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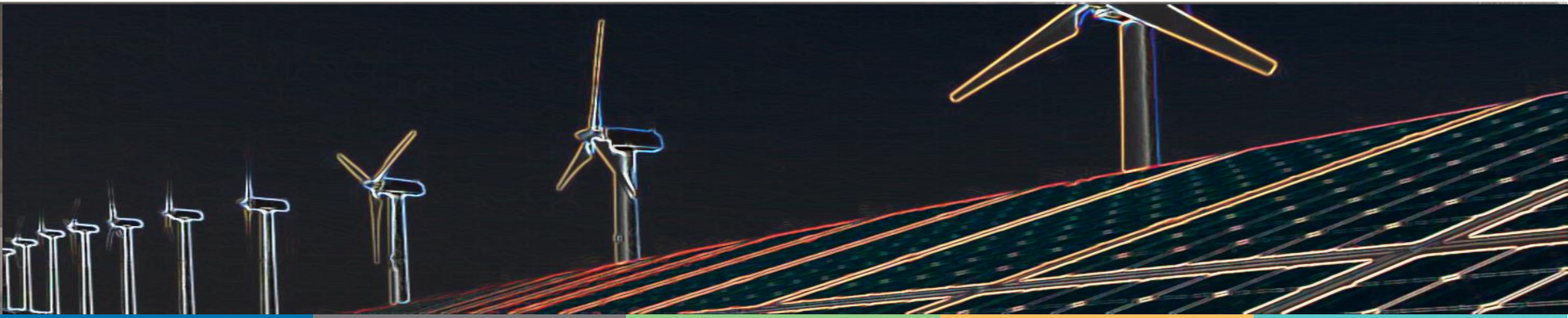
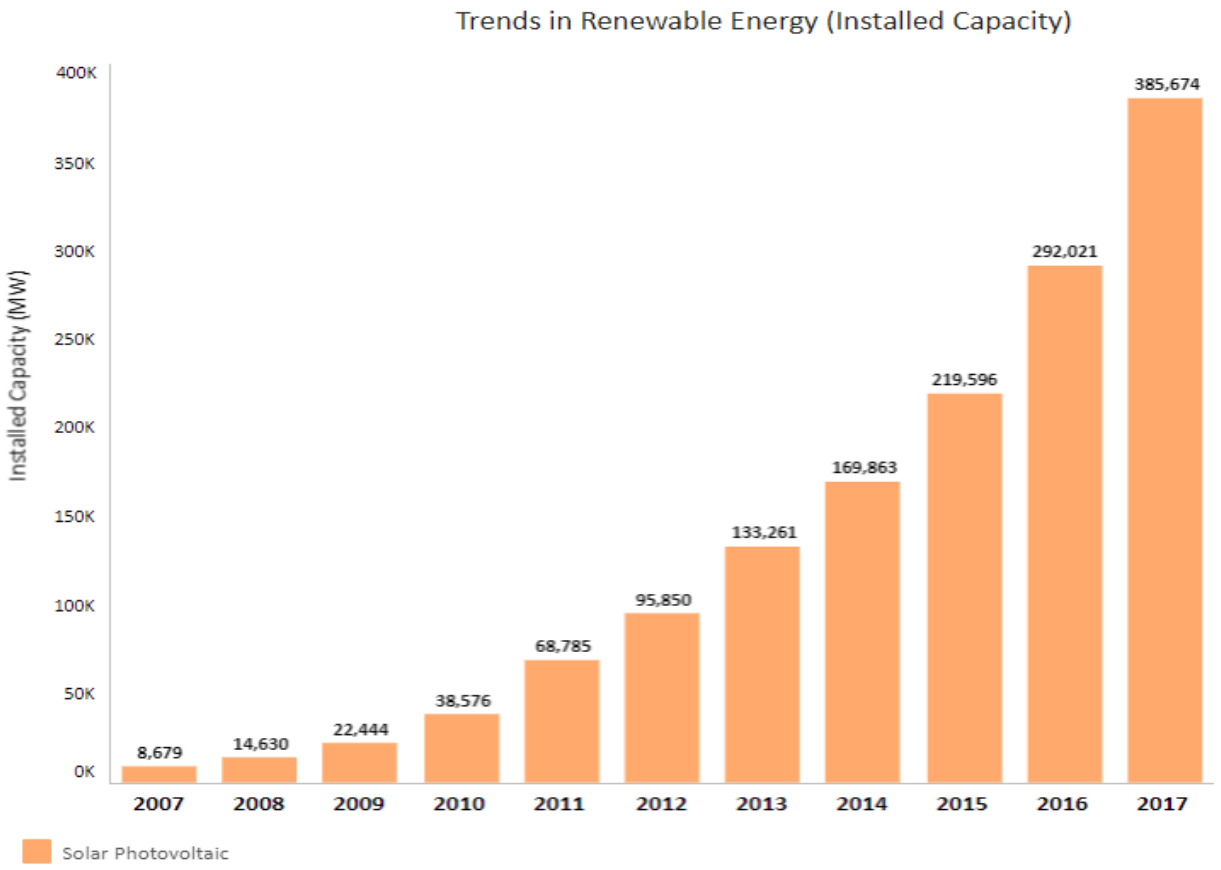


Quality Infrastructure boosting PV markets

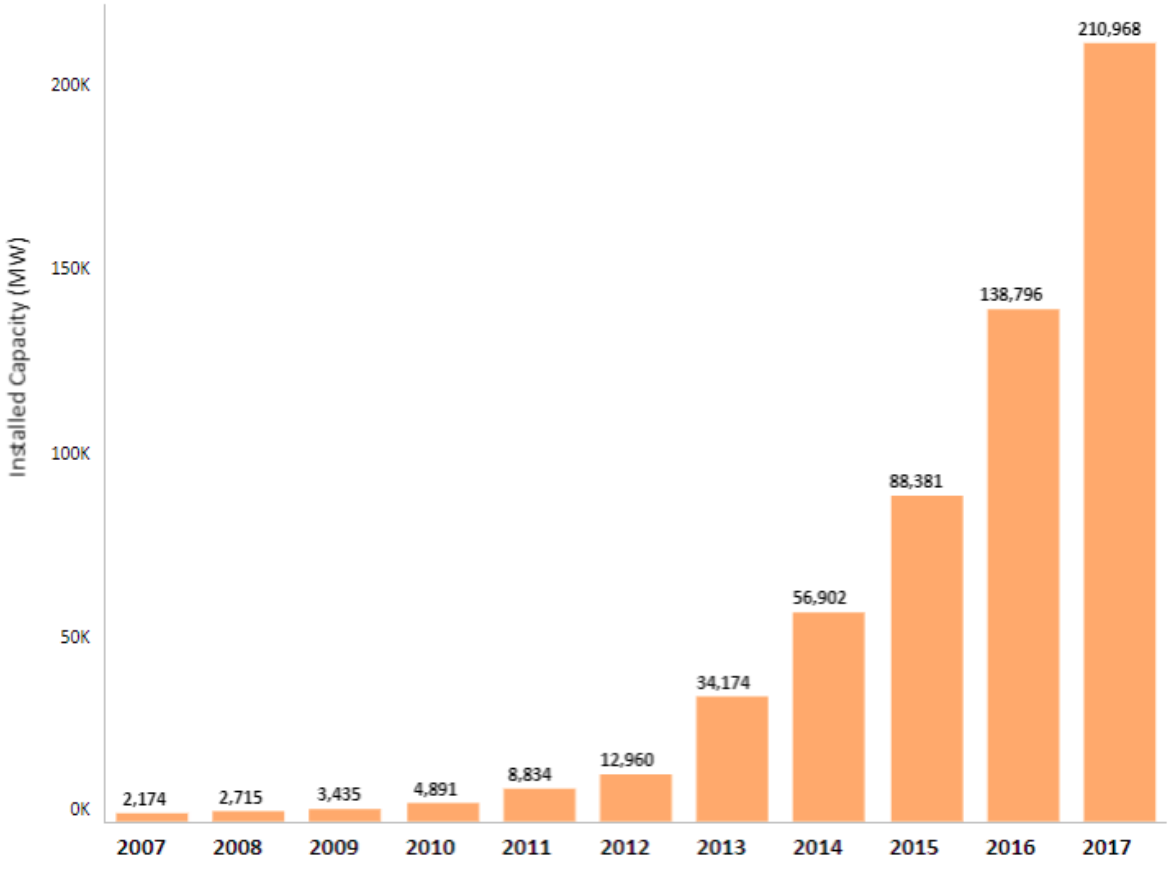
ACEF 2018
Manila, Philippines
8 June 2018

Global PV market

World

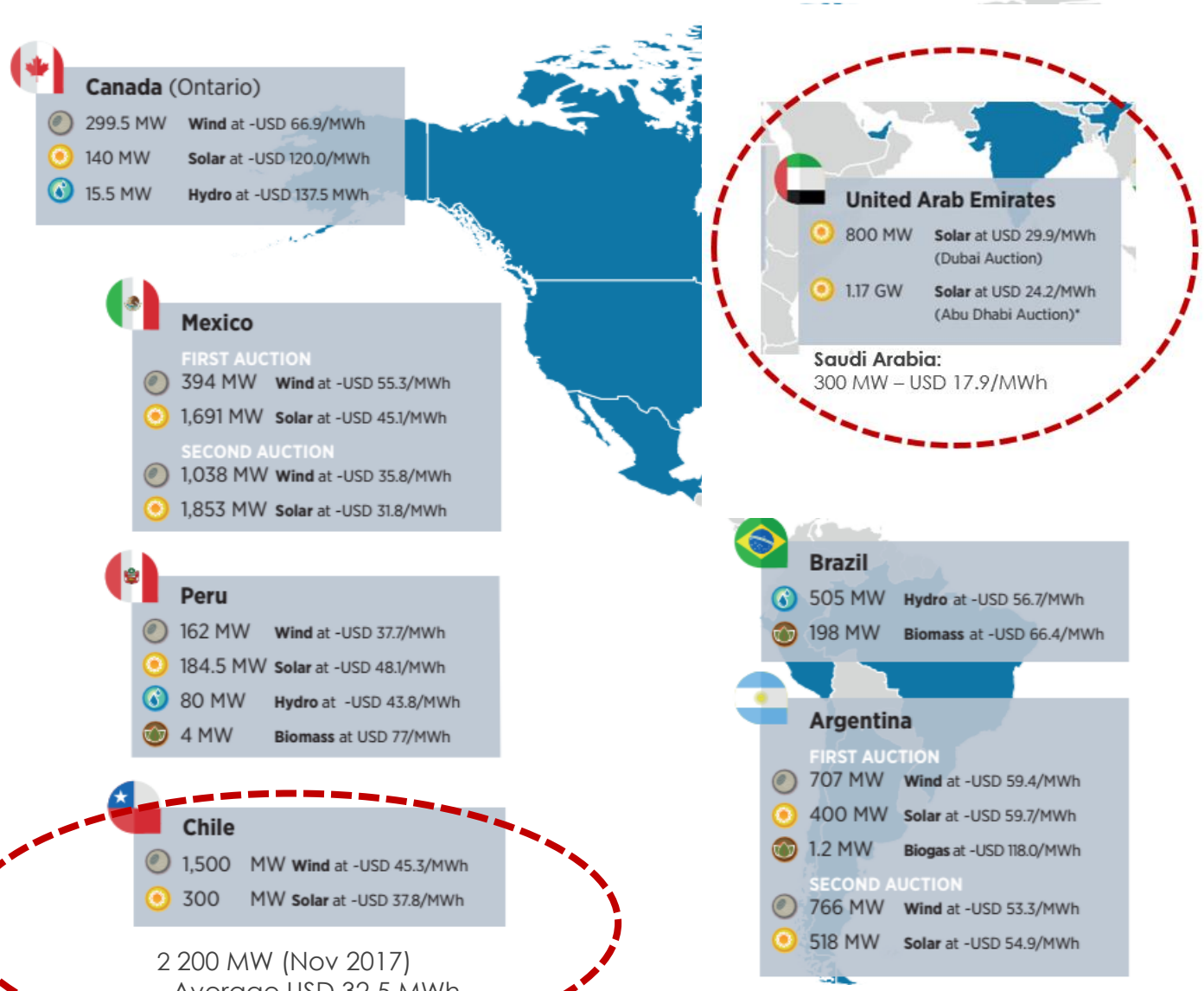


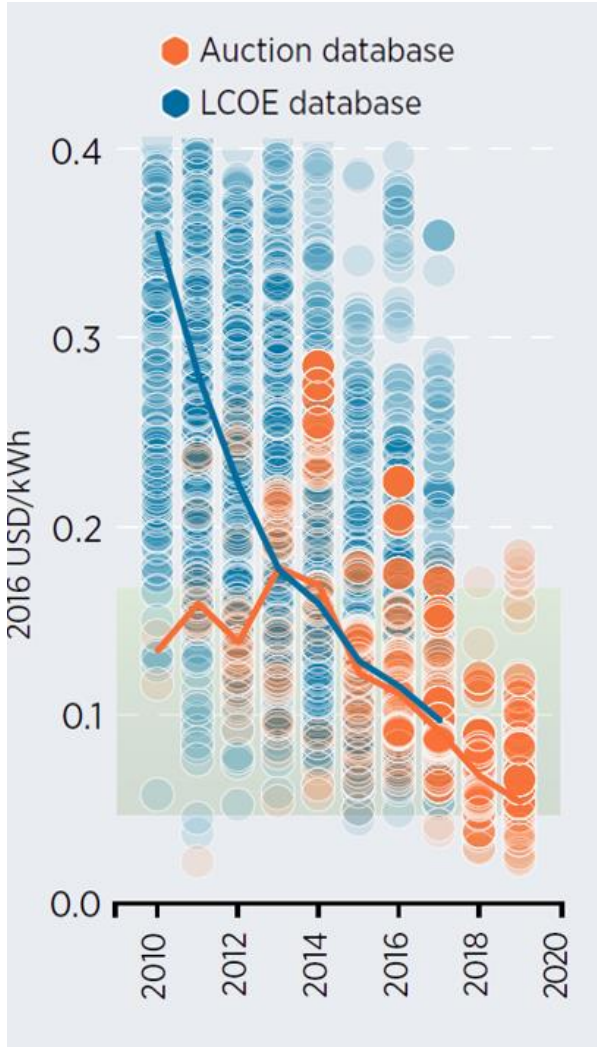
Asia



Globally: 2017: 161 billion USD 2050: ~ 7 000 GW and > 6 trillion USD

Record PV auction prices – what will be delivered?





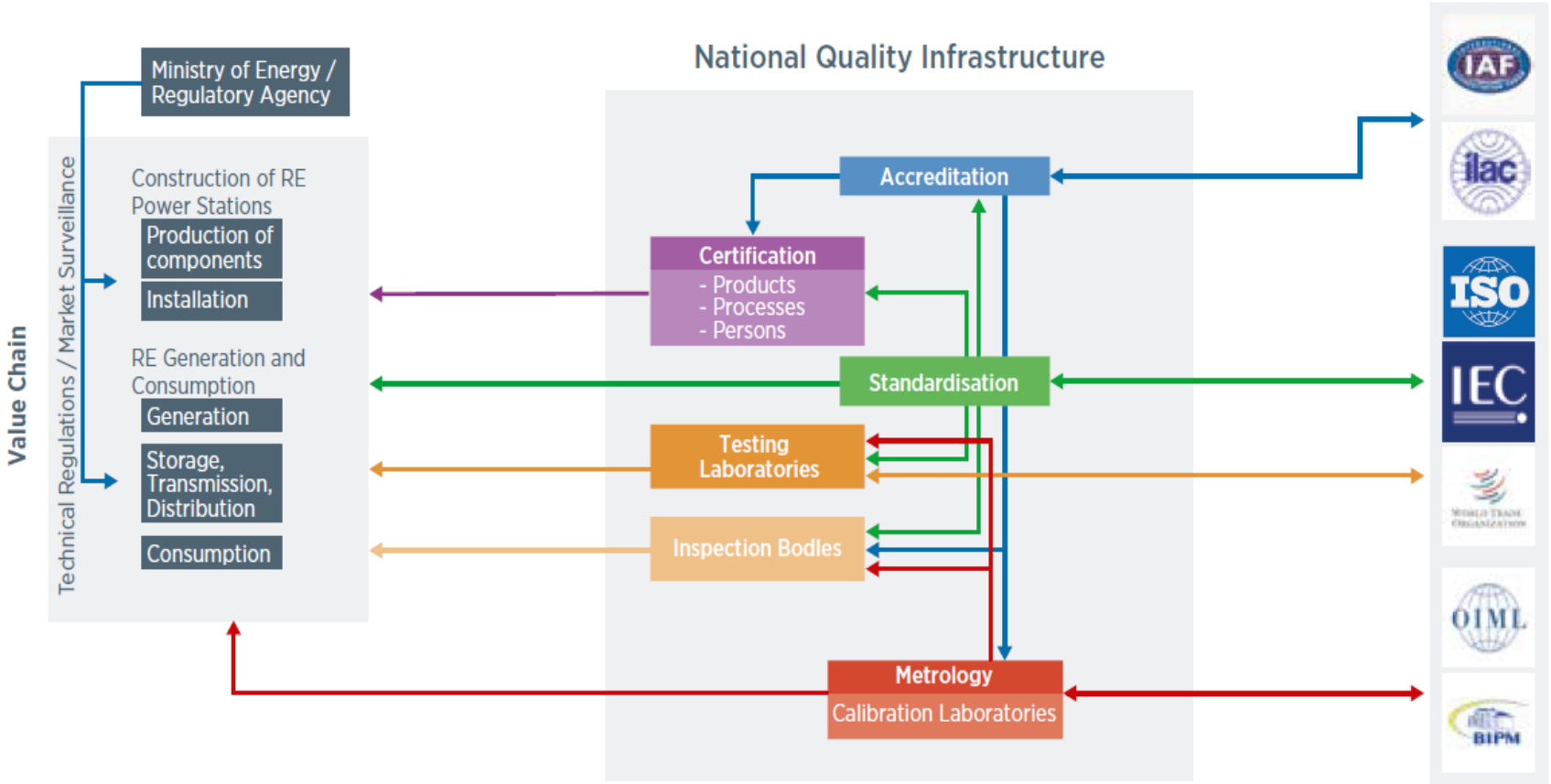
Sources:
IRENA (2018), Renewable Power Generation Costs in 2017
CNE Chile

Quality Infrastructure to mitigate technical risk

Which **instruments** do we have to mitigate technical risk, attract investment and public acceptance, and meet expectations by all stakeholders in a USD trillion market?

Lenders' perspective: revenues only important during first 10-15 years

- Risk of infant failures are passed to EPC
- Bankability assessments further minimize risks of midlife failure
  - ✓ Track record of company and modules
  - ✓ Quality of manufacturing facility
  - ✓ Warranty conditions
  - ✓ **Valid renown certifications**



Holistic View - Quality Covers the Whole System, not Hardware only

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Identify → Screen → Assess → Select → Pre-development → Development → Construct → Operate & Maintain → Decommission

Licensing Installers

USA

NABCEP™
Raising Standards. Promoting Confidence.

Australia

CLEAN ENERGY COUNCIL
SOLAR ACCREDITATION SCHEME

UK

MCS
The Certification Mark for Onsite Sustainable Energy Technologies

Netherlands

ZONNEKEUR

TÜV Rheinland

"Every other fault that we detect is due to incorrect installation."

Source: TÜV Rheinland

IRENA (2013) "International Standardisation in the Field of Renewable Energy"

Implementing a Quality Infrastructure

INCREASING QUALITY ASSURANCE

Cost/benefit ratio:
- 1:10

Source: IRENA (2017) Boosting Solar PV Markets: the role of quality infrastructure

It's not about equipment cost / it's about LCOE

Calculating the levelised cost of electricity

$$LCOE = \frac{\sum_{t=1}^{n} \frac{I_t + M_t + F_t}{(1+r)^t}}{\sum_{t=1}^{n} \frac{E_t}{(1+r)^t}}$$

Where:

LCOE = the average lifetime levelised cost of electricity generation;

It = investment expenditures in the year t;

Mt = Operations and maintenance expenditures in the year t;

Ft = fuel expenditures in the year t;

Et = electricity generation in the year t;

r = discount rate; and

n = life of the system.

Commonly a major criterion for investment

But not only relevant criteria:
- Installation and services
- System performance
- Durability

QI aims to minimise the LCOE and maximise profit

Photo-voltaic Module	Inverter	Design and Installation	Comm-issioning
IEC 61730 and IEC 61215, or IEC 61646 as applicable	IEC 62109-1, IEC 62109-2, IEC 62093 (Qualification)	IEC 62548[1] (Primary) and IEC 60364 series	IEC 62446
Perform-ance and Operations	**Grid-Code-Related**	**Off-Grid Specific**	**Utility-Scale Specific**
IEC 61724 Future IEC 62446-2 (2017)	Country specific, but grid function testing per IEC 62116, IEC 62910	IEC 62257 Series for off-grid and rural electrifica-tion	Future IEC 62738 (2016)

International standards across the project lifecycle

QI supporting policy-makers

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1

POLICY OBJECTIVES

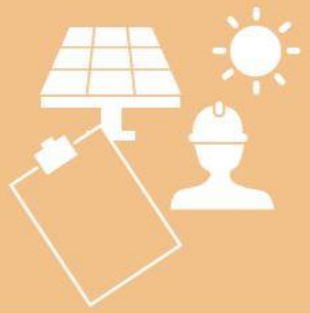
- Economic and affordable photovoltaic systems
- Support development goals
- Reliable photovoltaic systems
- PV integrated in power systems

2

HOW QUALITY INFRASTRUCTURE SUPPORTS THE POLICY OBJECTIVES

- Attracts investment through risk mitigation
- Increases public acceptance
- Encourages efficient services
- Fosters good practices
- Promotes consumer protection

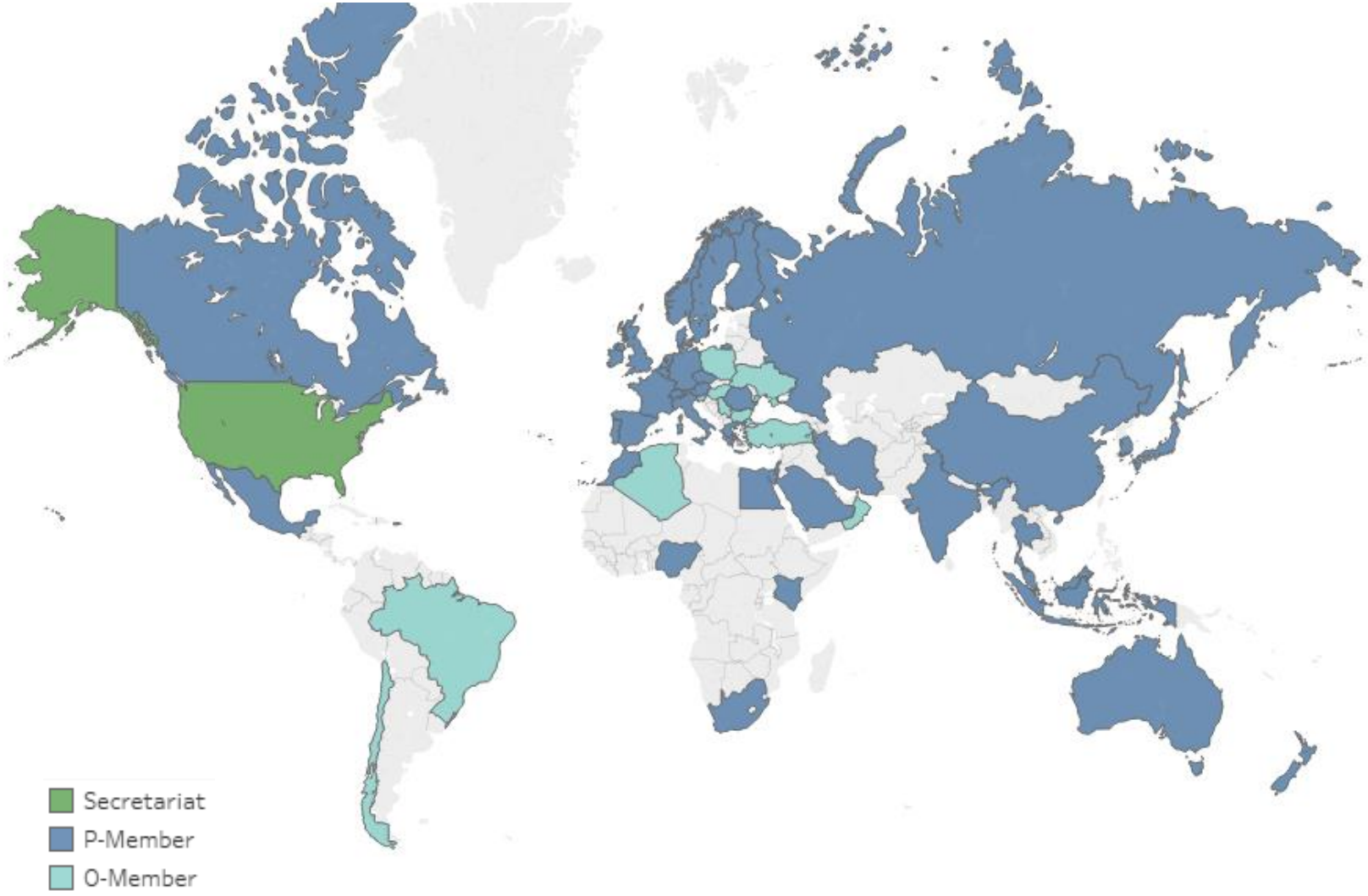
3



WHERE TO APPLY QUALITY INFRASTRUCTURE

- White papers
- Guidelines
- Regulations
- Incentives
- Industry guidebooks
- Vocational training

Europe's engagement in international standardization IEC TC82



-Limited engagement from emerging markets

-Need for engagement in relevant international platforms

- IEC / IECRE
- PVQAT
- IEA PVPS (T13, T12)
- IRENA
- Others

-Work together

- Industry (SolarPower Europe – SolarBankability, SolarUnited)
- R&D institutes
- Financial institutions
- Commercial banks
- Insurance companies
- Policy-makers and regulators
- Communities and final consumers

Source: http://inspire.irena.org/Pages/default.aspx

Take aways

- We entered into an era of low equipment cost and higher pressure on marginal profits | quality infrastructure is critical to mitigate risks and achieve the **expected LCOE**
- **Cost – benefit** ratio of assuring quality is positive
- **Quality is not about hardware only**, but a system approach is needed
- Progress on standards and conformity assessment schemes need to **accelerate the pace** to meet the existing and NEW markets needs
- Need to **engage emerging markets** and work closer with project developers and R&D bodies to adapt technology and technical requirements
- International and regional **cooperation networks** strengthen and accelerate the development and implementation of QI for PV systems. Leverage on existing initiatives
- **QI supports effectiveness of policies** for PV markets – all white papers should include the role of QI

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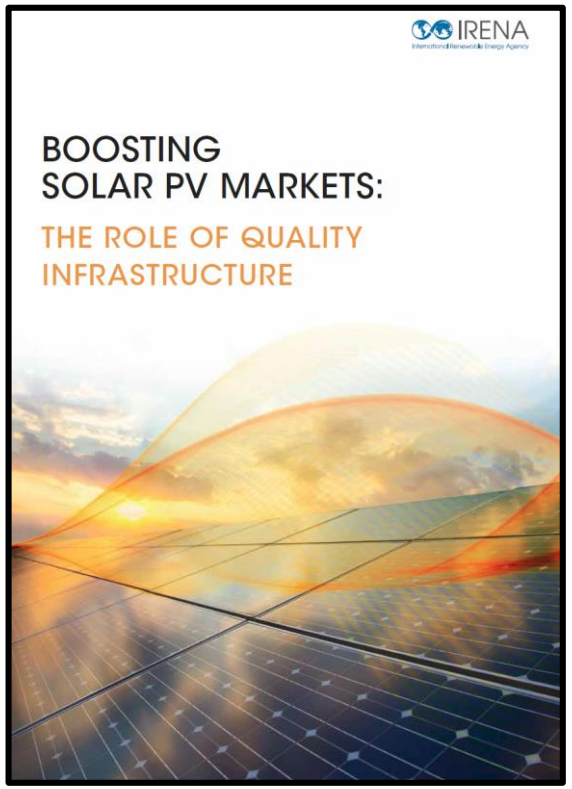
IRENA INSPIRE

http://Inspire.irena.org



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Thank you

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