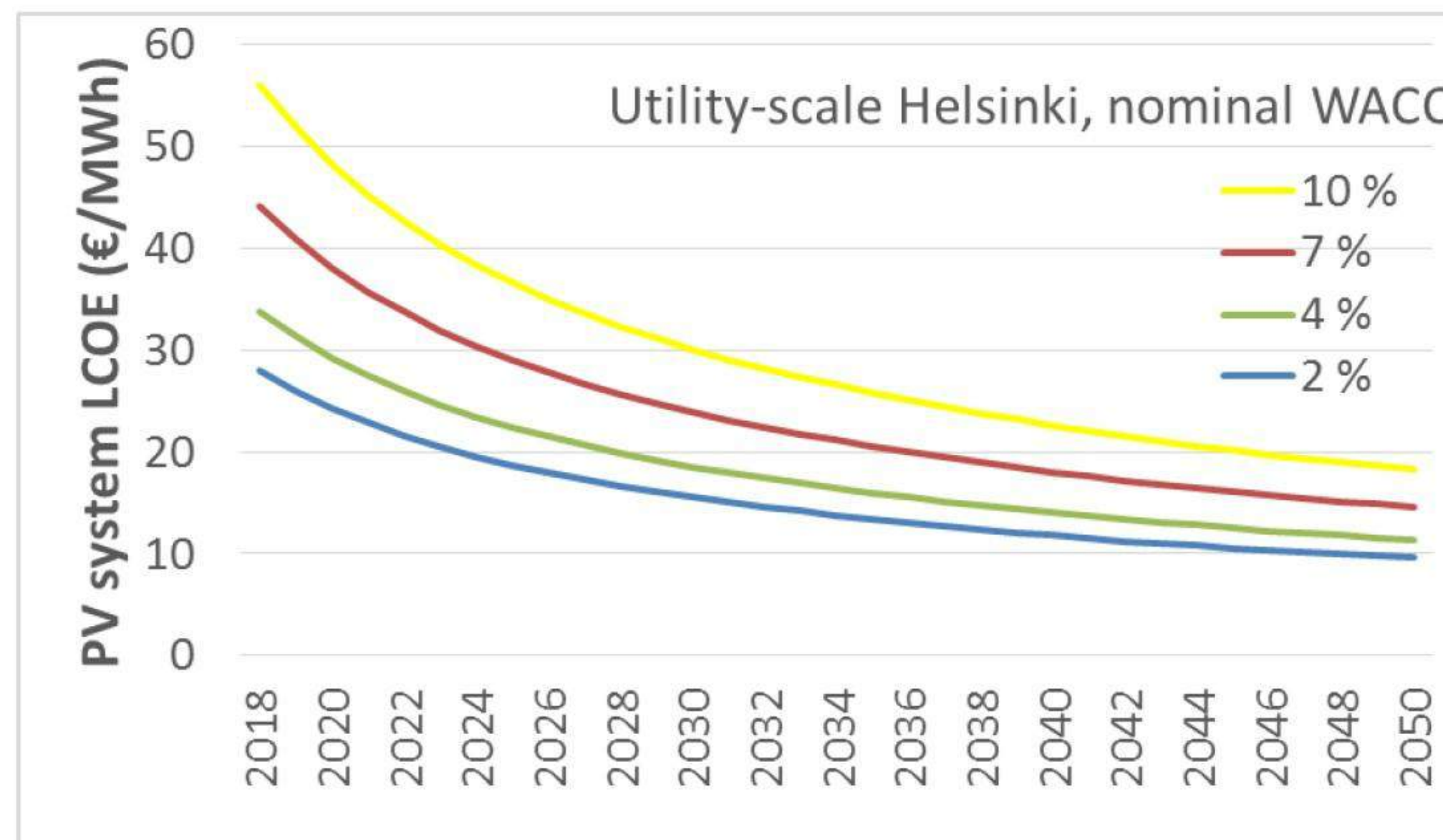




# LCOE Cost Structure

The importance of the cost of capital

**LCOE with 10% nominal WACC is double the LCOE with 2% WACC**



LCOE with 2% inflation; w/o taxes





# Sustainability : low carbon footprint and efficient use of common materials

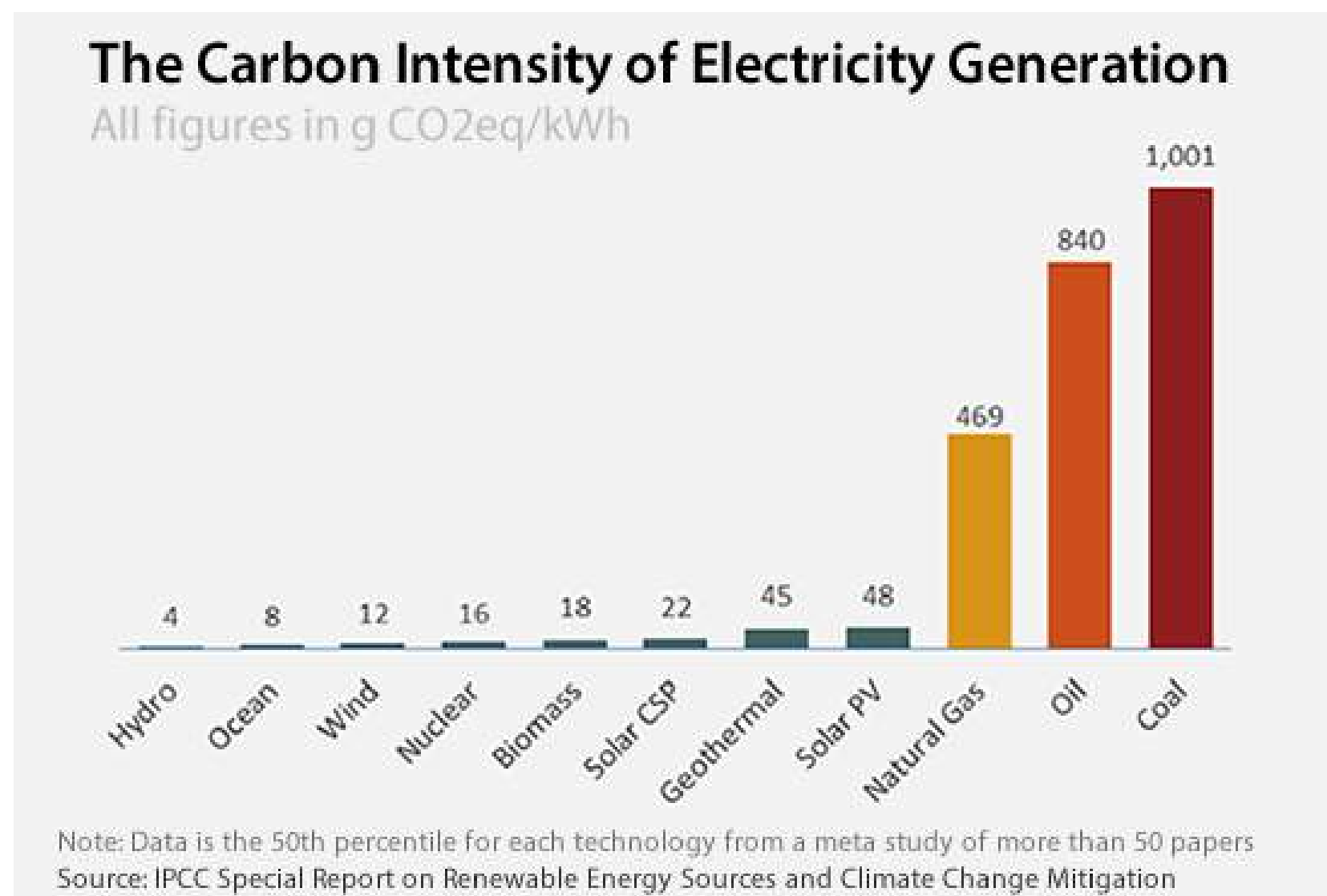
## CO2 content :

- still in progress due to decreasing consumption of materials
- Already among the lowest power sources

Warranty periods : 25 to 35 years on most technologies

Lifetime : above

Recycleability : plants available





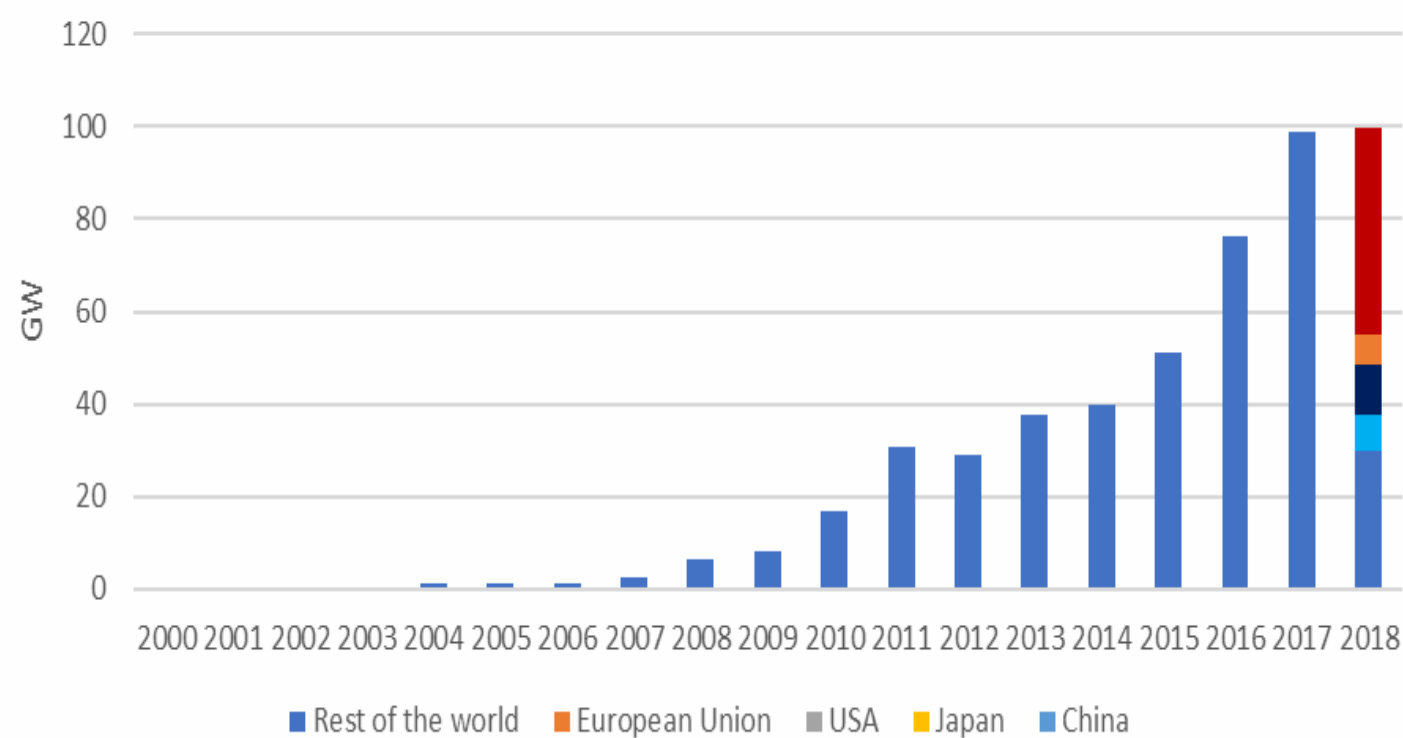
# Worldwide market

The largest growth among renewable, with an annual market of 100 GW

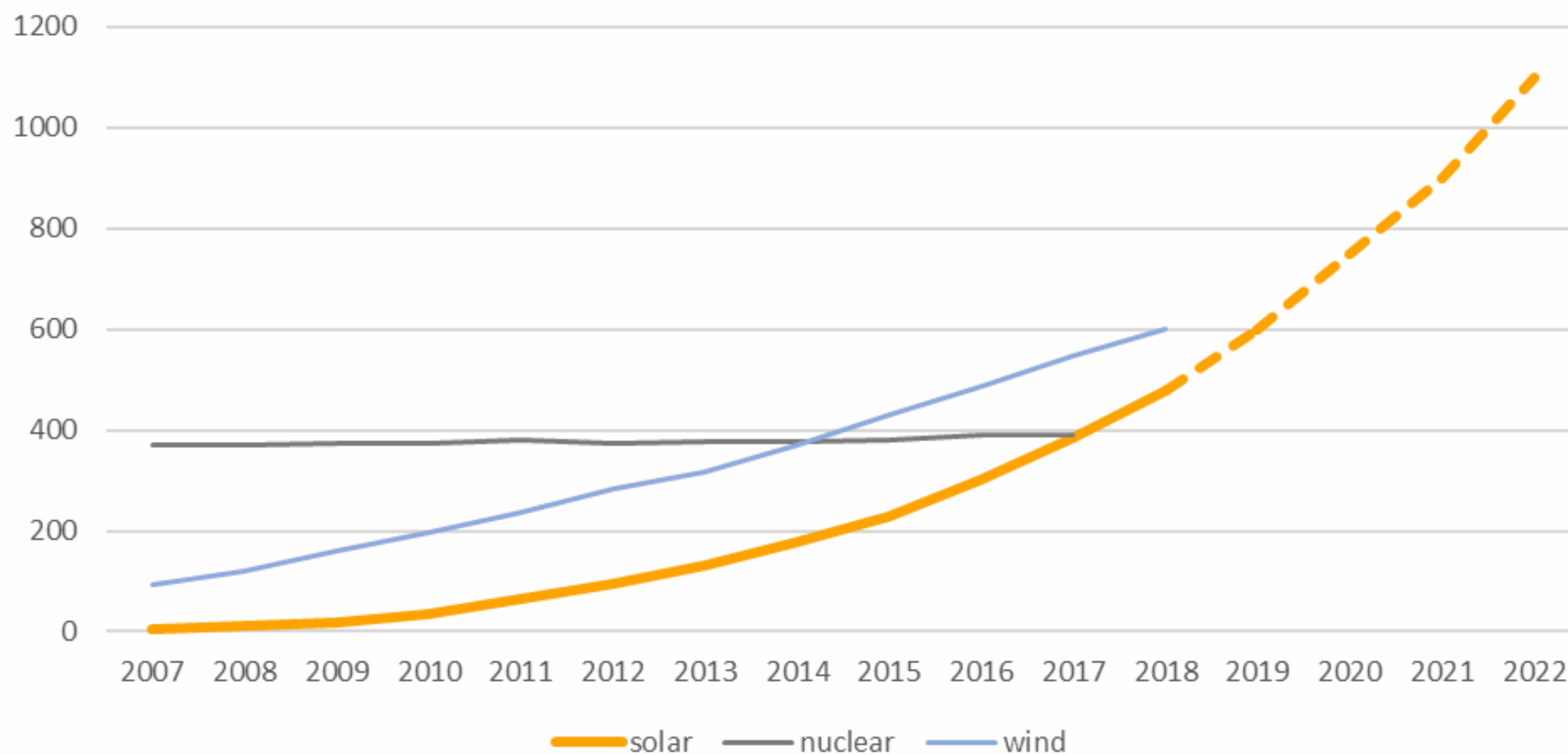
On the way to 1 TW installed capacity within 3 to 4 years

A potential of 30 to 60 TW

Evolution of annual PV installations



Installed worldwide capacities, in GW

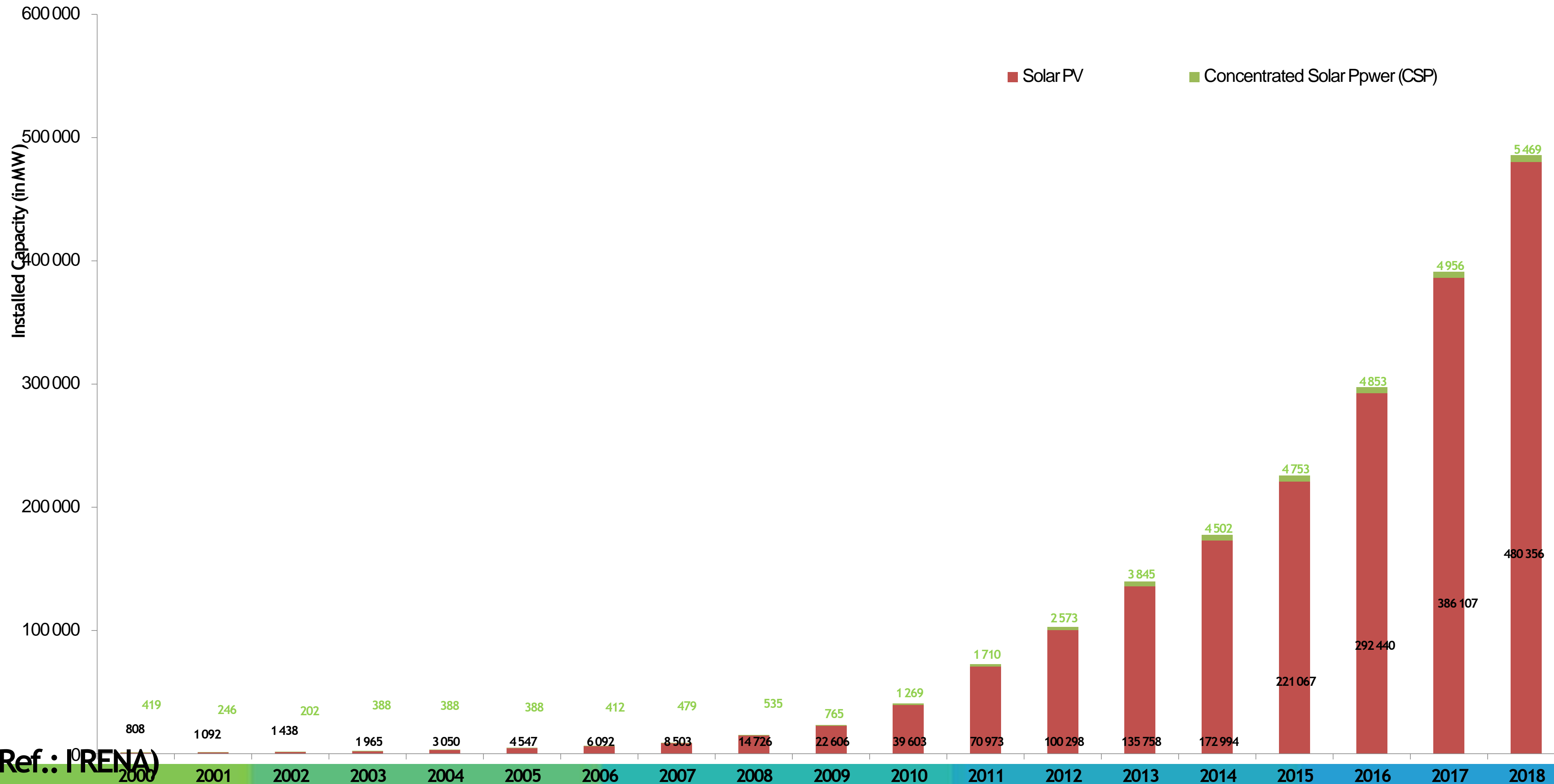




# Solar Growth Trajectory



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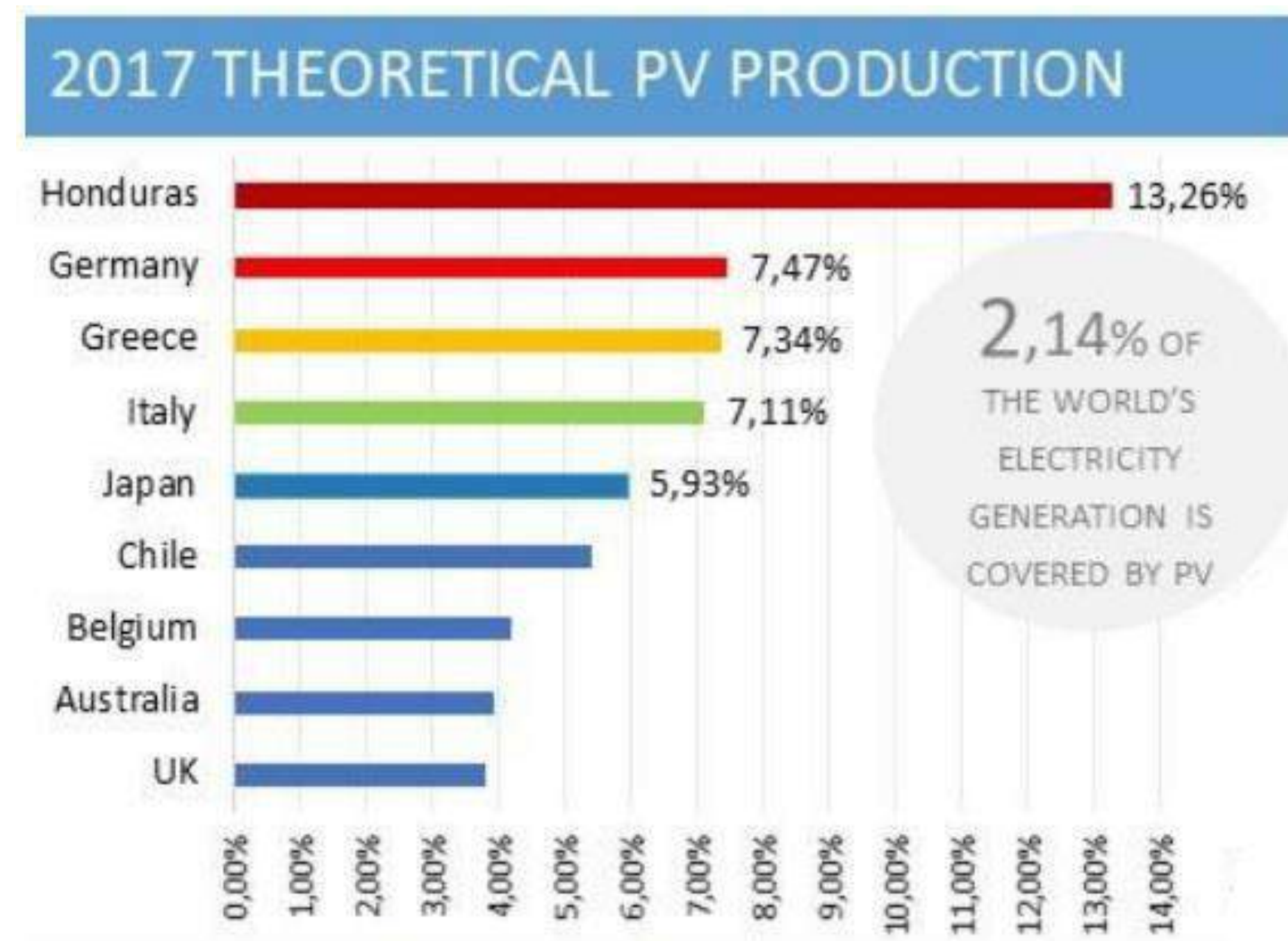


(Ref.: IRENA)

# Achievement so far



2% of the worldwide  
electricity mix in 2017

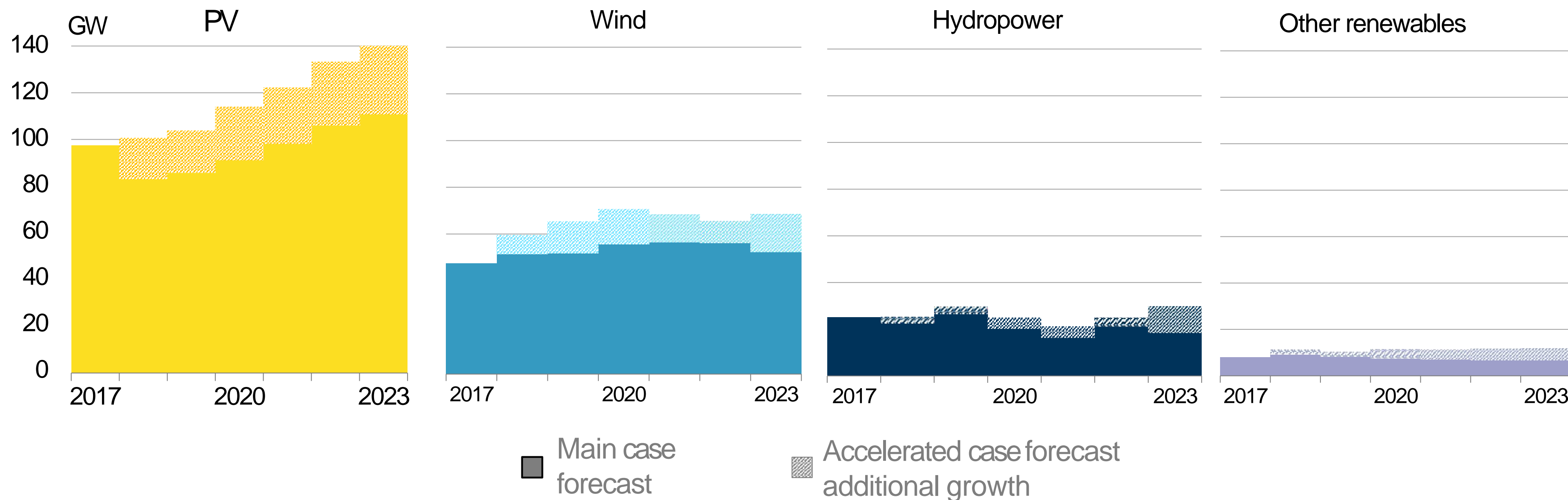






# This growth will carry on

According to the IEA, the strongest growth to come among renewables



Source: Renewables 2018



## First take aways

1. The cheapest form of electricity :
  - Available everywhere
  - Decentralised
  - Decarbonised & Sustainable
  - Manageable using digital economy
  - Capital intensive
  
2. Progress will carry on : We are only at the dawn of the age of solar energy



# Solar Energy : for what purposes ?



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# Overview of Solar Applications



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# Access to energy : changing lives



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“I have saved money with my solar lamps, I no longer buy kerosen, paraffin or dry cell batteries. I use the money for my children.”





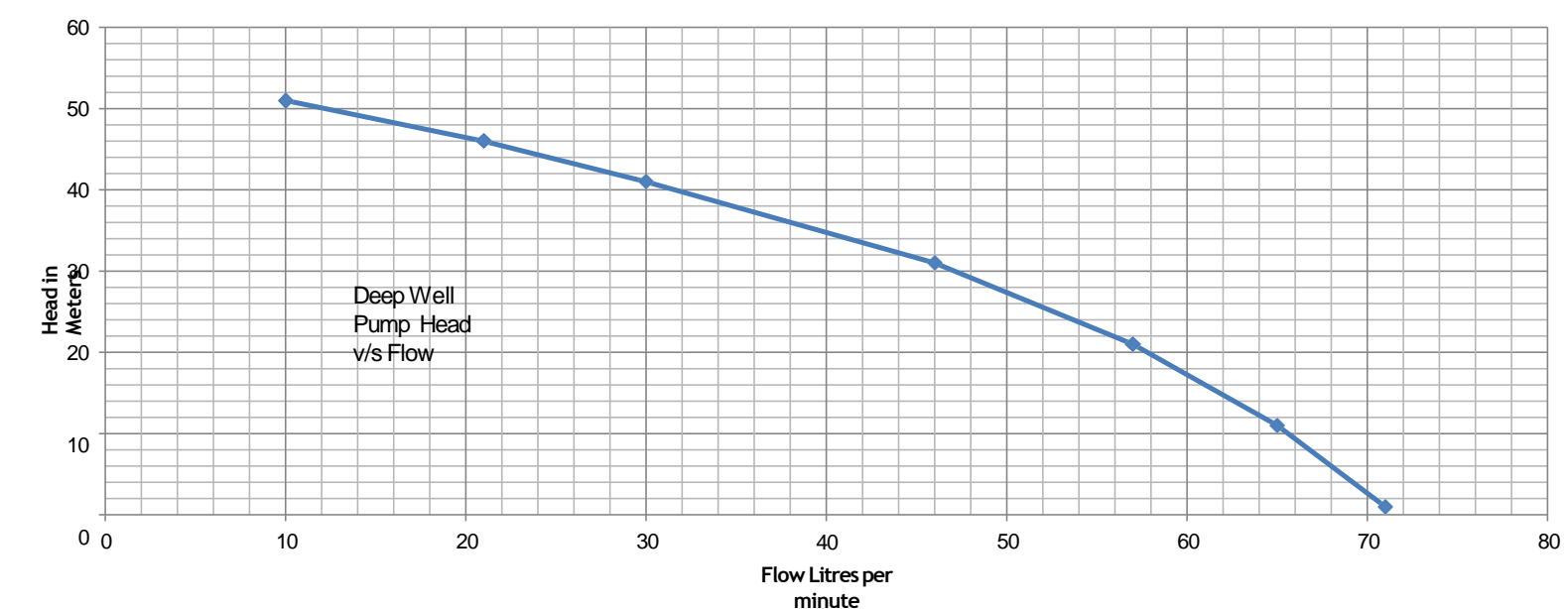
# Changing lives : Solar Pumps



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## For Irrigation and Drinking Water applications

- Major components: PV/module array of capacity ranging from 200 Wp to about 10 kWp, a DC/AC surface mounted/floating motor pump set/submersible pump set, electronics and an 'on-off' switch.
- Surface pumps (both AC& DC) are used with canals, open wells, lakes, other shallow sources (up to 15 m depth)
- Submersible pumps (both AC& DC) with number of stages can be used to lift the water from the ground, from the depths up to 150 meters or more.







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## RainMaker2 with ClimateSmart™

sun culture  
Transforming Agriculture

**Product features**

- Personalized Irrigation Recommendations**  
ClimateSmart™ gives you real-time, weather-based recommendations for irrigation by SMS.
- Remote Monitoring with predictive maintenance**  
Detects issues and use of Microsoft™ Machine Learning Tools & artificial intelligence to predict maintenance requirements.
- Improved Flow Rate**

Well Depth	0ft	15ft	65ft	130ft	200ft
Flow Rate Liters per hour	3,000	2,500	850	500	200

- Li-Ion Battery Backup**  
Deep cycle Lithium Ion battery with ClimateSmart™ software that enables remote monitoring with predictive maintenance.
- Multi-Purpose Usage**

**PAYMENT PLAN**  
KES **3,900**  
FOR 30 MONTHS - DEPOSIT OF KSHS. 8,900

- ClimateSmart™ Solar Energy System with Li-Ion Battery & MPPT Charging
- Powerful, brushless motor solar pump with 10 year lifetime
- 260W panel or 160W foldable panel
- 100 meters of 25mm PN10 PE pipe
- Four sprinklers and all fittings
- 50 meters of electrical cable
- Four 600 lumen LED light bulbs with 5m cable and switch
- 3 Year warranty





# Containerized Solar Solution



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## Uses:

Doctor's clinic • Health screening by para medics • Cold storage of milk, vegetables and fish before collection • Vaccination centre • Centre for disaster management • Water purification systems

## Specifications:

- Solar Panels: 4 – 8 kWp
- Inverter Rating: 6 – 12 kVA Hybrid
- Battery: Tubular gel, 3 – 4 hr at 60% Load
- Standard 20' marine container, 6 m x 2.45 m
- Free Area = 8 sq. m.
- Walls/Roof: Insulated with PUF



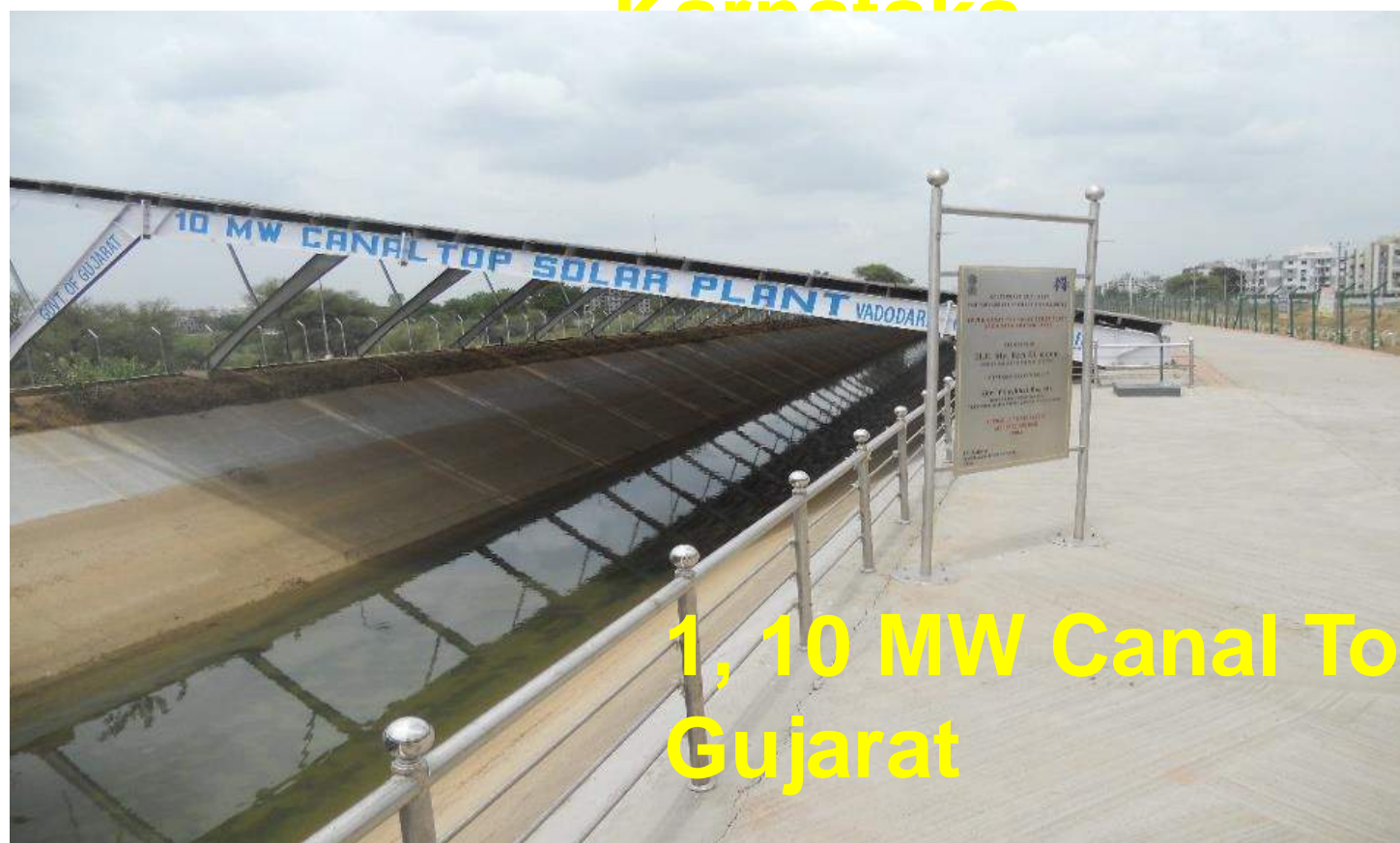
# Canal Top and Canal Bank Solar Power Projects



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1 MW Canal Top SPV Power Project in  
Karnataka

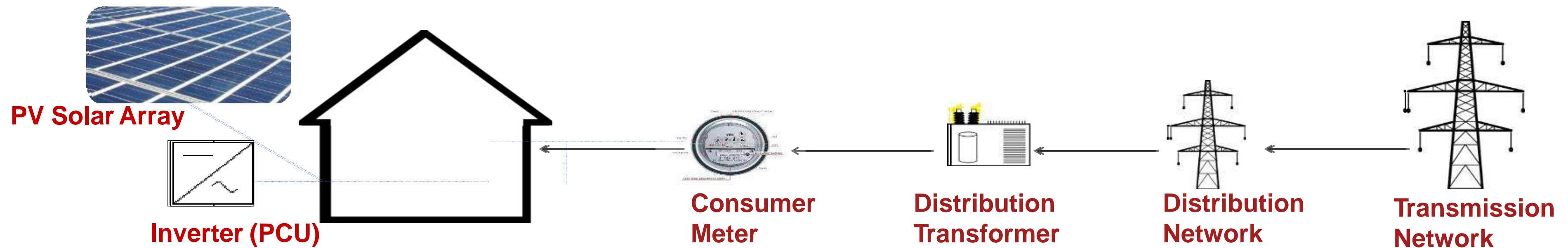


1, 10 MW Canal Top SPV Power Project in  
Gujarat





# Rooftop PV Arrangement



- Rooftop PV is an arrangement to utilize the vacant roof space to generate electricity.
- The electricity generated can be utilized for ***self-consumption and/or grid feeding***.
- Different types of inverters/PCUs are used for this purpose viz. Off-grid, Grid-tied and Hybrid.

## Required Policy Framework

- CONNECTIVITY NORMS**
- METERING POLICY**
- SOLAR TARIFF POLICY**





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**PV MODULES ON PF-2 (MIDDLE)  
KATRA RAILWAY STATION**



# 400 kWp Plant : Chinnasawamy Stadium, Bangalore



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# 648 MW Solar PV Power Plant in Tamil Nadu, India



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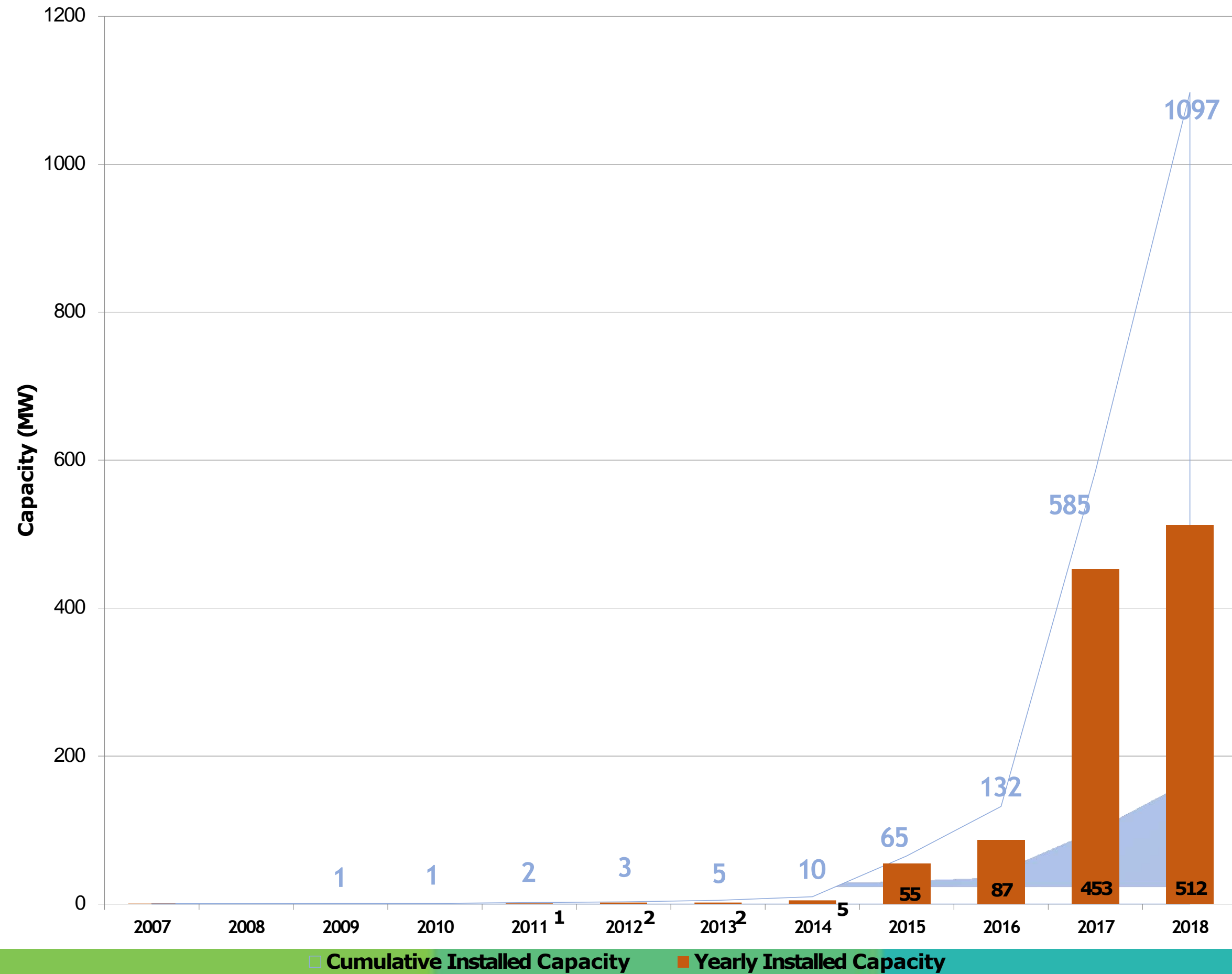


# Floating Solar PV



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*World's largest 150 MW plant in China*





# Solar energy and seawater

*A desalination unit, without battery can produce few m<sup>3</sup> up to hundred of 100m<sup>3</sup> per day, or more when powered by hybrid energy sources.*

**Gaza Province, Mozambique : 30 m<sup>3</sup> / day**



**Cape Province, South Africa :**  
*100m<sup>3</sup> per day*

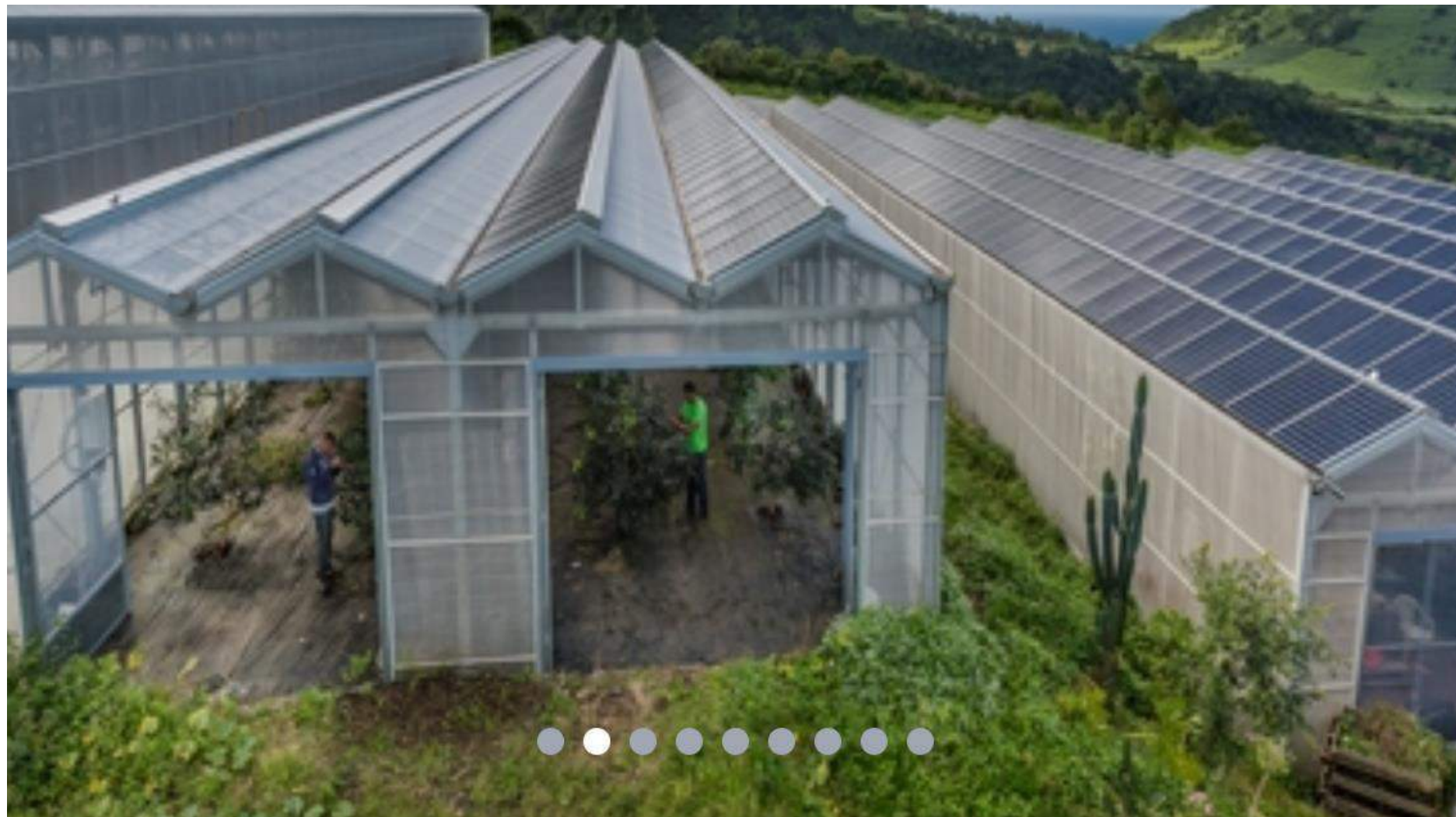
**Abu Dhabi, UAE : 40m<sup>3</sup> / day**





# Synergetic approach : solar energy and agriculture

- No loss of agricultural land
- Greenhouses bring energy and food autonomy



Species still to be adapted





# Synergetic approach : solar energy and agriculture



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## Hail protection of orchards :

- Vineyards
- Apple trees





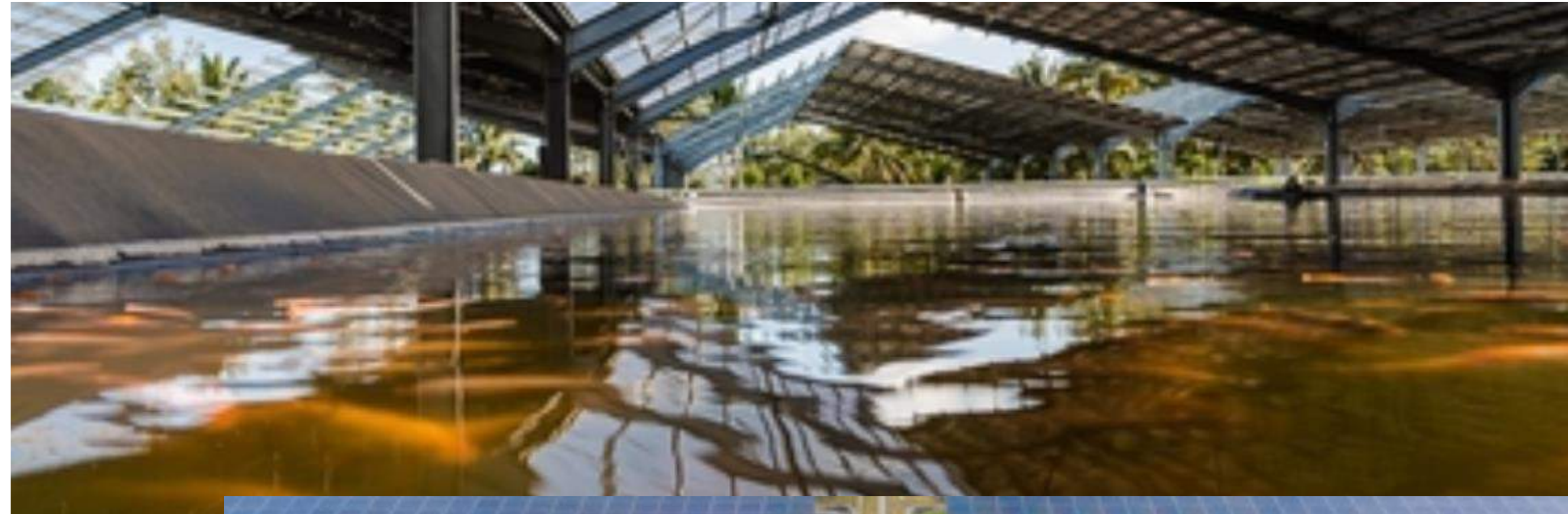
# Solar Energy and aquaculture



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No additional land required for fish farming

Example in the Indian Ocean





# Power and water management



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In slightly hilly areas,  
two reservoir tanks help  
in regulating fluctuating  
PV power.





# Lanes in parking lots







PV charging station, with storage and grid connection

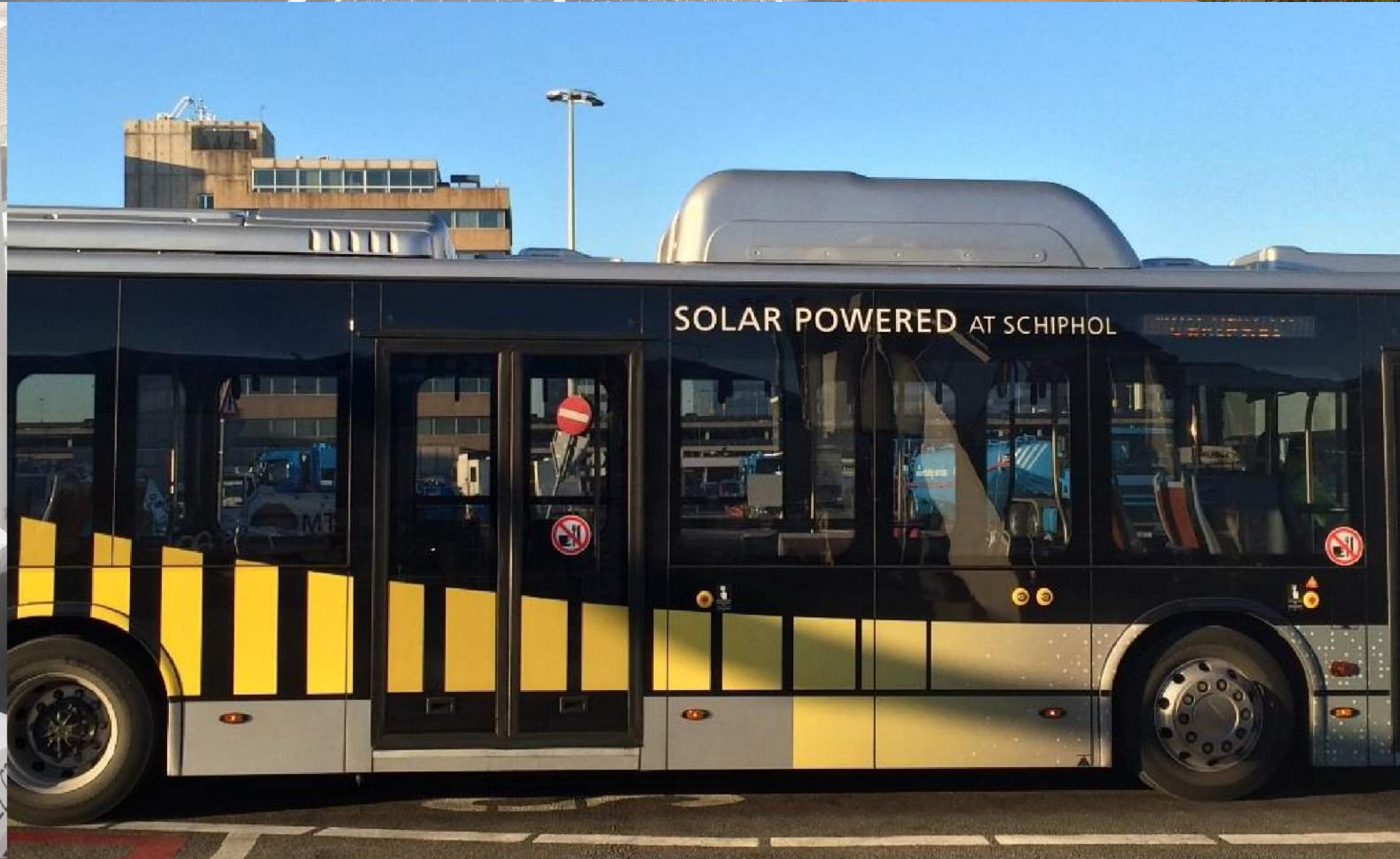
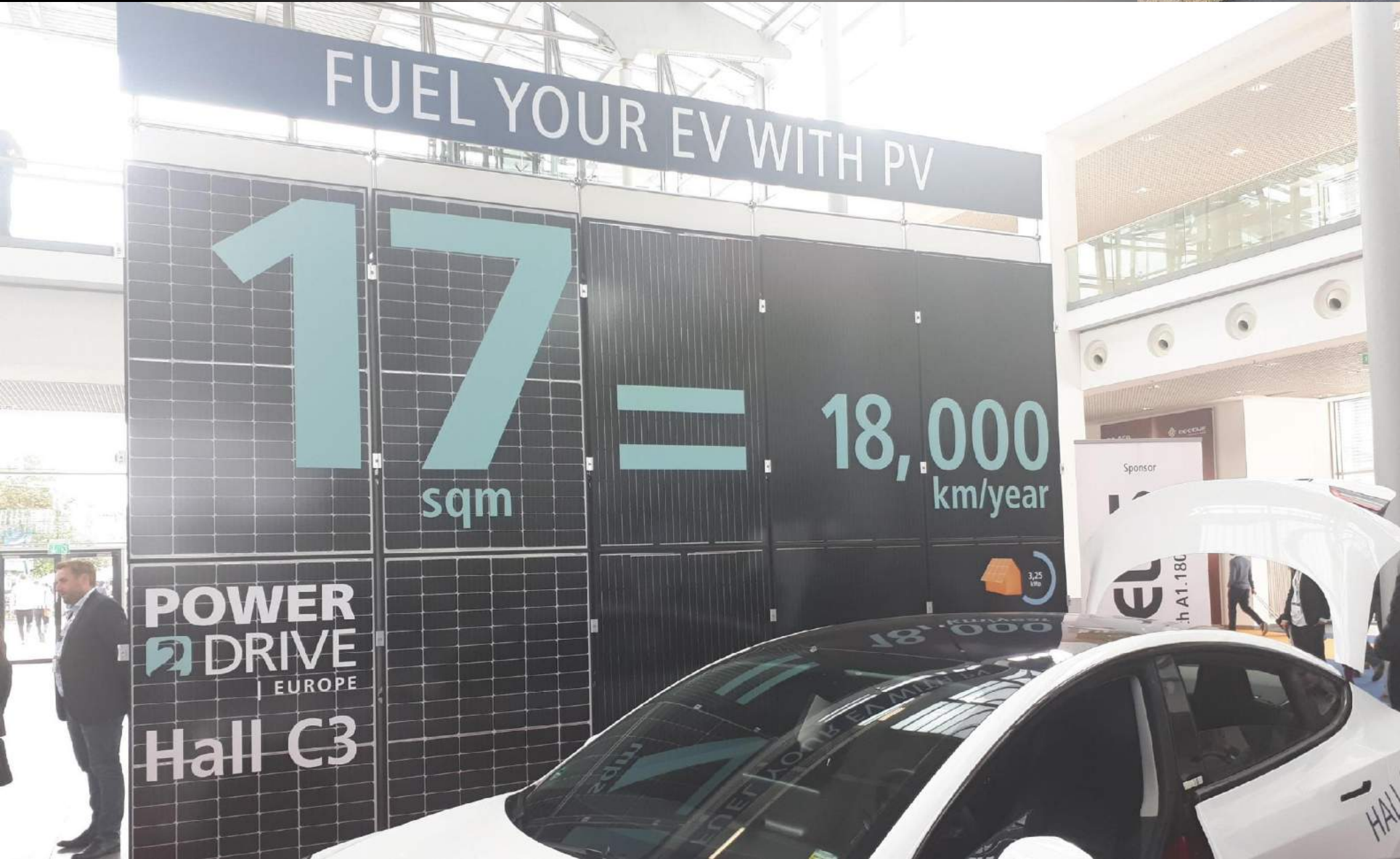
Corsica Sole / Driveco

1 m<sup>2</sup> supplies « 1 000 km / year\* »  
One parking place allows 15 000 km / year\*

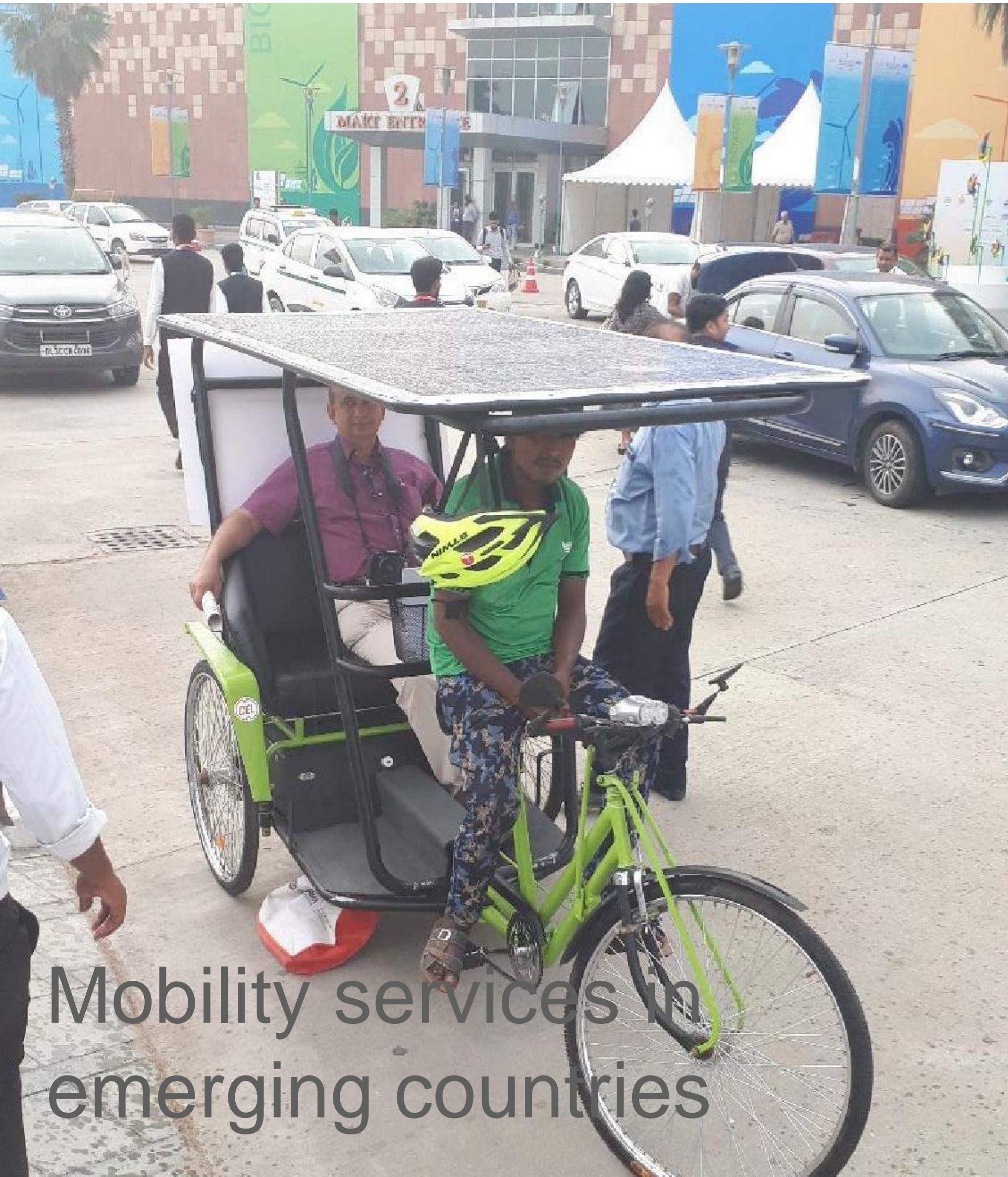
\* : average in France



# Transport applications







Mobility services in emerging countries



# Summary: First Ever Solar Electric Vehicle

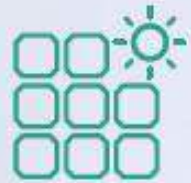
# E-Mobility & Sharing for Everyone



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Family sized Solar Electric Vehicle with 255 km range (WLTP), an additional natural air filtration system, at a retail price of €25,500 incl. battery



Integrated solar cells that recharge the Sion, for up to 34 km/day in Munich

34km / sunny day  
in Munich



> 10,00 Reservations



Innovative peer-to-peer services such as carSharing, rideSharing and powerSharing



Open source strategy for O&M and repairs

Ein Bild, das Auto, Himmel enthält.

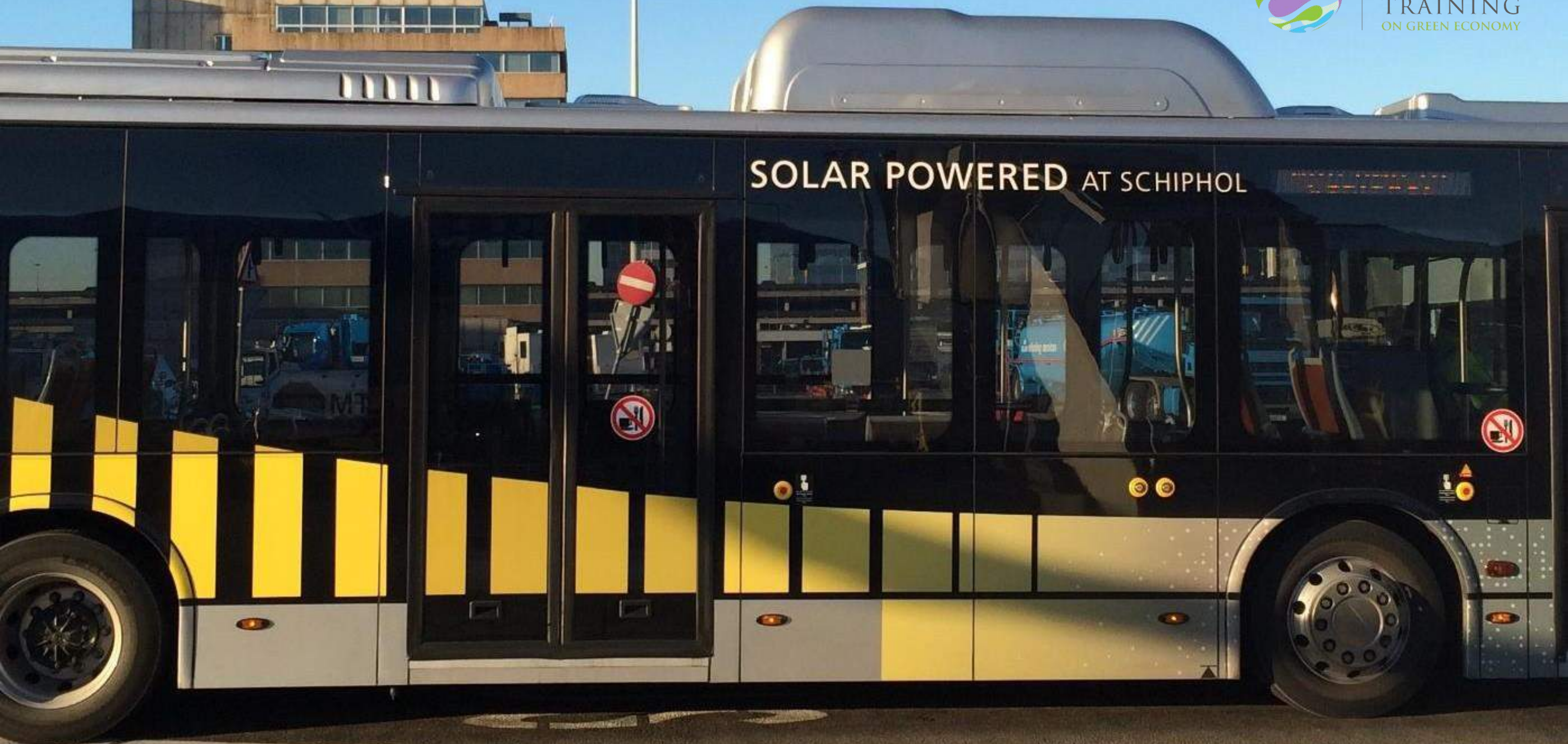
Automatisch generierte Beschreibung



Within airports



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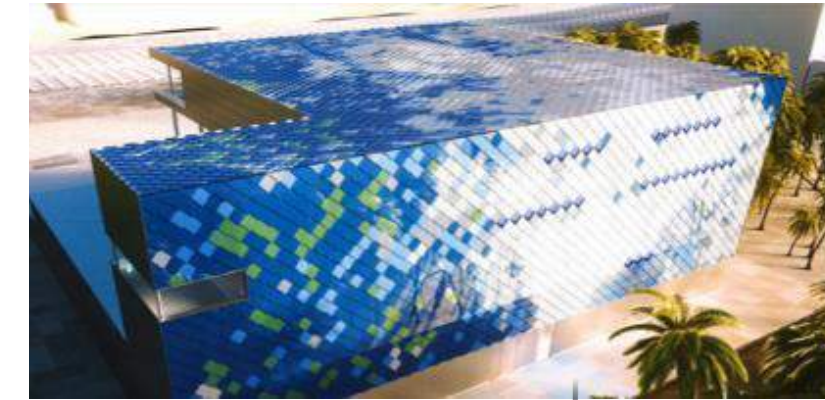
SOLAR POWERED AT SCHIPHOL



# Future applications



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Distributed PV share will gradually increase





# Second take aways

1. An increasing variety of applications :
    - Off-grid, for improving living conditions, and now for productive uses
    - On-grid : from small-scale domestic use to large-scale power plants
  2. Modular and easily installed, with limited externalities.
  3. All sectors are concerned : grid, buildings, transportation, industry, agriculture
- Multifunctionality and integration are important key words towards local revenues optimisation and increased resilience





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# 3. Policy Pathways





# How to act ?

How to start ?

How to speed up existing dissemination ?

How to optimise the benefits to the local economy ?





# Usual obstacles to the scaling up of solar energy

The lack of awareness, lack of local know-how, lack of finance, lack of quality project and equipment are common



Perception of obstacles may be different, according to the various stakeholders





# Defining and disseminating targets

1. First step is a review of the needs
2. Second step is to define ambitious goals at the government / regional levels :
  - Planification and priorities, in terms of share of renewables within the energy mix
  - Short-, medium- & long-term objectives :
    - by applications and technologies : off-grid rural electrification (residential kits, minigrids PV-genset), grid-connected applications
    - among regions, cities, communities
3. Third step is to share this information among all ministries : energy, finance, economy, agriculture, health, education, industry, transportation, buildings, for them to take actions :
  - Enabling environment, regulatory framework, financial incentives, etc.
  - Demonstration projects, programmes, etc.



# Many studies available now regarding 100% RE scenarios



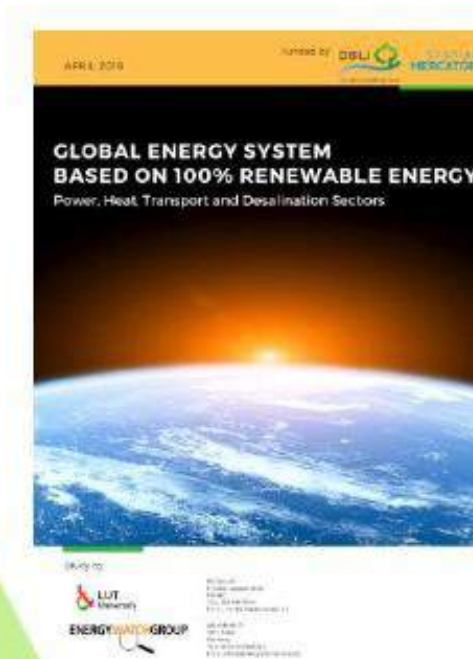
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## New Study by LUT shows:

The energy transition is not a question of technical feasibility or economic viability, but one of political will.

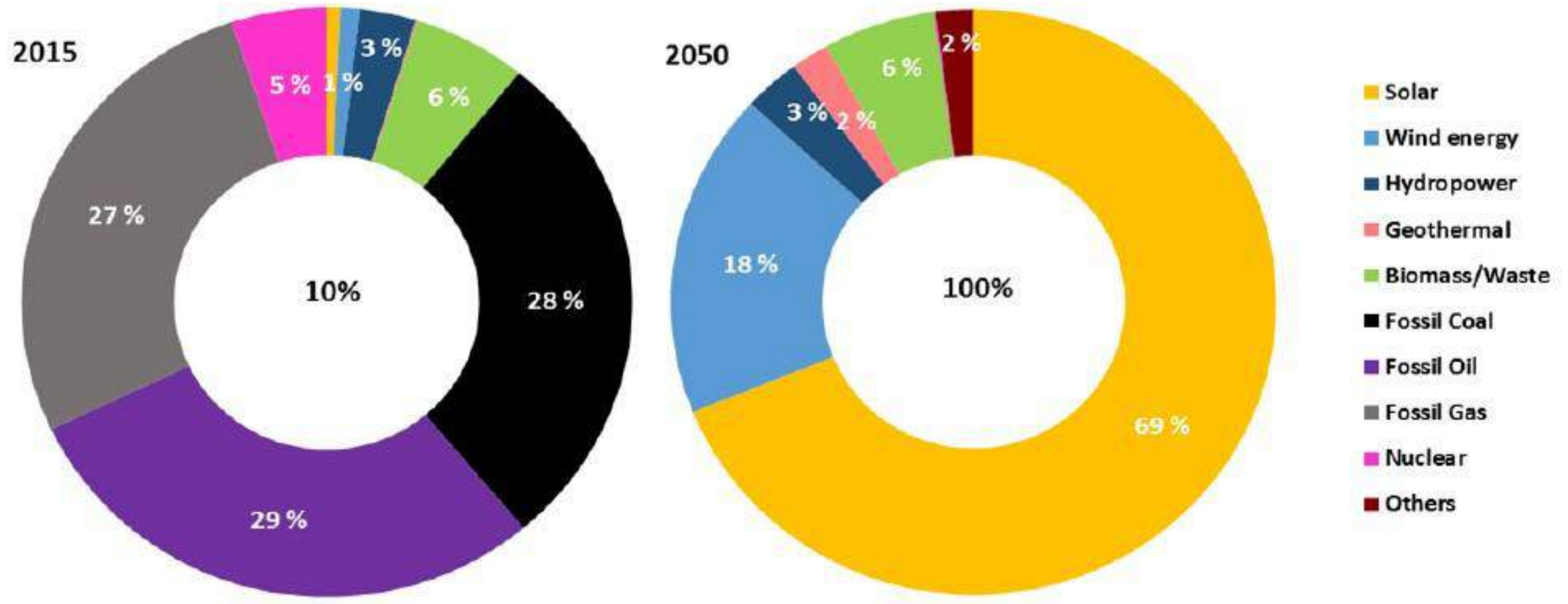
100% renewable energy worldwide is more cost effective than the current energy system and leads to zero emissions before 2050.

Largely domestic energy systems based on 100% renewables will create energy independence and support millions of local jobs in the energy sector.





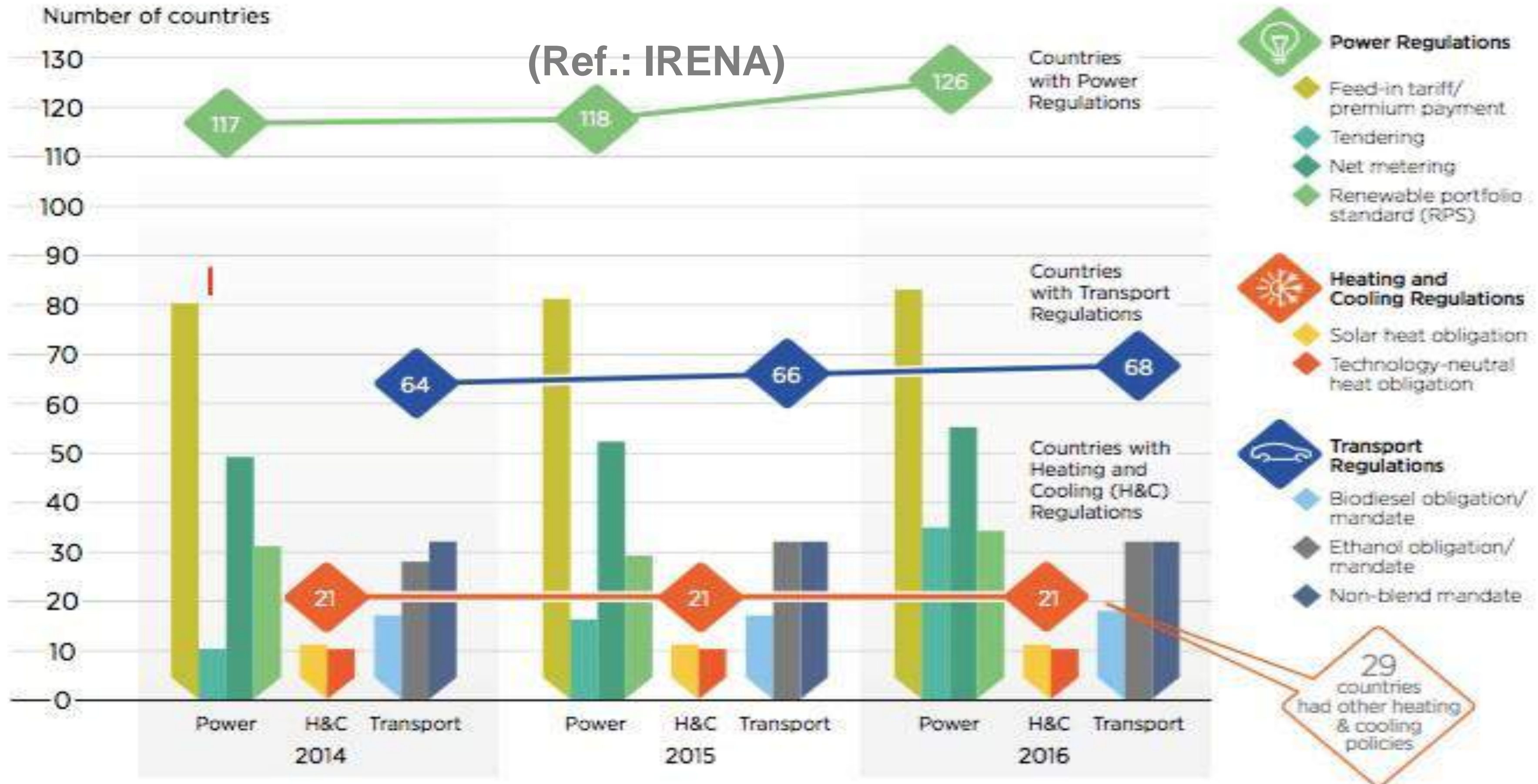
# Solar and Wind Will Dominate the 100% Renewable World



Primary energy source	Solar	Wind	Biomass/Waste	Hydro	Geo-thermal
Share in 2050	69%	18%	6%	3%	2%



# Defining pathways : many policy options





# Policy Prescription for Promoting Solar



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## Feed-in tariffs

Solar power is procured at feed-in tariff.

## Concessional Import duties

Concessional duty on import of solar power equipment

## RPO and REC

Mandatory RPO targets to create demand. Provision of REC for resource poor entities for compliance.

## Subsidies and VGF

Capital grants from the govt. to make solar projects viable

## GBI

Solar Power developers get a fixed sum per unit energy generated in addition to tariff.

## Waiver on evacuation charges

Exemption from Open Access charges, Wheeling & Banking charges, UI charges etc.

## Tax Benefits

Accelerated Depreciation, Tax holidays, etc.

## Assured offtake

Solar plant is provided must-run status and exempted from the merit order dispatch.

+ Net metering !



# Competitive bidding or reverse auctions: a powerful tool

- The least cost option



\$30-45<sub>/MWh</sub> PV (India, Mexico, UAE, Argentina)

\$35-50<sub>/MWh</sub> onshore wind (India, Morocco, Egypt, Turkey, Chili)

## Denmark's wind-solar auction ends with average price of €0.031/kWh, and almost 40% of capacity assigned to solar

Although wind power had the largest share with 165 MW of capacity, solar was able to secure the same number of projects and a total capacity of 104 MW. The Danish Energy Agency had received 17 bids, including 280 MW of solar projects.

DECEMBER 3, 2018 **EMILIANO BELLINI**

MARKETS

POLICY

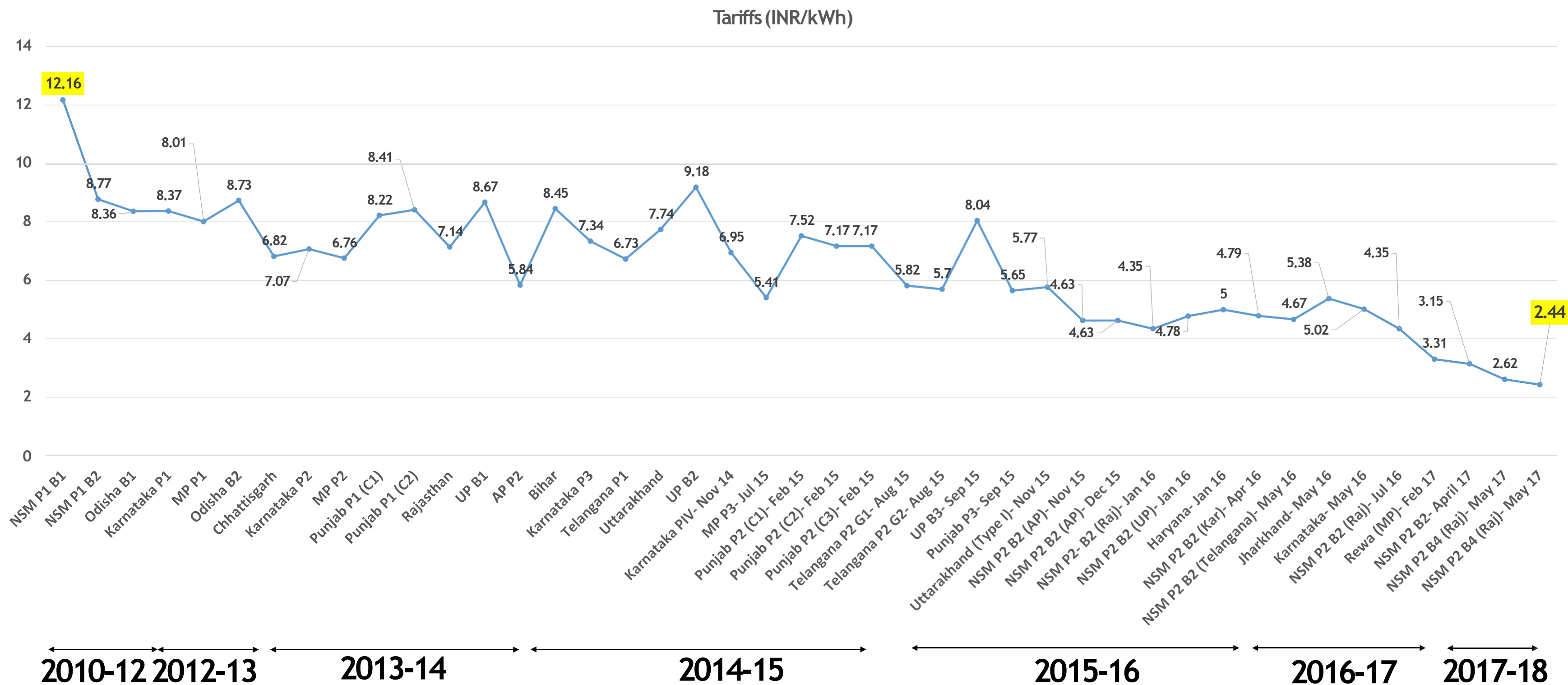
UTILITY-SCALE PV

DENMARK





# Evolution of Solar Tariff: Indian Example



**INR 12.16 = US\$ 0.174**  
**INR 2.44 = US\$ 0.035**  
**1 US\$ = INR 69.67**



# Competitive bidding, or reverse auctions : a powerful tool

- The least cost option
- With **specific criteria**, to drive the process according to priorities and policies :

Criteria	Objectives	Examples
High efficiency modules	Support innovation and industry	Top-runner programme in China
PV+ Wind, PV+ storage, specific applications : Buildings, carports, etc.	Response to needs and priorities, support innovation	Denmark, Germany, France
Use of hazardous substances	Environmental, health	
CO2 content	Climate	France
Aesthetics	Architecture	France
Use of specific lands (damaged)	Territorial planning	France
Citizen participation into the investment	Social acceptance	France



# Policy Example: Indian National Solar Mission



- ❑ Selection of projects through Competitive Bidding
- ❑ Solar Park scheme by Government of India
- ❑ Promotion of off-take of solar power
  - *8% of electricity consumption excluding hydro power, mandated from solar energy by March 2022. (Solar RPO)*
  - *Renewable Generation Obligation (RGO): New coal/lignite based thermal plants after specified date to also establish/ procure/ purchase renewable capacity*
- ❑ Policy on the concept of **“Polluter should pay”**; levied cess on each tonne of coal purchased by generating companies to create **National Clean Energy Fund**.
- ❑ Regulatory Provisions
  - *Exemption from the requirement of environmental clearance*
  - *Must-run status in merit order dispatch of power*
  - *Exemption for wheeling charges on Central Transmission Utility*
- ❑ Payment security mechanism
- ❑ Development of Standard Bidding Guidelines



# Solar Parks: Concept and Approach



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- ❑ Solar Parks aim to achieve solar targets through
  - providing well characterized and properly infra-structured land provided with transmission and evacuation facilities, and
  - thereby ***minimizing the risk as well as the permitting process.***
- ❑ SOLAR PARKS are established jointly by Central and State governments.
- ❑ Land area by the State Governments and support to setting up infrastructure by the Central Government (***up to 30% of the project cost subject to INR 20 lakhs/MW.***)
- ❑ Solar Park may hold several solar power plants each developed by separate or the same groups/promoters.
- ❑ Filling up of Parks through solar projects under Government's schemes; generated power could be procured by any of the States. Host State to buy at least 20% of the capacity of solar park.



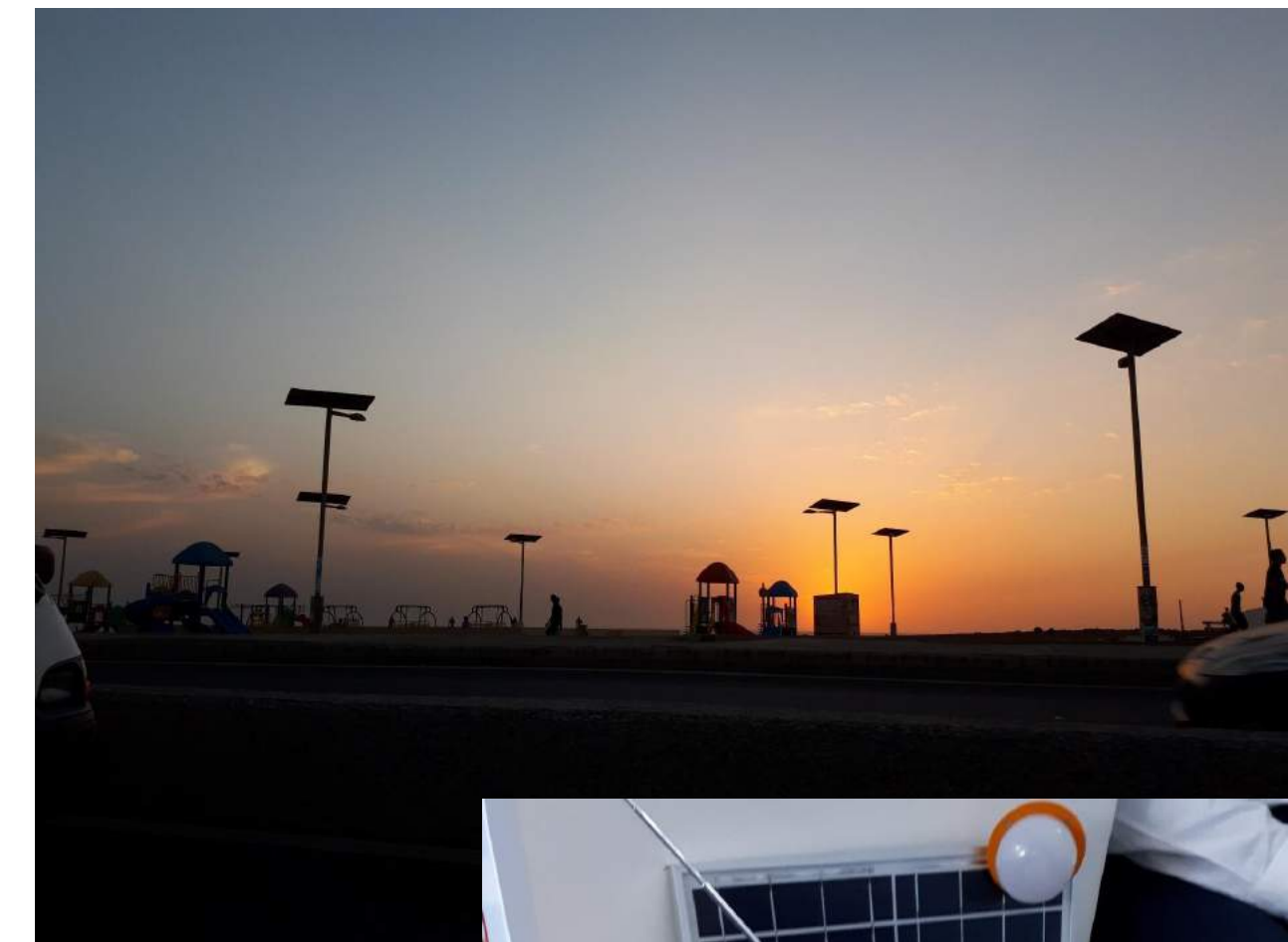
# Energy access : specific business models



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Upfront investment or third-party financing and then « Pay as you go » or « Pay as you grow » services :

- Lighting,
- Phone charging
- Cooling,
- Watering,
- Etc.







## Third take-aways

1. A large variety of policy options :

- On-grid applications : No standard recipe. Visibility is a must to reassure investors, flexibility also to follow the roll-out
- Off-grid applications : public / private initiatives to align

2. Whatever the selected option, guidelines are a must. The devil is into the details

3. The beginning of :

- institutional and legal reforms
- major geopolitical changes





## 4. Enabling activities

Capacity building  
Project management  
Quality assurance  
Technology transfer  
Socio-economic impacts



# Capacity building

Of all stakeholders, in a coherent manner, in order to increase :

- The number of programmes and projects,
- The local content,
- The overall quality, therefore the end-user satisfaction







# Capacity building

The ISA' STAR C programme is designed to address all of these activities

Bundling these activities on a regional level could speed up the learning process :

- Exchange of practices
- Reuse of existing training material

## Strengthening local infrastructures

Training (face to face & e-learning)	Benchmarkin g, testing	Customisatio n, innovation
--	---------------------------	----------------------------------



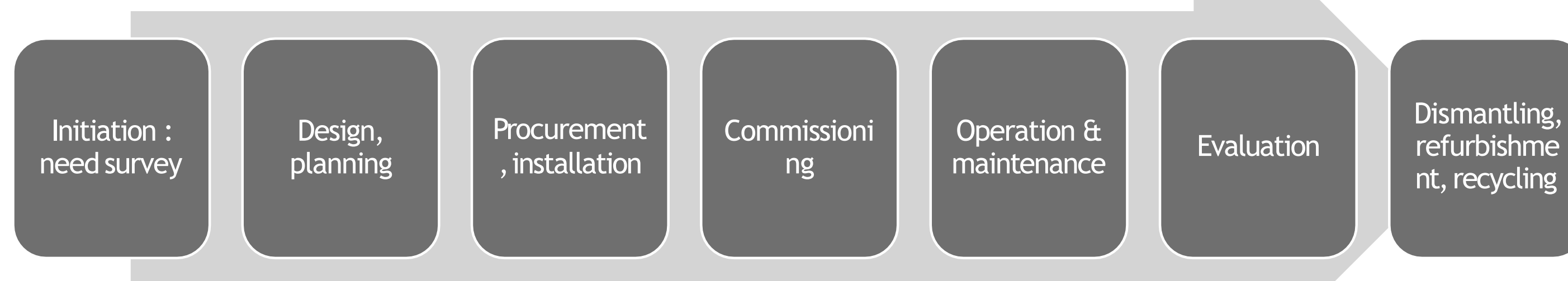


# Project management

Long-term objectives at the country level are necessary :

- To help in the alignment of all stakeholders within implementation programmes
- To make each project implementation easier

The project management should cover all the steps from the need survey to the long-term operation of the various systems, including recycleability and sustainability aspects



The goal of the procurement phase may be to require :

- The provision of equipment and systems,
- A service-oriented approach over a long period to ensure customer satisfaction

Guidelines,  
Standardized  
tendering  
documents

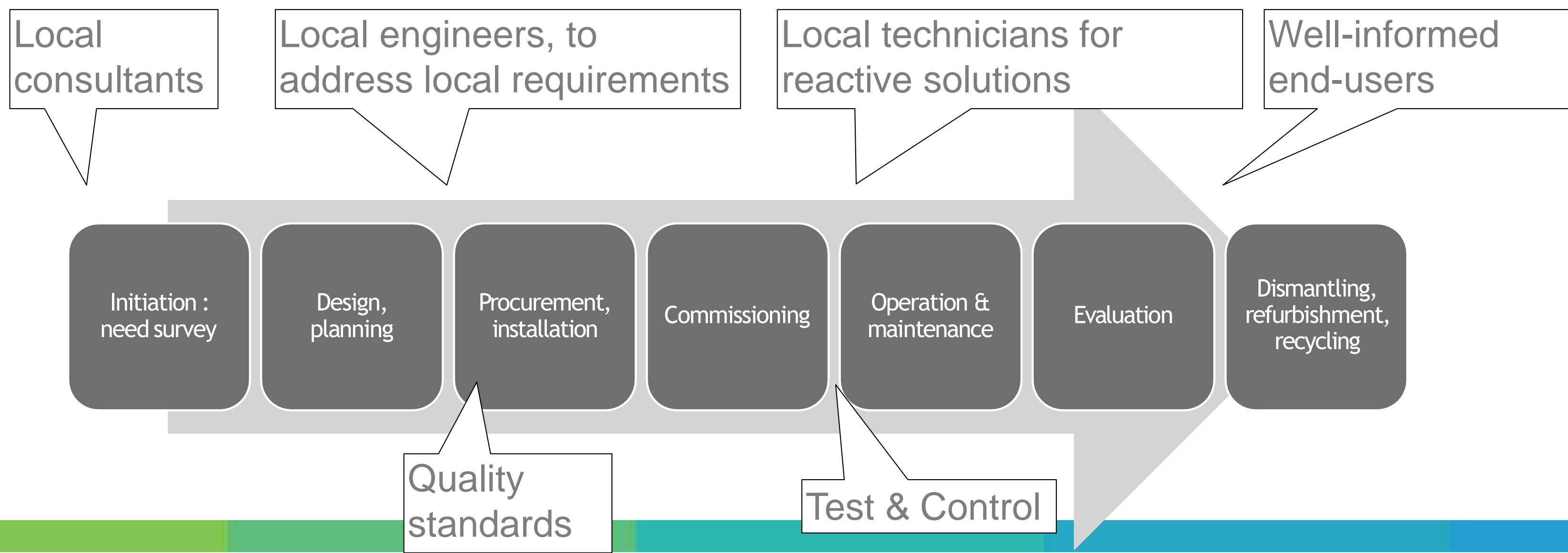




# Quality assurance

Quality is of utmost importance in order to avoid user dissatisfaction, poor image and increased overall costs (Buy « cheap stuff », buy twice).

It should be ensured at all stages of project implementation, with skilled project managers, acting with well-trained stakeholders :





# Technology transfer, local content

Tax policy has to be coherent.

Specific criteria and compliance to some standards in calls for tenders may help to address specific issues :

- Need high efficiency modules
- Non use of toxic materials, minimisation of the CO2 content, recycling, etc.
- Durability under specific climate conditions

Local content requirements may also be added :

- Training / employment of workforce for local assembly, installation, operation & maintenance, repair, etc.
- Use of local materials (foundations, supporting structures, wiring, etc.)



# Socio-economic impacts, in general

1. For all end-users, reduction of the electricity cost, for an improved purchase power
2. At the country level :
  - Reduction of the balance of payment deficit, when fossil fuels are imported
  - Job creation :
    - Cell and module manufacturing (when available)
    - Related to local content activities : supporting structures, wiring, module customisation, etc.
    - Installation and maintenance
  - On the long-term, access to the cheapest power supply to energy-intensive industries





# Socio-economic impacts: energy access

Changing lives by bringing light, water, telecommunications, and productive uses

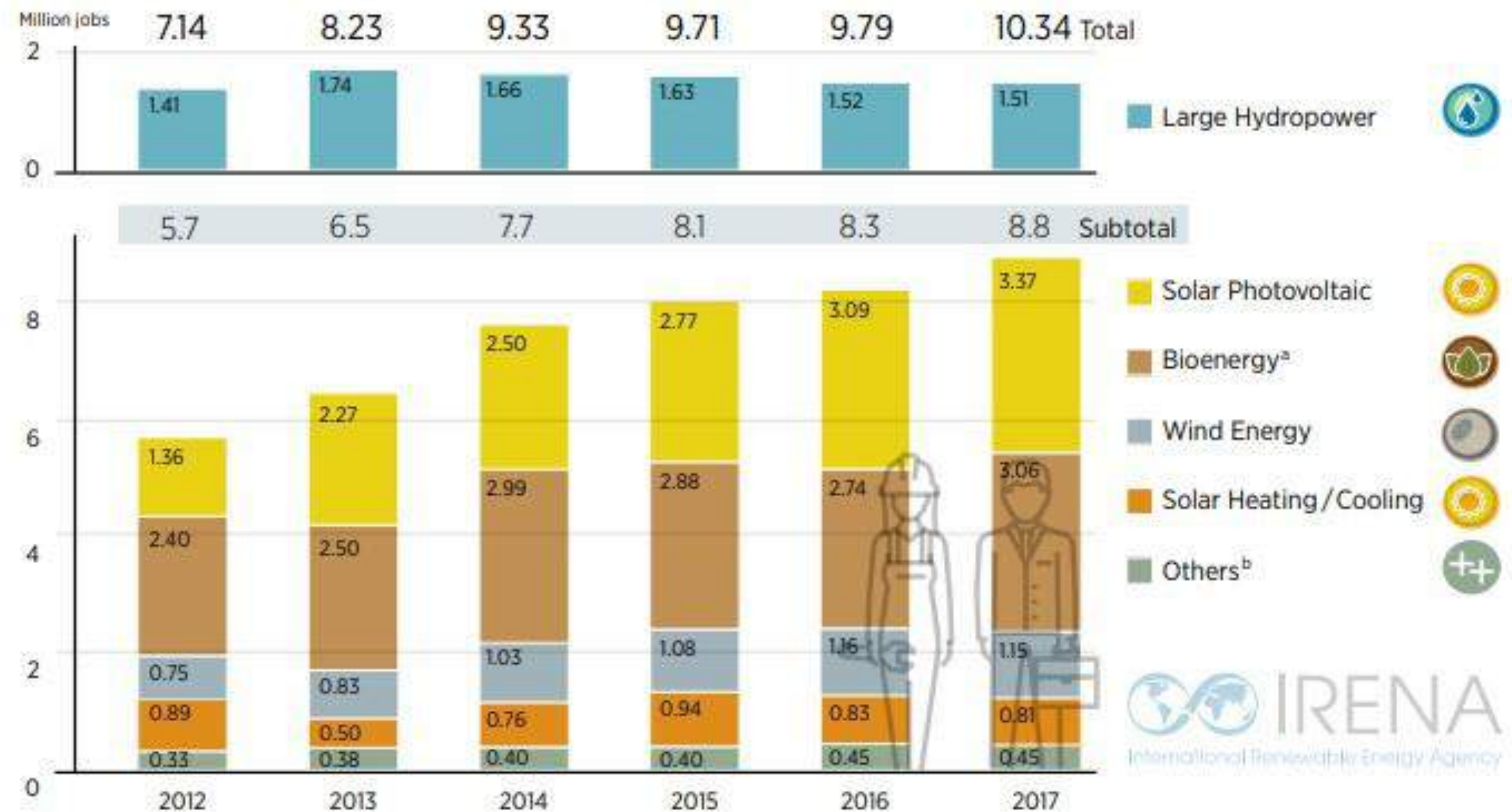
Therefore reducing rural-urban migration and negative impacts of growing slum areas



# Job development

▶ The Solar PV industry sector is currently the largest employer among renewables, especially in China and India.

- ▶ almost 3.4 million jobs
- ▶ up 9% from 2016 to 2017



Source: IRENA jobs database.

Note: The numbers shown in this Figure reflect those reported in past editions of the Annual Review.

<sup>a</sup> Includes liquid biofuels, solid biomass and biogas

<sup>b</sup> Other technologies include geothermal energy, hydropower (small), concentrated solar power (CSP), heat pumps (ground-based), municipal and industrial waste, and ocean energy.



# Job development

Which talents, for which positions ?



Installer



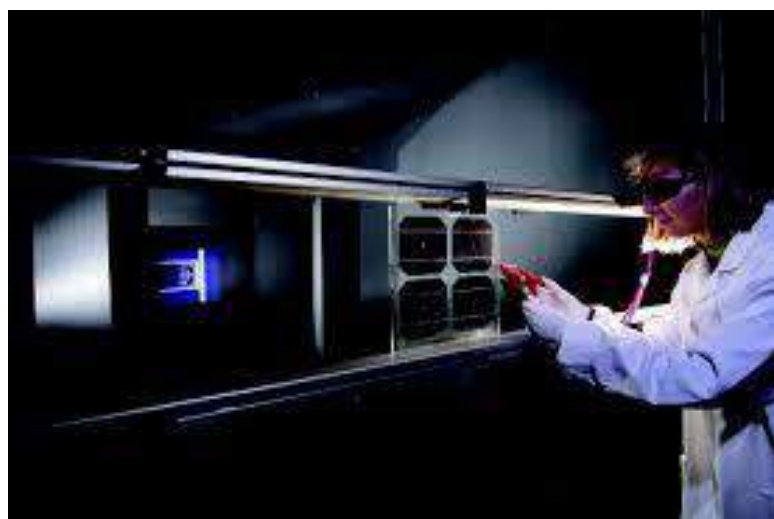
Construction



Design, sizing



O&M



Technician



Teacher / researcher



Bank, financing



Insurance



# Our fourth take-aways

A holistic approach is required

Capacity building of all stakeholders is a must to ensure :

- The optimisation of the added value to the country
- Quality of the systems and services
- Job creation

It has to be made in a gradual and coherent manner

Avoid a « stop & go » approach and aim at long-term job creation



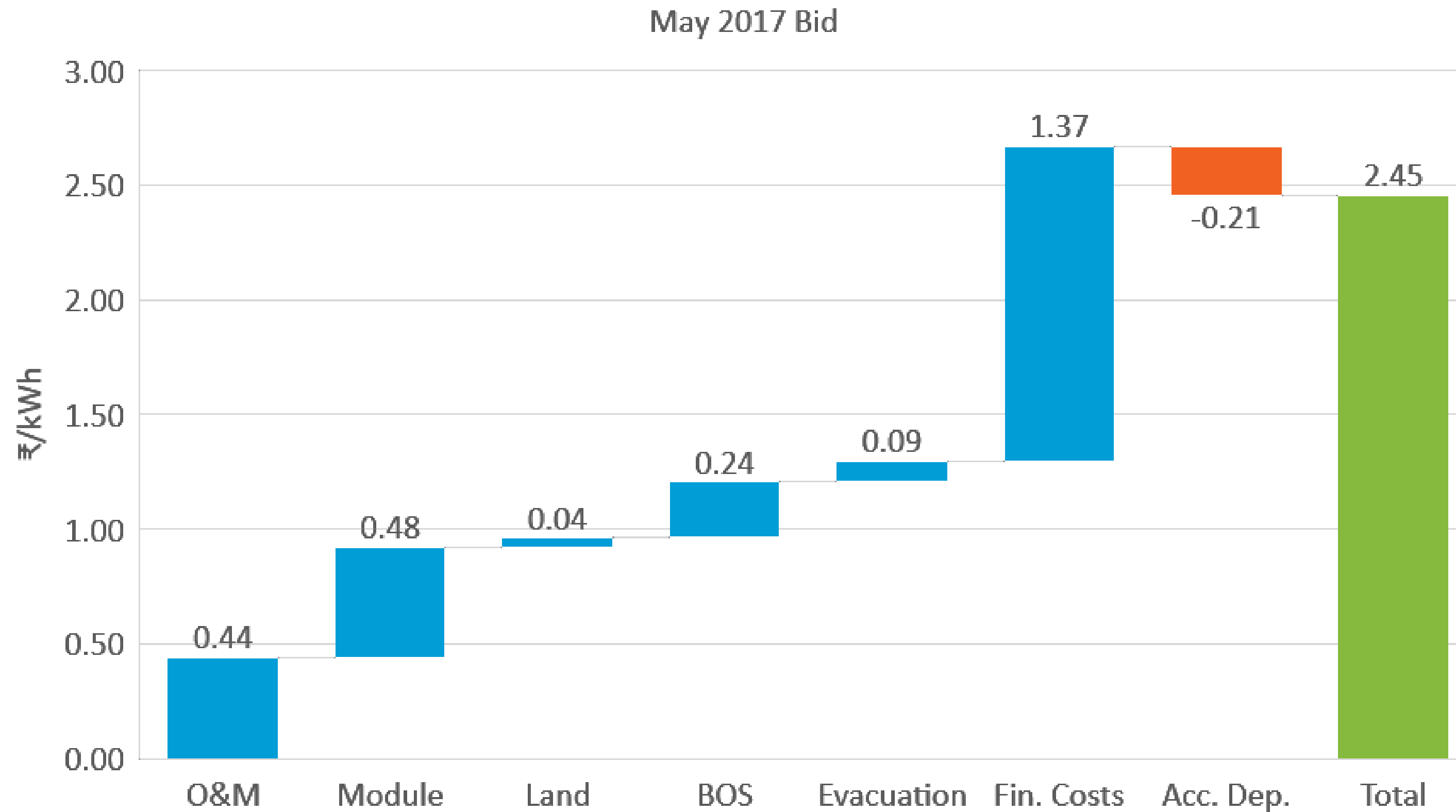


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# 5. Financing



# Anatomy of an RE tariff: risk perceptions determine costs of finance





## Risks identified by the market



- Offtake Risk (Delays or defaults in payments)
- Curtailment risk
- Foreign exchange risk
- Land acquisition and construction risk
- Policy uncertainty and change in law risk

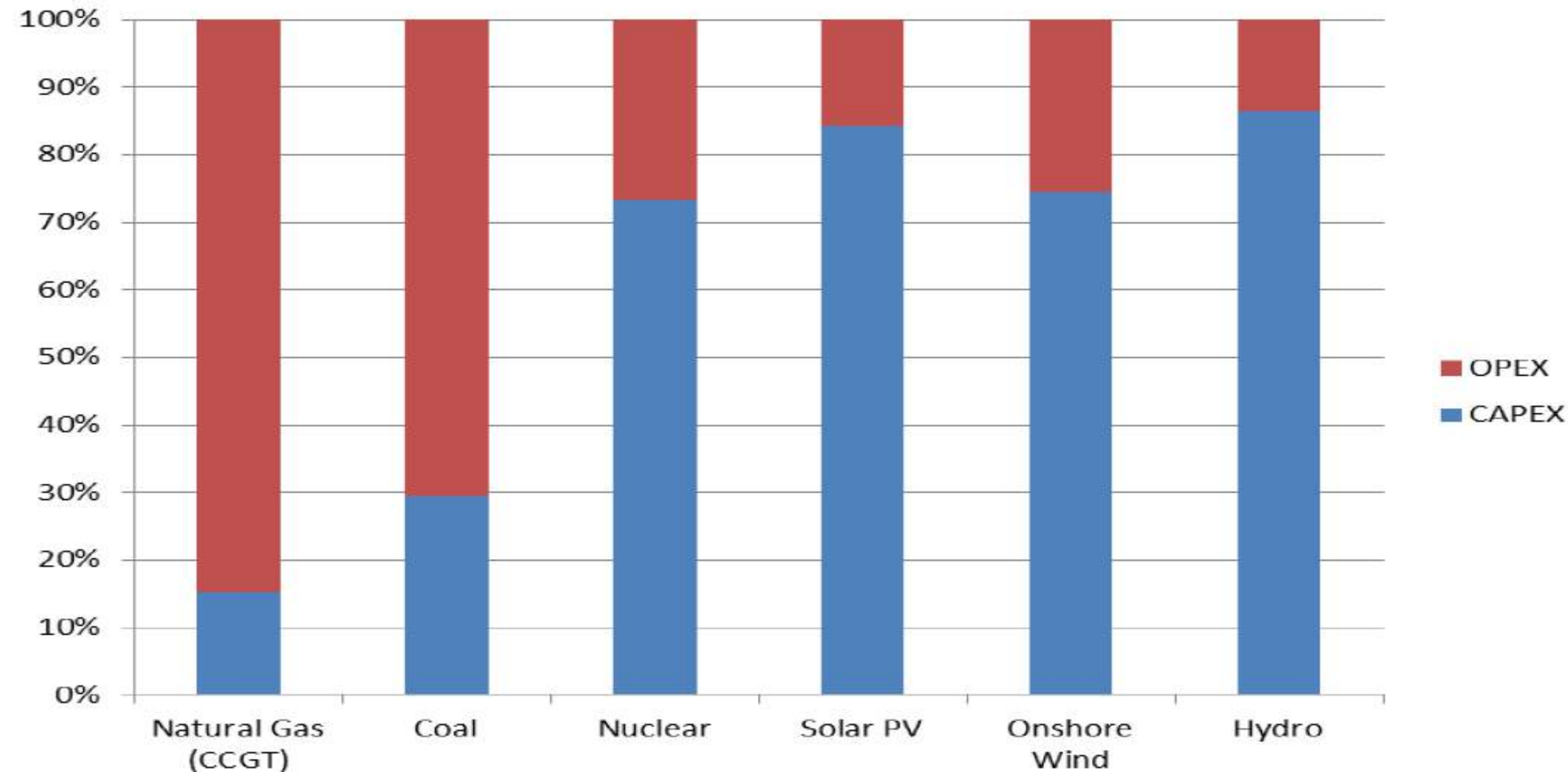


# Renewables are more capital intensive than other energy sources



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Typical shares of capital expenditures and operating expenditures in the levelled cost of generation for



- The upfront cost of solar projects is significantly higher than of thermal and gas projects, even as per unit of electricity solar is now competitive with other sources of power in most economies
- The large upfront capital requirements makes the total costs more vulnerable to risks

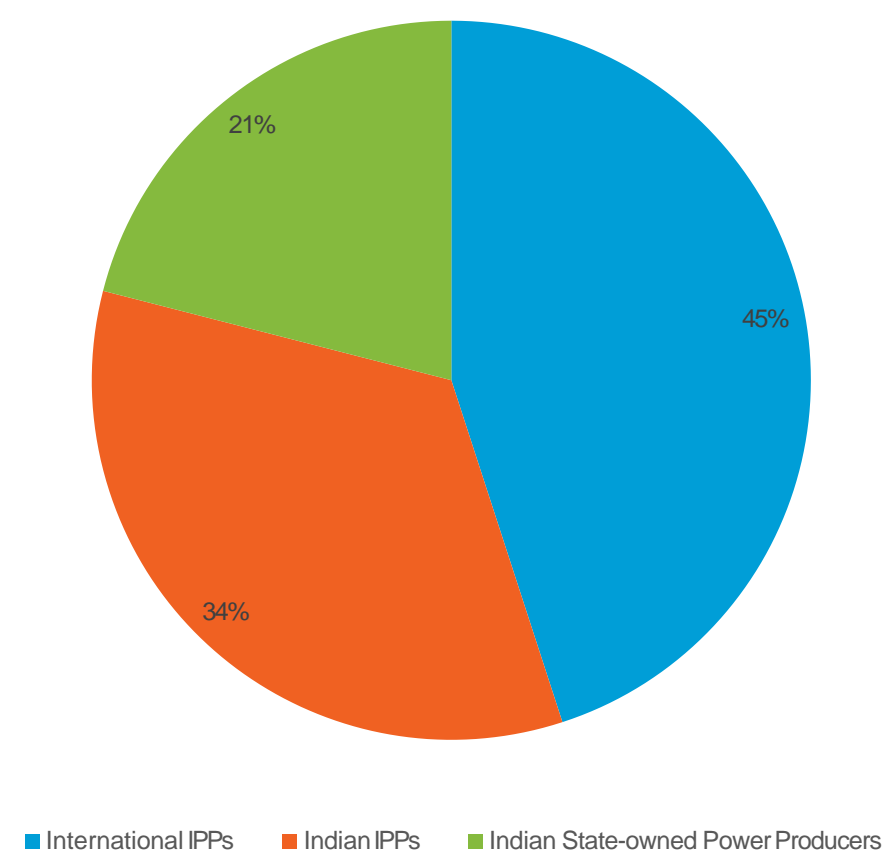


# The role of solar parks in addressing risks and attracting capital

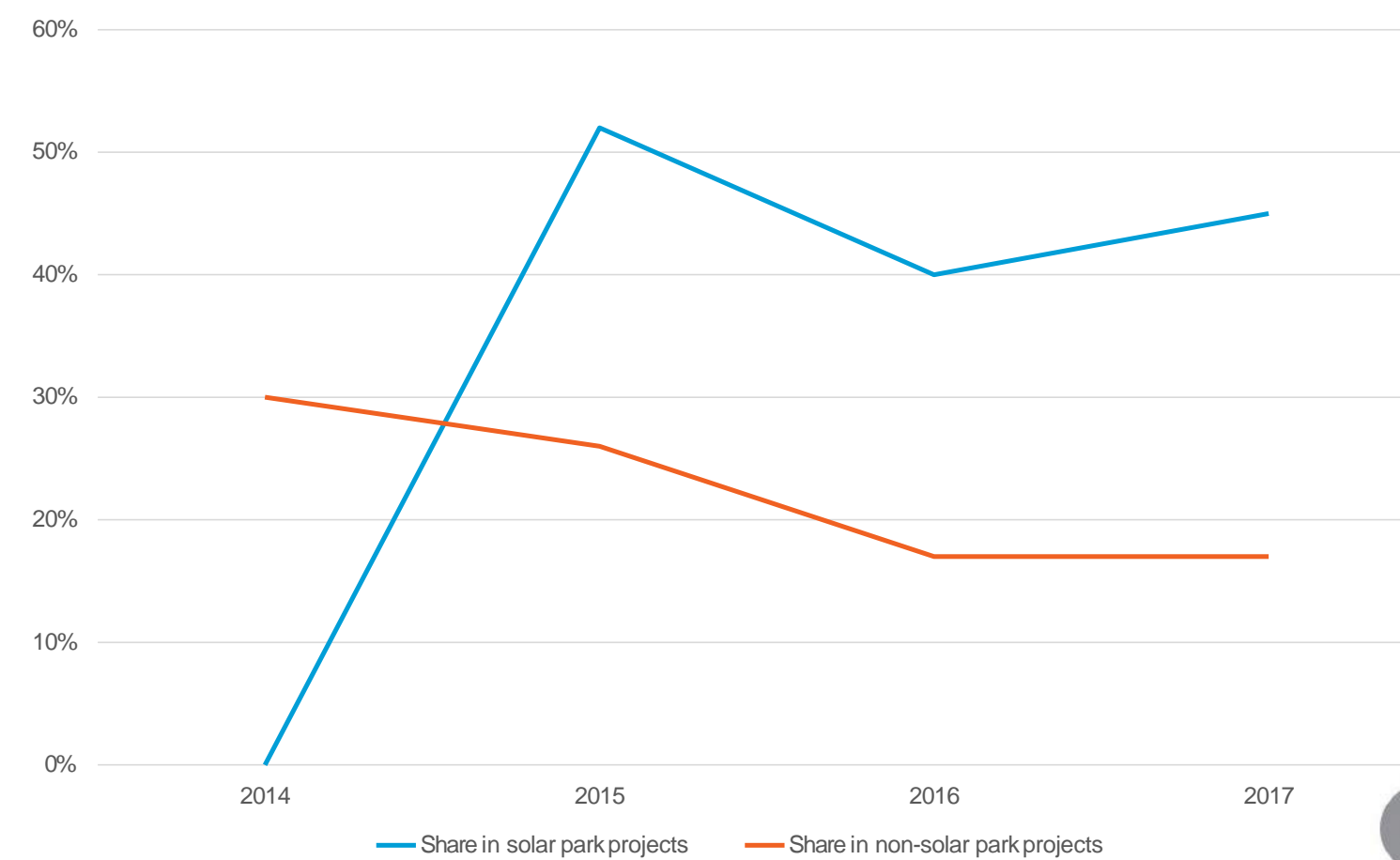


- Over half of solar PV projects sanctioned in India in 2017 were based on solar parks
- Share of solar parks in overall projects sanctioned in India rose from 38% in 2015 to 54% in 2017

Share of projects at solar parks (2014-2017)



Solar investments by international IPPs



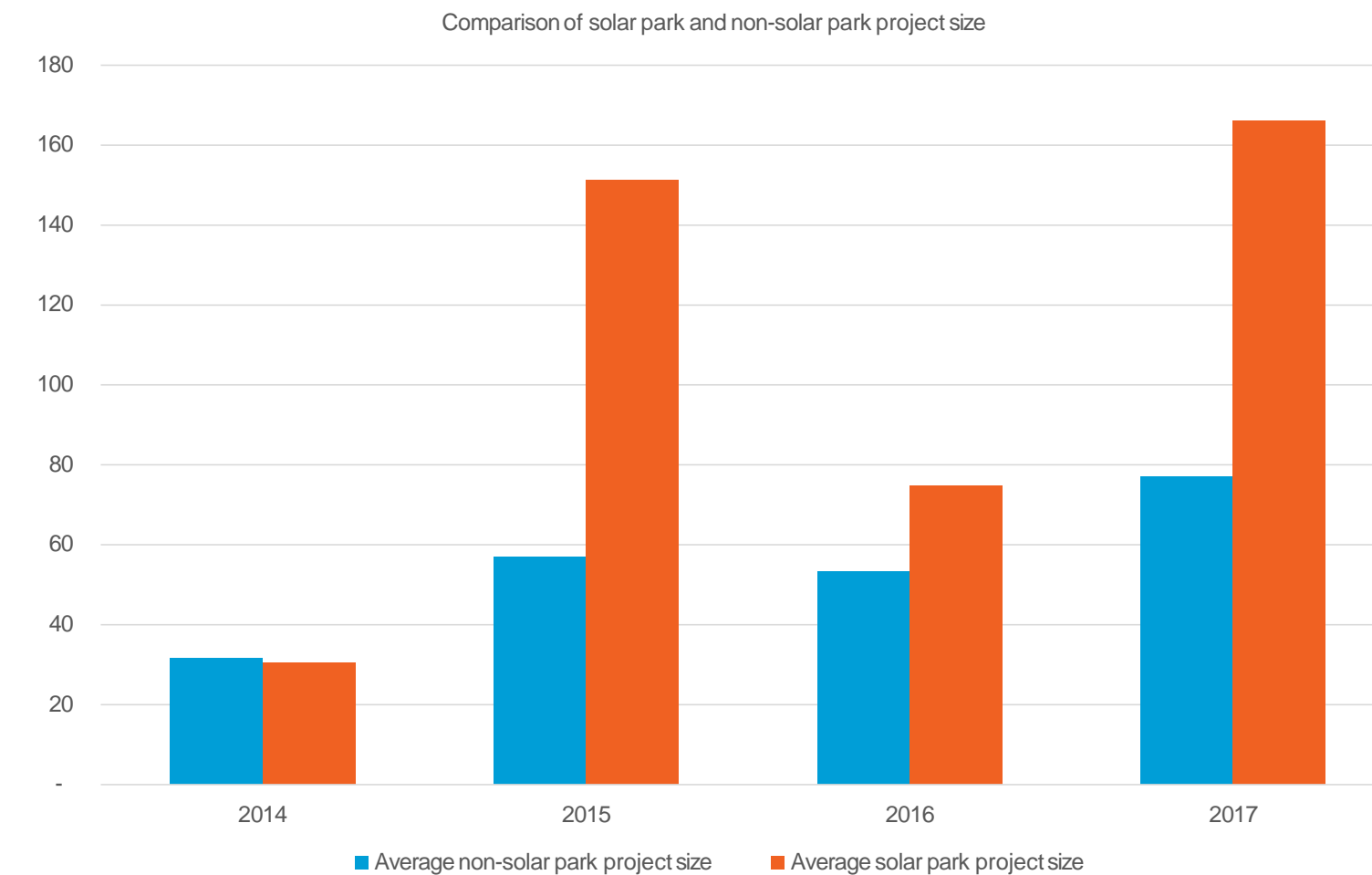
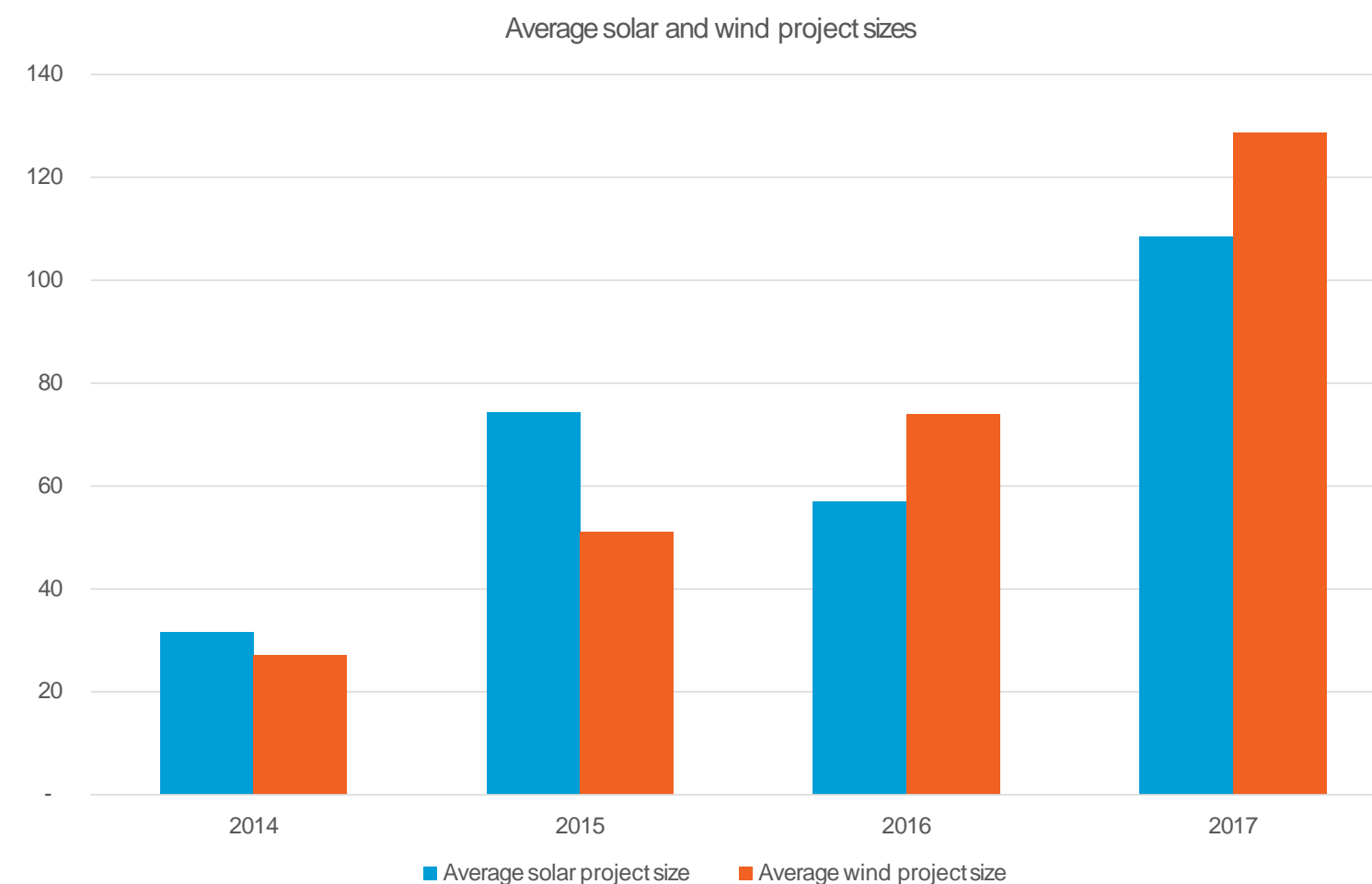


# Ambitious targets and support policies have enabled bigger project sizes



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- The tendering of larger capacities and an overall supportive policy framework has helped drive an increase in average project size for both solar and wind energy
- Challenges in acquiring contiguous land with high solar/wind potential could limit future growth in projectsizes



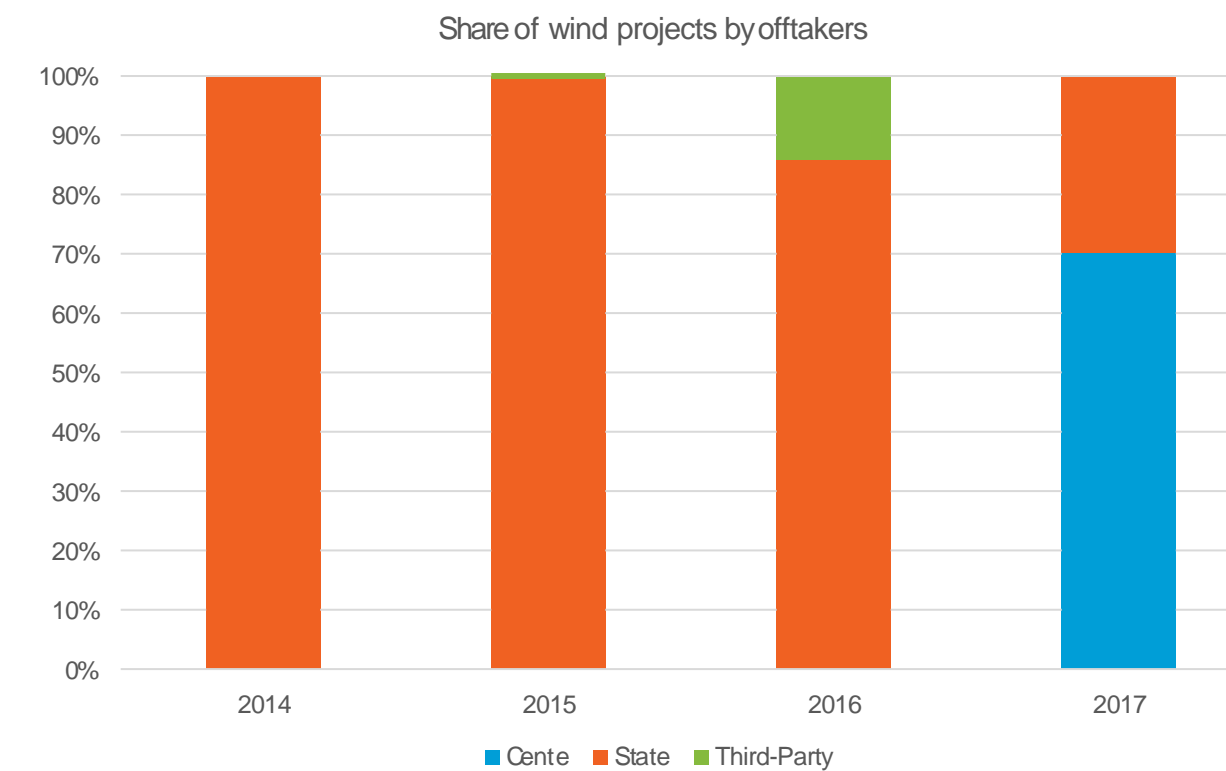
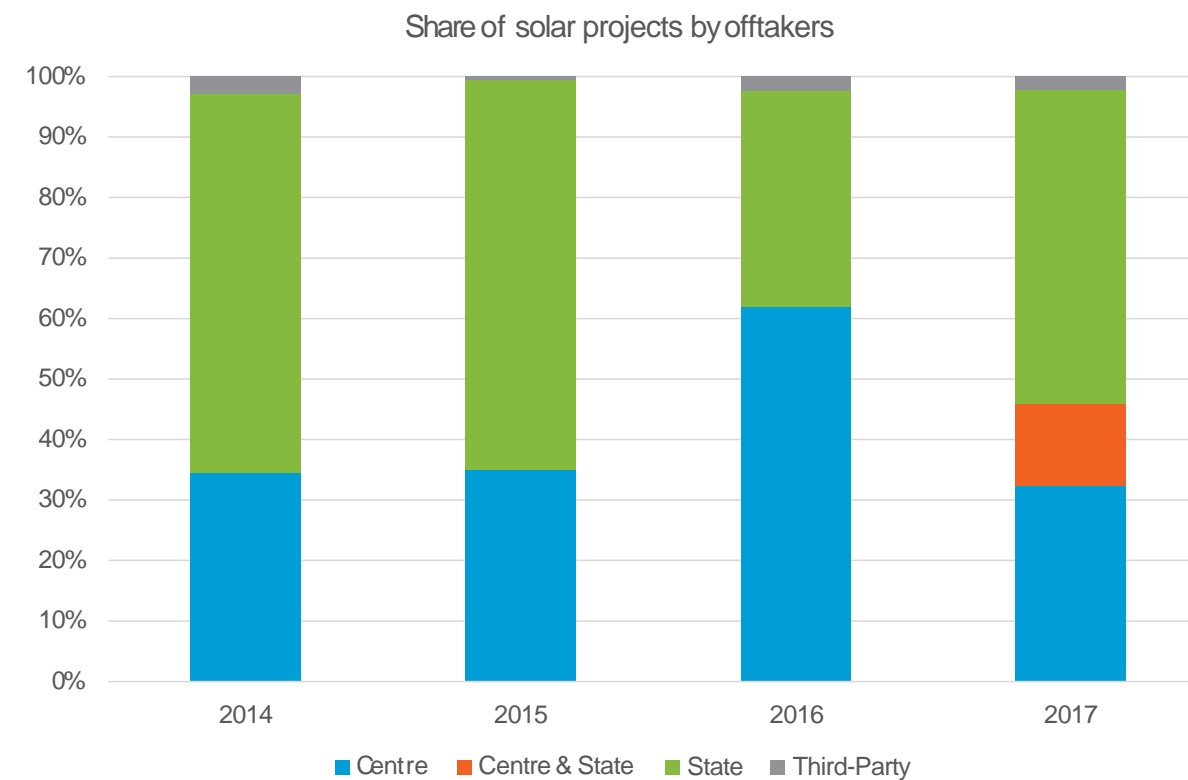


# Creditworthiness of offtakers strongly impacts investment

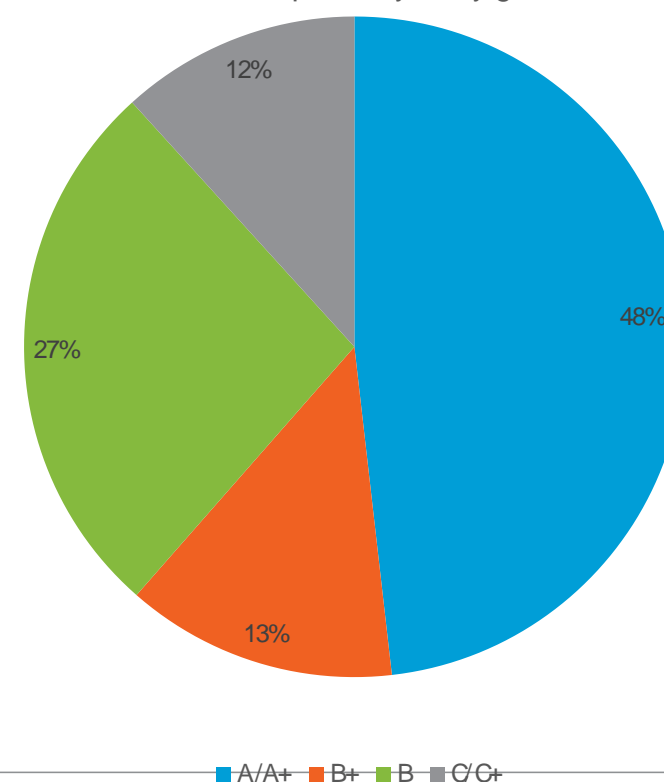


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- Preference for creditworthy central offtakers for solar and wind projects
- Creditworthy state DISCOMS account for the majority of state offtakers



Share of sanctioned projects with state distribution companies by utility grade

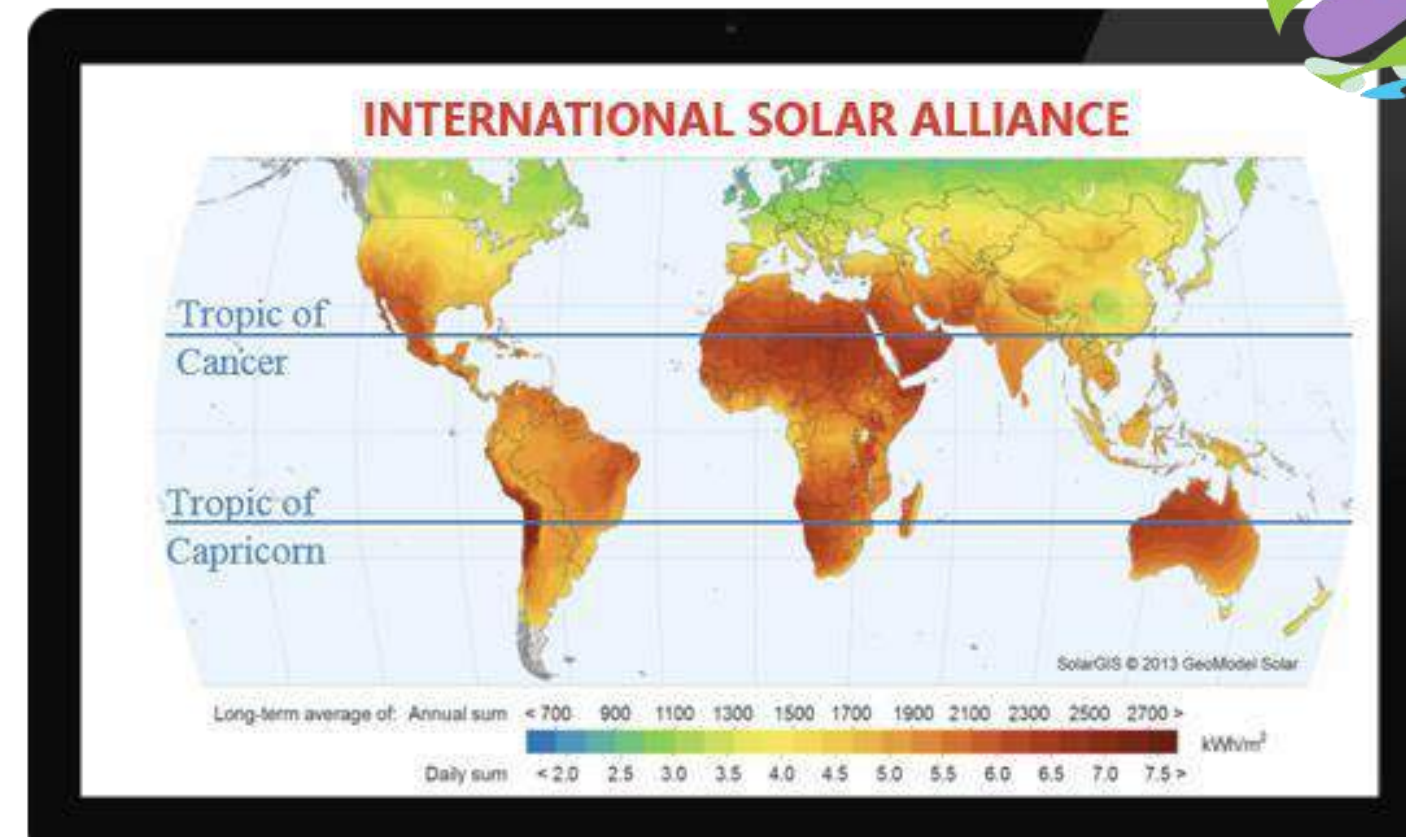




# International Solar Alliance: A new kind of energy partnership



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*Recognizing that sustainable development, universal energy access, and energy security are critical to the shared prosperity and future of our planet, and acknowledging that clean and renewable energy needs to be made affordable for all, we do hereby declare our intention to support India's proposal to launch an international solar alliance as a common platform for cooperation among solar resource rich countries lying fully or practically between the Tropics of Cancer and Capricorn.*

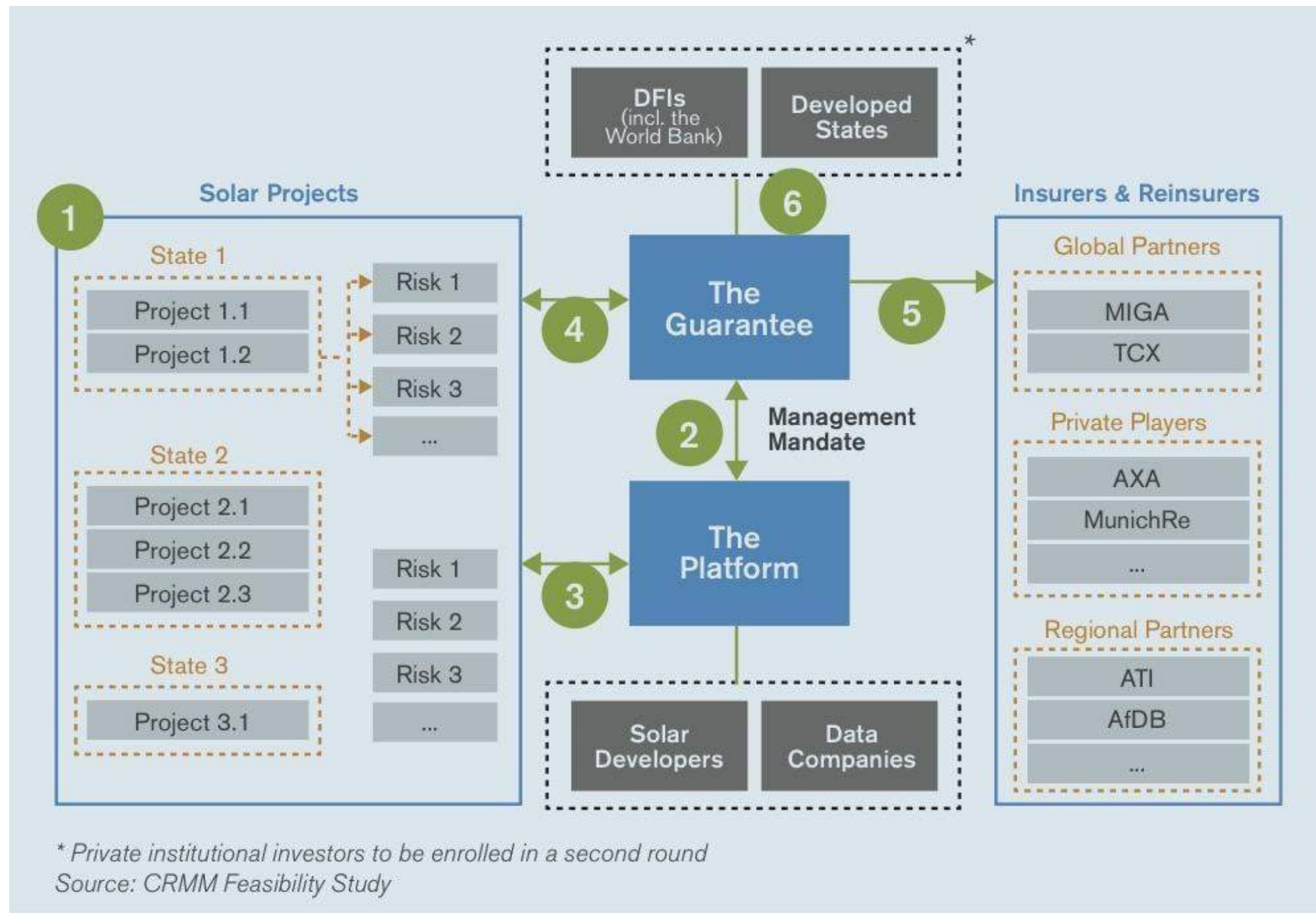
CÉEWE  
THE COUNCIL



## Common Risk Mitigation Mechanism (CRMM)

- For mitigating non-project specific risks (currency, offtaker, and political risk)

[www.opensolarcontracts.org](http://www.opensolarcontracts.org)



### Now available for review :

- Power purchase agreement
- Implementation agreement
- O&M agreement
- Supply agreement
- Installation agreement
- Finance term sheet





# Solar energy & the green economy : Conclusions

Some take-aways regarding solar energy :

1. A major technology to address climate emergency by speeding up the transition off fossil fuels
2. Four decades of gradual and impressive improvement, allowing energy access or reaching grid parity everywhere. However solar energy is only at the beginning of a peaceful revolution, in which solar energy will be key to implement a green economy in most countries
3. A very hopeful future : once we know, once we realise, then we change, then we act.

We need finance, speed, scale and therefore skills for the required large-scale implementation, and that's what ISA is dedicated to.





**KEEP  
CALM  
AND  
GO  
SOLAR**



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