

IRENA Activities on Energy Sector Transformation



IRENA IITC
Visit from Indonesian Delegation
Bonn, Germany. 4 October 2019

Analysis on Cost and Performance of Renewable Energy Technologies

Costs continuing to fall for RE, solar & wind power in particular



In most parts of world RE a competitive source of new electricity

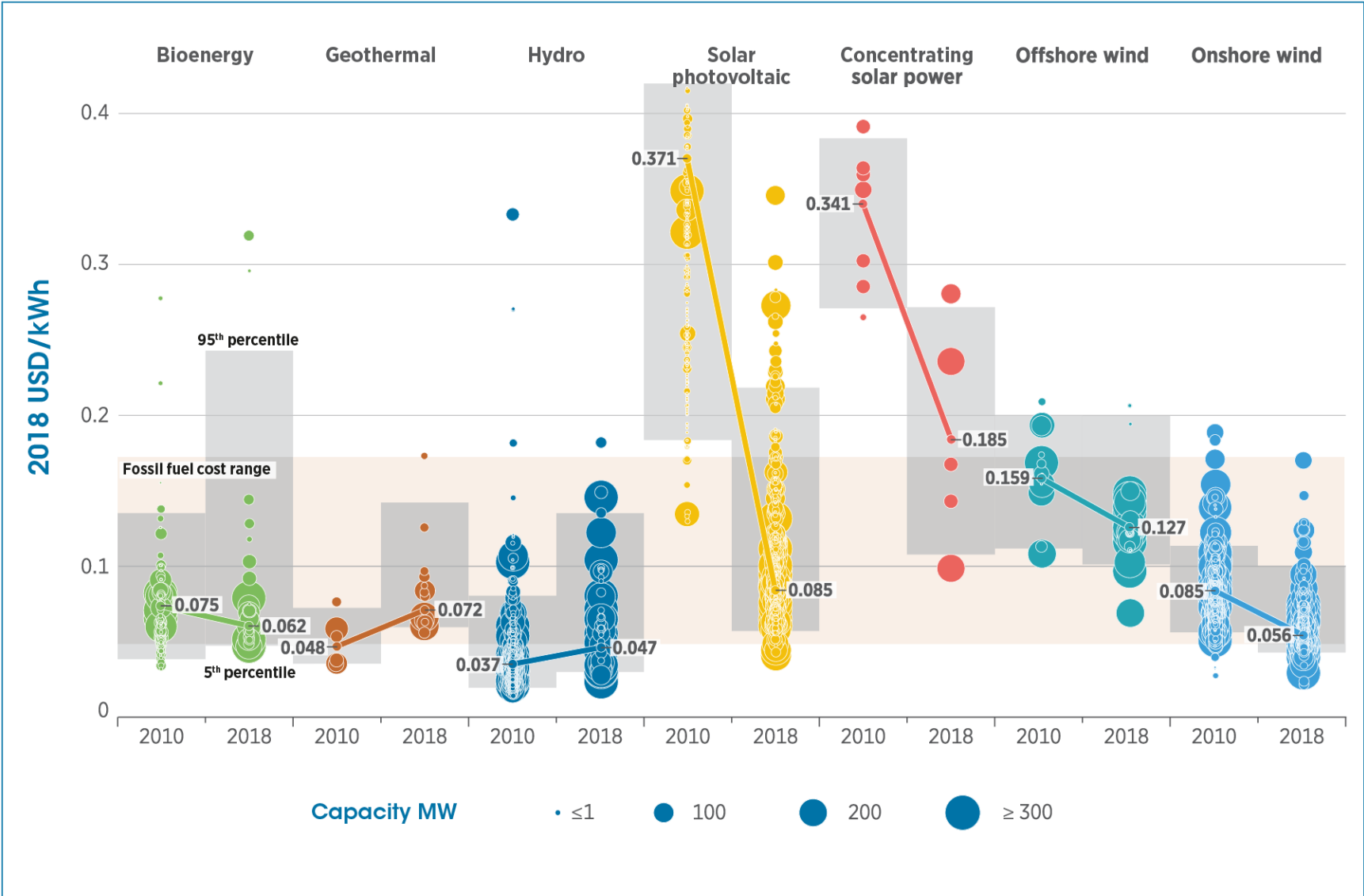
Solar & wind to offer cheaper electricity than least-cost fossil fuel option by 2020

Will increasingly undercut even operating costs of existing coal

Cost reduction expectations being continually beaten

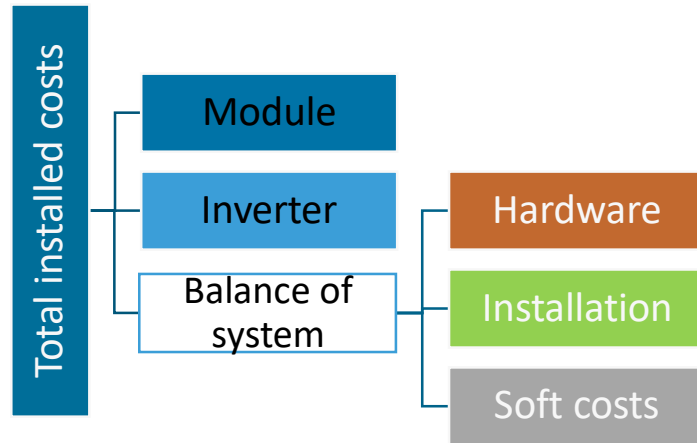
Implications for energy transition are significant

Recent cost evolution

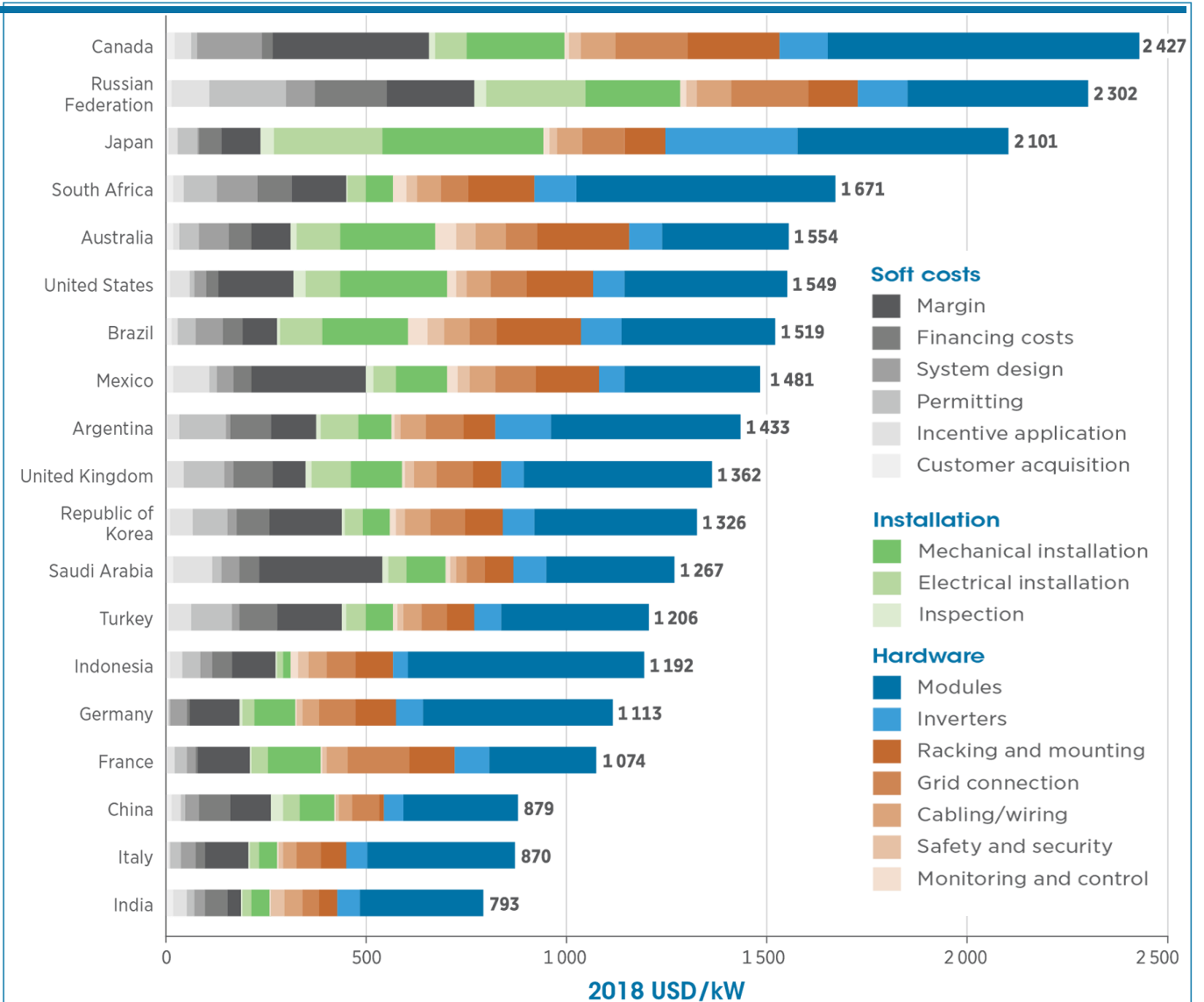


Solar PV cost reduction potential

Balance of system costs have an increasing role in determining total installed costs



- Large differences still persist among markets in BoS hardware
- India has compressed costs for all components to achieve lowest installed costs



Source: IRENA Renewable Cost Database, 2019

Project Navigator

Project development Guidelines

- » Clear project development process
- » Tools
- » Key Actions
- » Control questions and deliverables
- » Contract templates

Technical Concept Guidelines

- » Land and resource assessment
- » Technology selection and sizing
- » Contractual aspects
- » Lessons learned from previous projects

How others did it

- » Find examples
- » Case studies
- » Templates



Create your own workspace

- » Password protected workspace
- » Interactive tools
- » Store up to three projects

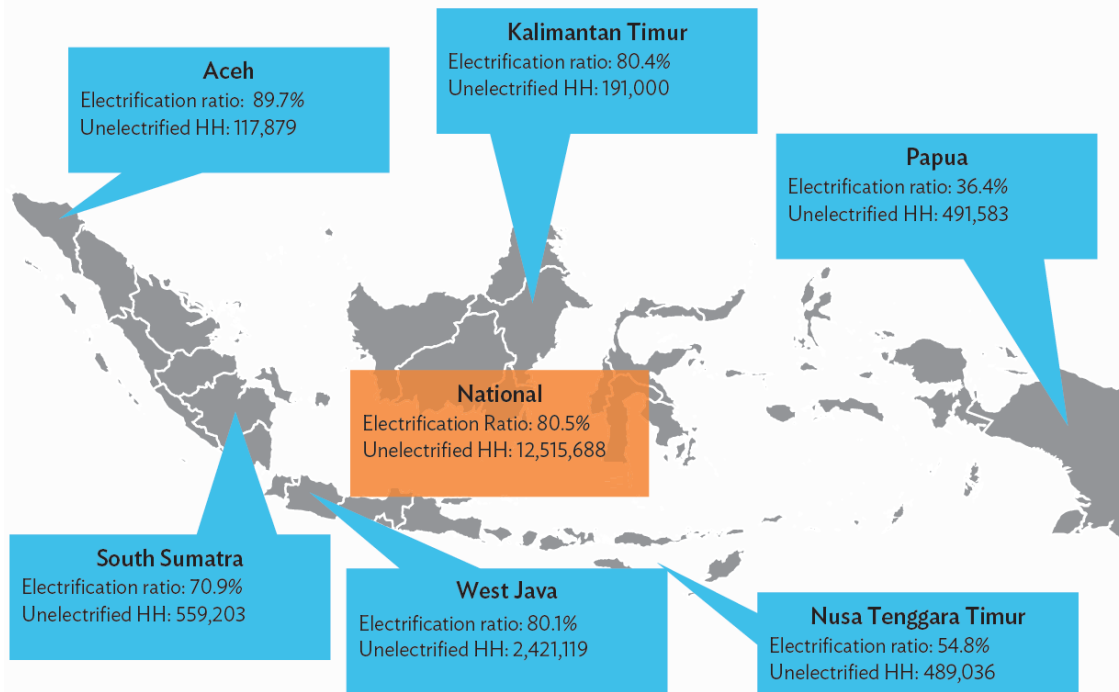
Follow a clear project development process

- » Clear objectives
- » Interactive tools
- » Control questions to ensure that nothing important has been overlooked

Track your progress

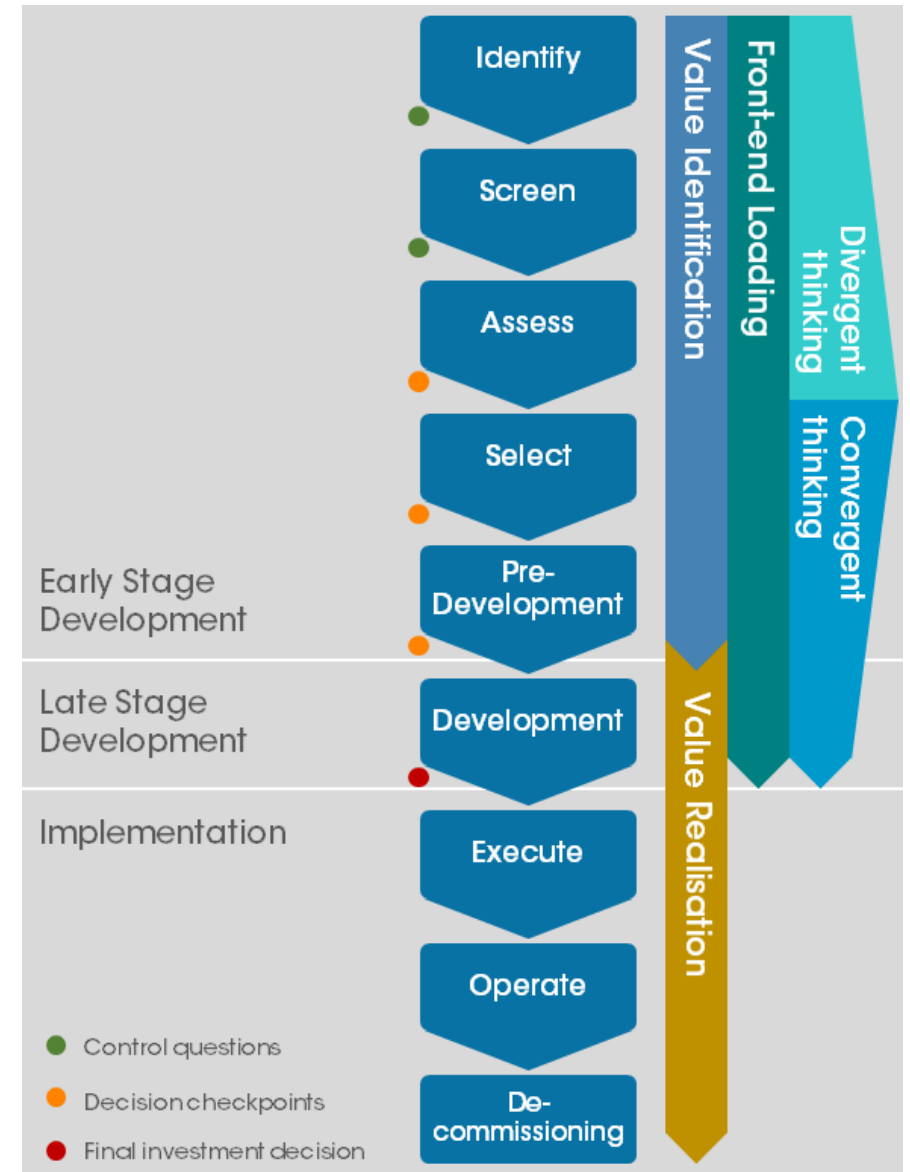
- » Store your data
- » Keep track of your project
- » Export and download reports

Project facilitation support for microgrid projects



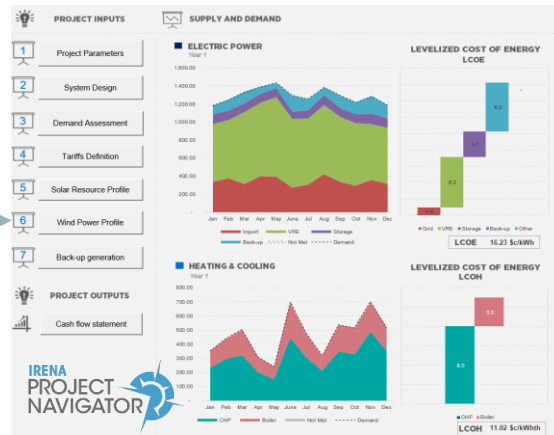
Asian Development Bank, 2016

- Analysis levelized cost of electricity of the project
- Best practices linked to the technical configuration of the project
- Assessment of the electricity generation profile of the project
- Evaluation of the cost estimates and planning of the project
- Sensitivity and risk mitigation methods



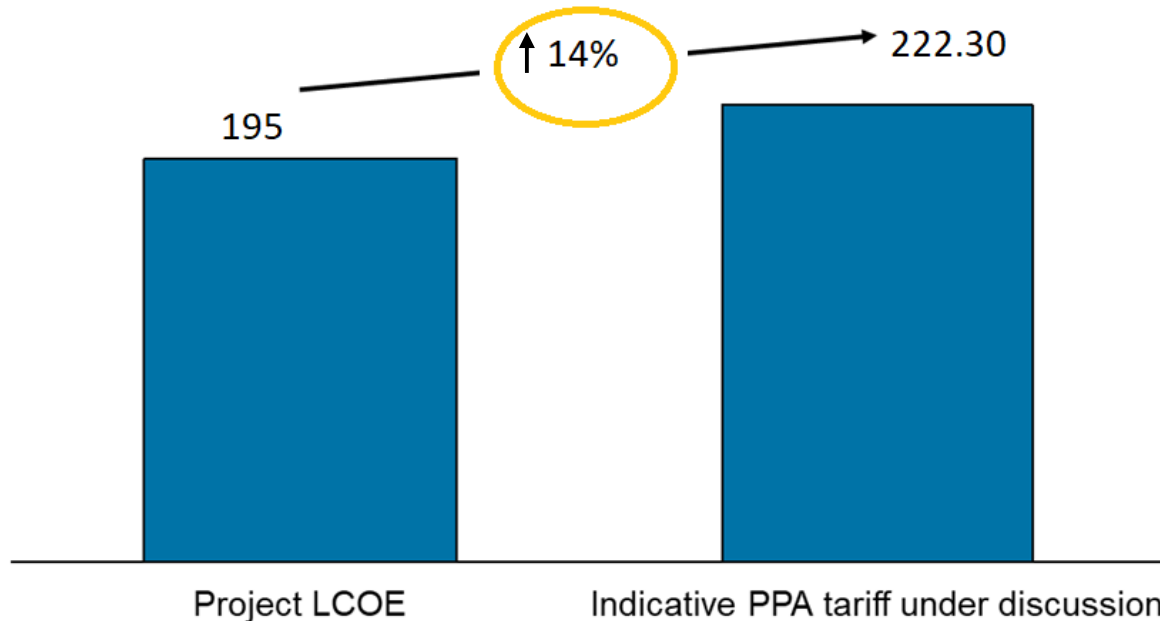
Performance of microgrid projects

Tech-economic analysis



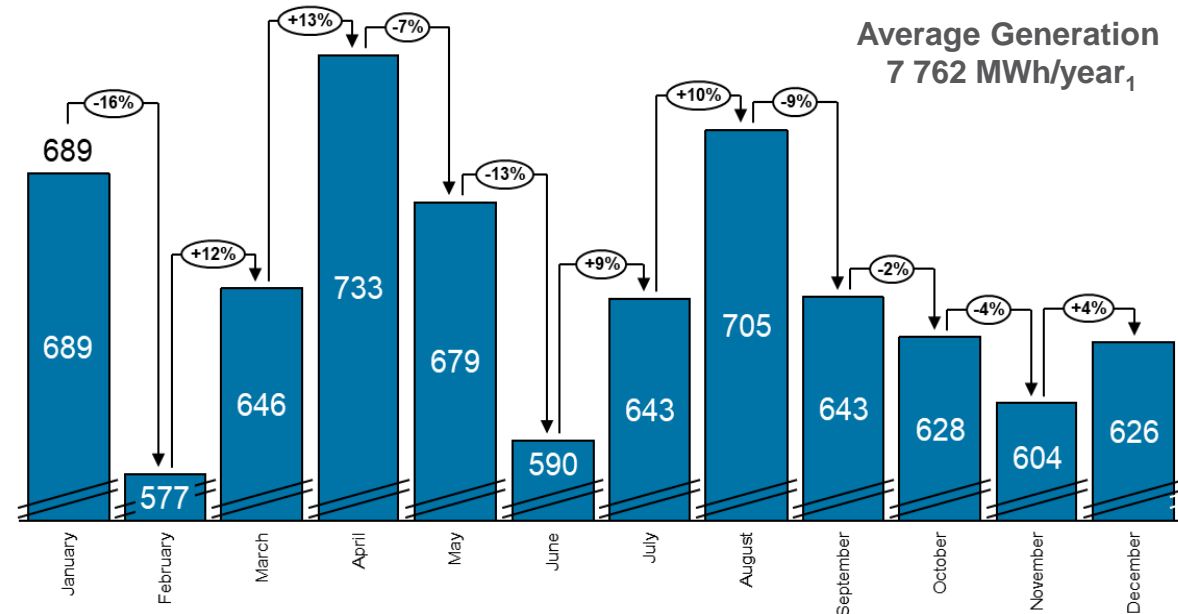
Evaluation LCOE of a Solar PV plant with storage

LCOE and Proposed tariff for the project (in USD per MWh)



Assessment of the electricity generation profile of the project

Monthly electricity generation (in MWh)



- ✓ Analysis of the electricity output; peaks and falls over the power plant lifetime.
- ✓ Analysis of yield to meet load and operational requirements.
- ✓ Enables to understand Power Purchase Agreement (PPA) and indicative tariffs over a given period of time. **USD per megawatt-hour.**

Technical concept guidelines



Guidelines in the pipeline:

- Heating and Cooling for Cities
- Climate resilient RE Projects

REMAP

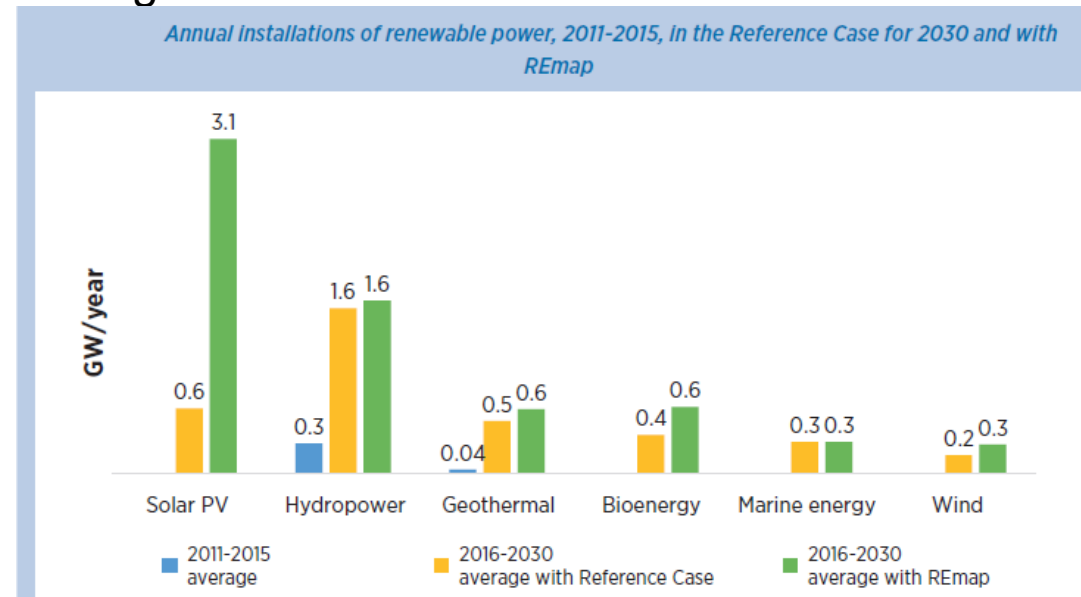
- Shows **feasible, cost-effective** ways to increase **renewable energy deployment** in world's energy mix, **2030 / 2050** horizon
- Identifies **RE technology options (a REmap option)** against the Reference Case (i.e. power, transport, industry, residential, services)
- Country based bottom-up approach covering
 - **Global level (Global Energy Transformation)**
 - **Regional level**
 - **Country level**
- Based on country engagement – for scenario exercise
- In cooperation with 70 countries
- Assesses policy and investment implications
- Outlines benefits (economic, social, environmental)
- More than 40 publications to date and datasets



REmap Analysis in Indonesia (2017)



- 8th REmap country report published, collaboration with Indonesian government (MEMR) (2016-2017)
- Indonesia is the largest energy consumer in the ASEAN region, with electricity demand to triple by 2030.
- Modern renewable share is targeted to increase from 6% in 2017 to 17% by 2030 in the Reference Case
- REmap shows that is can be increased to 23% instead by 2030 (or 31% of TPES) with a strong focus on Solar PV



Future Activities (2019 – 2021)

An ASEAN-IRENA MOU was signed in October 2018 to increase cooperation & dialogue

» Report and Regional Workshops on ASEAN RE Outlook Update (2020-2021)

Larger energy transition view to 2050, with alignment between ACE's ongoing study such as AEO6 and AIMM

» Report and Regional Workshop on bioenergy development outlook ASEAN

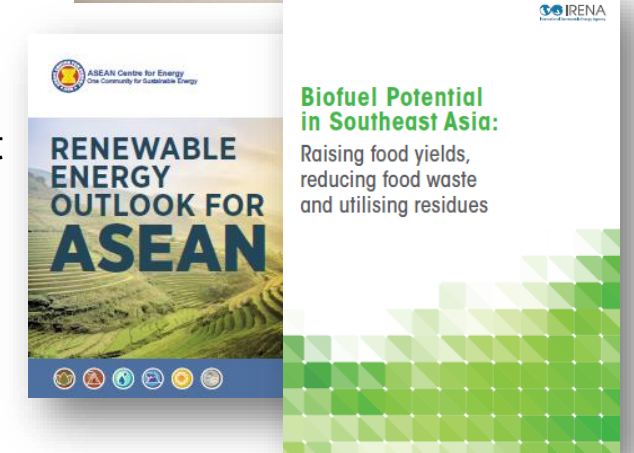
To develop regional strategy on scaling up the use of biomass for accelerated deployment of sustainable and modern bioenergy, and to integrate into long-term renewable energy planning

» Webinars on RE project development and access to financing

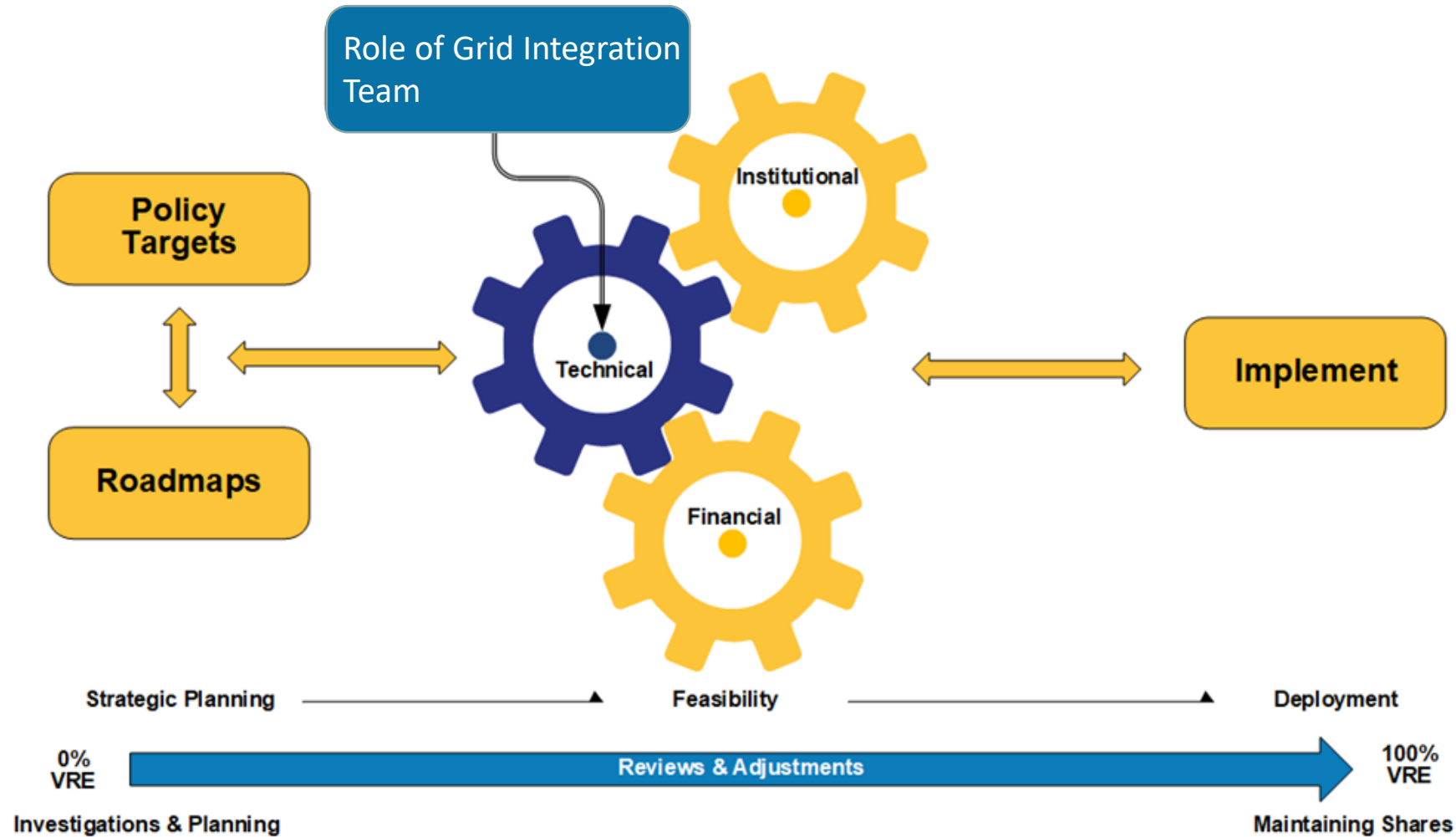
» Country roadmaps (REmap/RRA) for two ASEAN countries (2020-2021)

» Regional Workshop on RE financing and risk mitigation (May 2019)

IRENA also has ongoing cooperation with Japan & Denmark to support activities in ASEAN

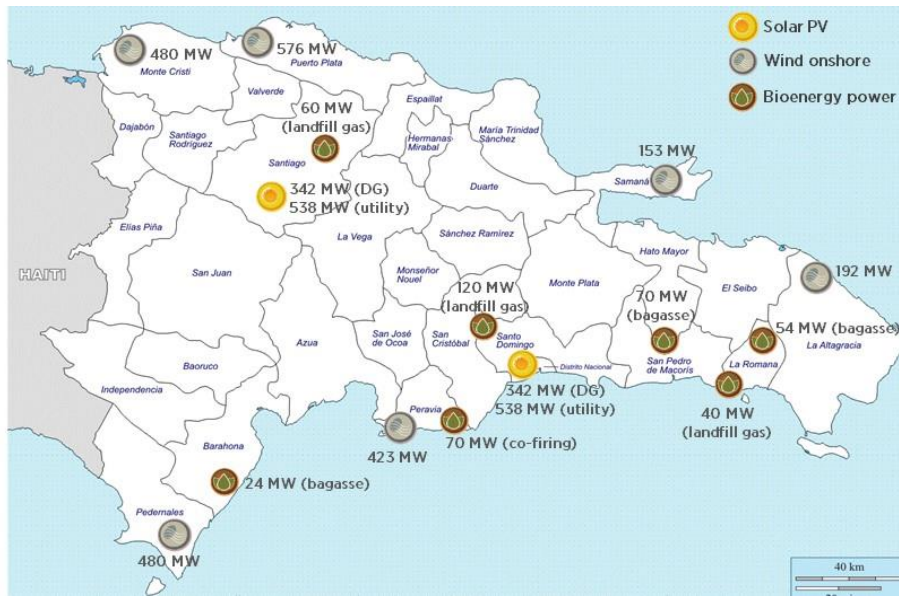


Grid Studies for the Integration of Renewables



IRENA 2019- "Transforming Small-Island Power Systems- Technical planning studies for the integration of variable renewables"

Dominican Republic-on going



Location of renewable power generation capacity in 2030 under Remap (IRENA, 2016)

Installed capacity at end of 2017- 5.13 GW

Demand- 16,107.09 GWh to reach 30,000 GWh by 2030/4473.14 MW peak demand

Transmission system- 69,138,345 kV- 5,351 km long

Expansion Plans: Hydropower expansion by 2025

RE targets:

25% by 2025

45% by 2030 in REMAP scenario

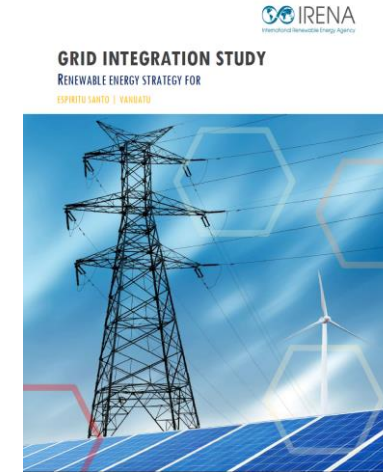
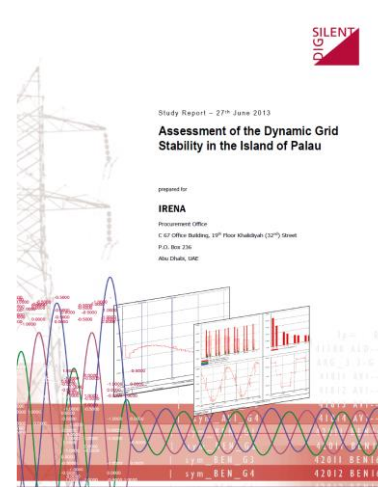
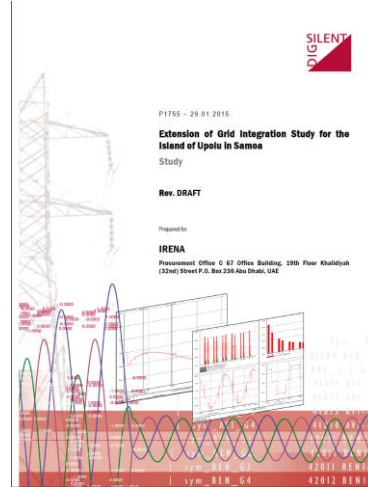
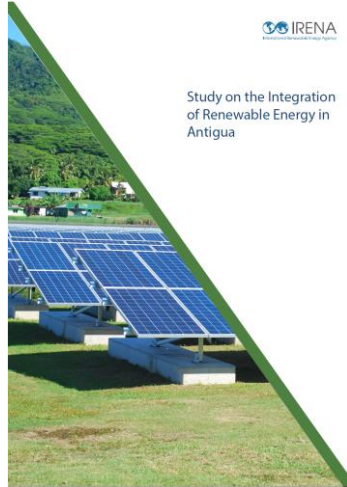
Methodology:

- Resource mapping of PV and wind
- Data collection for modeling the system
- Selection of utility scale, distributed PV and wind sites
- Scenario and sub-scenario definition-2020,2025 and 2030
- Calculating the inter-zonal transmission Dispatch and reserve allocation using Plexos (collaboration with PST team)
- System modelling using PowerFactory
- Selection of sub-scenarios or snapshots of the system at peak VRE/peak load/low VRE/Low load etc.
- Studies-frequency stability, transient stability and contingency analysis

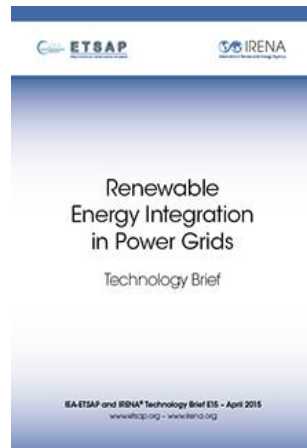
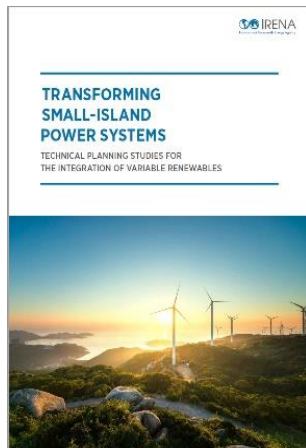
Recommendations

- Battery with frequency control to frequency regulation.
- Redispatch applied for cases when there is problems

Grid assessment studies

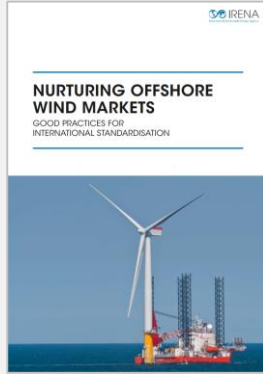


Technical publications



Quality Control and Standards for RET

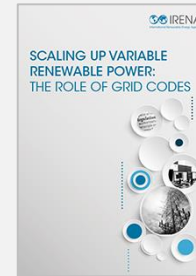
Quality and Standards Knowledge products and outreach



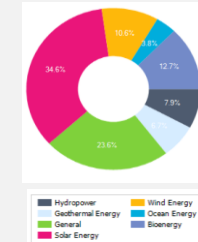
QI for solar thermal and small wind



Grid codes



INSPIRE Standards Database (>400) and Knowledge



Forthcoming: i) QI for smart mini-grids ii) Solar PV and wind under extreme weather conditions

QUALITY AND STANDARDS OUTREACH

Deep Dive Workshop: Scaling-up solar PV- Asia in Philippines



Latam Regional Forum: QI for Solar PV- Latin America in Chile



Workshop- QI for Solar Water Heaters- Costa Rica



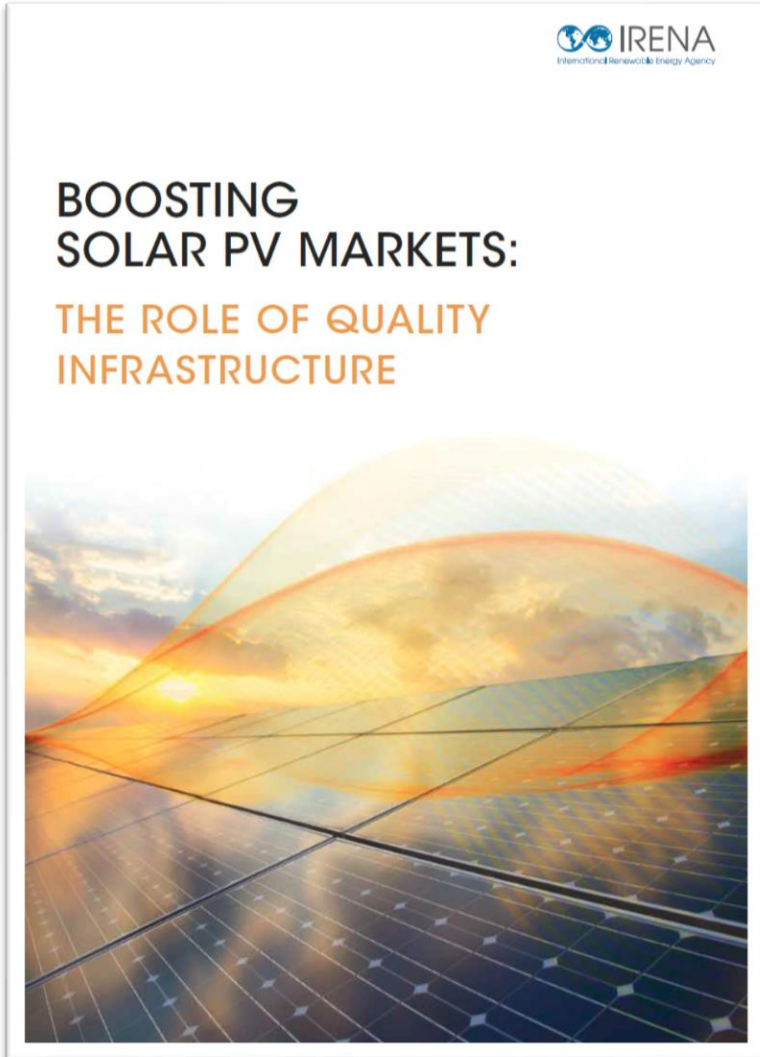
Green Quality Dialogue – China



Forthcoming: Workshop QI for PV in India

Knowledge Partners

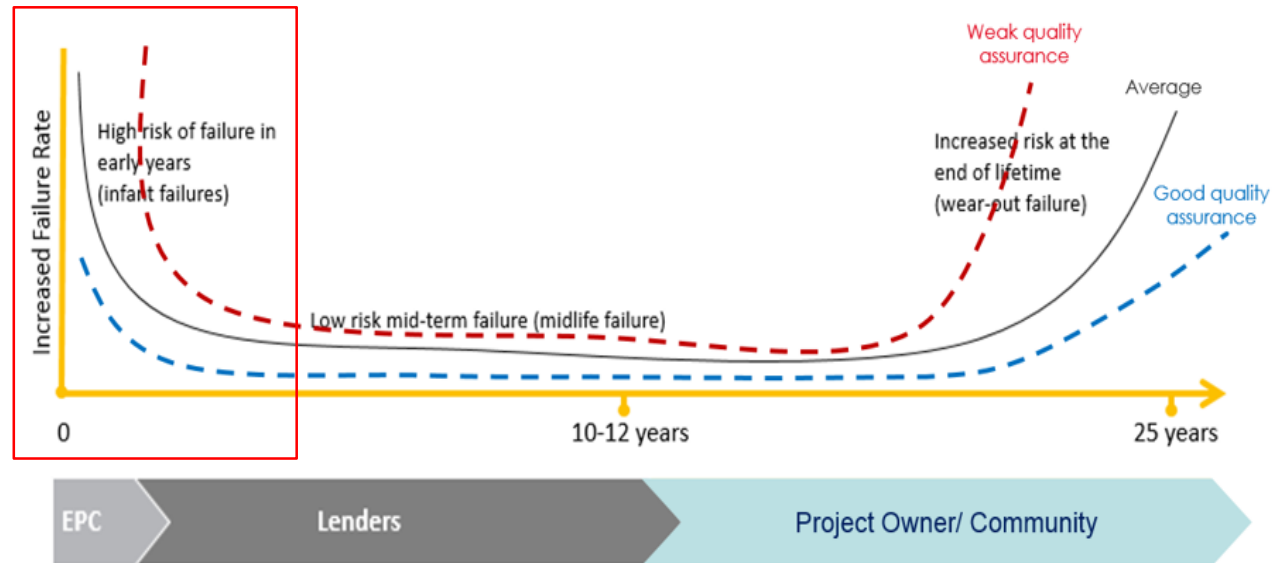




Link to Report:

<https://www.irena.org/publications/2017/Sep/Boosting-solar-PV-markets-The-role-of-quality-infrastructure>

IEC 61215/61730



Based on Solar World, 2016

Note: EPC = engineering, procurement and construction.

Thank you

