Regulations and Business models for Distributed Solar

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SOLAR KNOWLEDGE EVENT

ESMAP
Energy Sector Management Assistance Program

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Distributed Solar: Quick Game

- Please **stand up** in your place.
- Listen to each question:
  - If your answer is **'YES', stay standing**.
  - If your answer is **'NO', sit down.**

1. Do you know **what is** distributed solar?

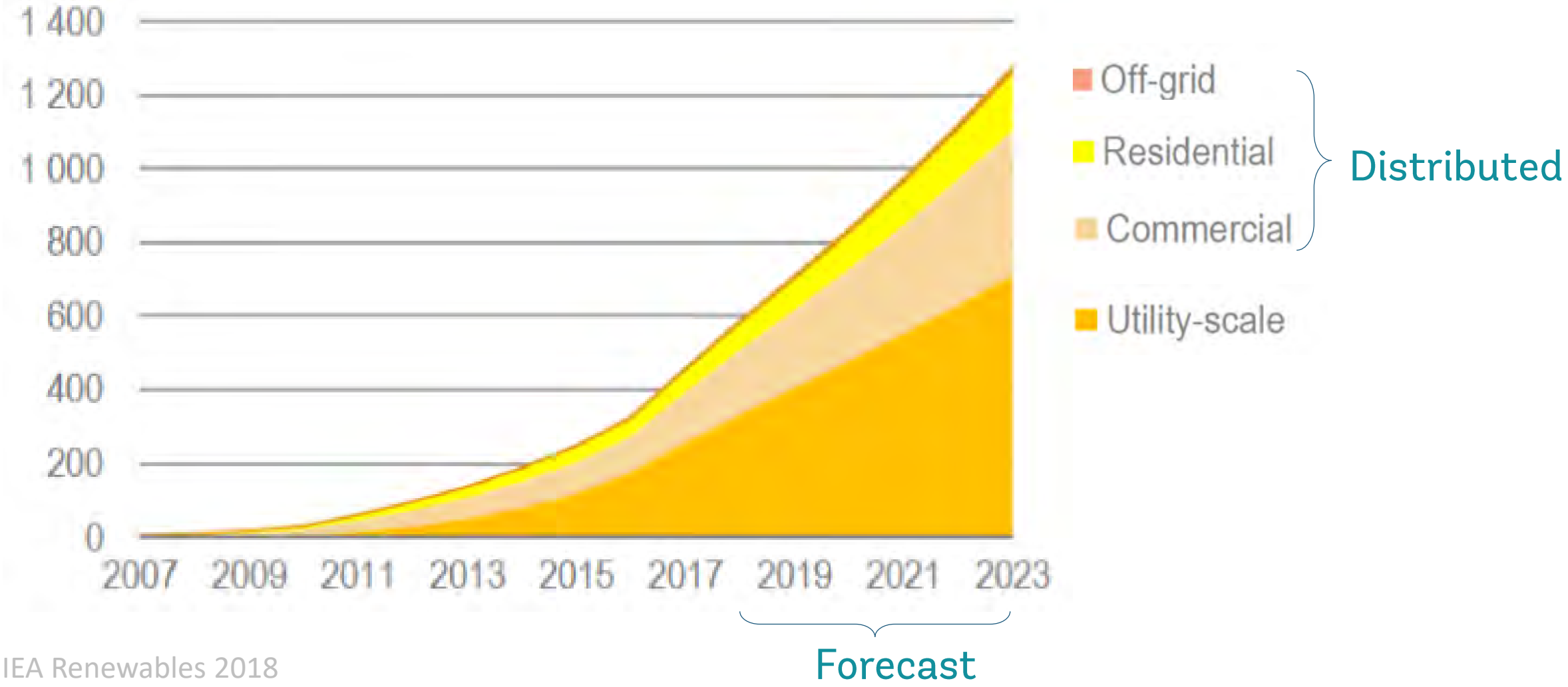
Distributed Solar: Quick Game

- Listen to each question:
  - If your answer is **'YES', stay standing**.
  - If your answer is **'NO', sit down.**

1. Do you know **what is** distributed solar?
2. Does the **country** where you live or work **have any** distributed solar?
3. Have you ever **worked on** a distributed solar policy, program or project?
4. Are you **willing to share** your experience on distributed solar at the coffee break?
5. Have you every lived or work in a **building with any** distributed solar?

IN NEXT 5 YEARS, 1/2 OF NEW PV WILL BE DISTRIBUTED

TWh/y global generation from new PV by type



Source: IEA Renewables 2018

Policy and Regulation for Distributed PV

Global perspective: key messages

Distributed PV offers **different benefits in different contexts**.

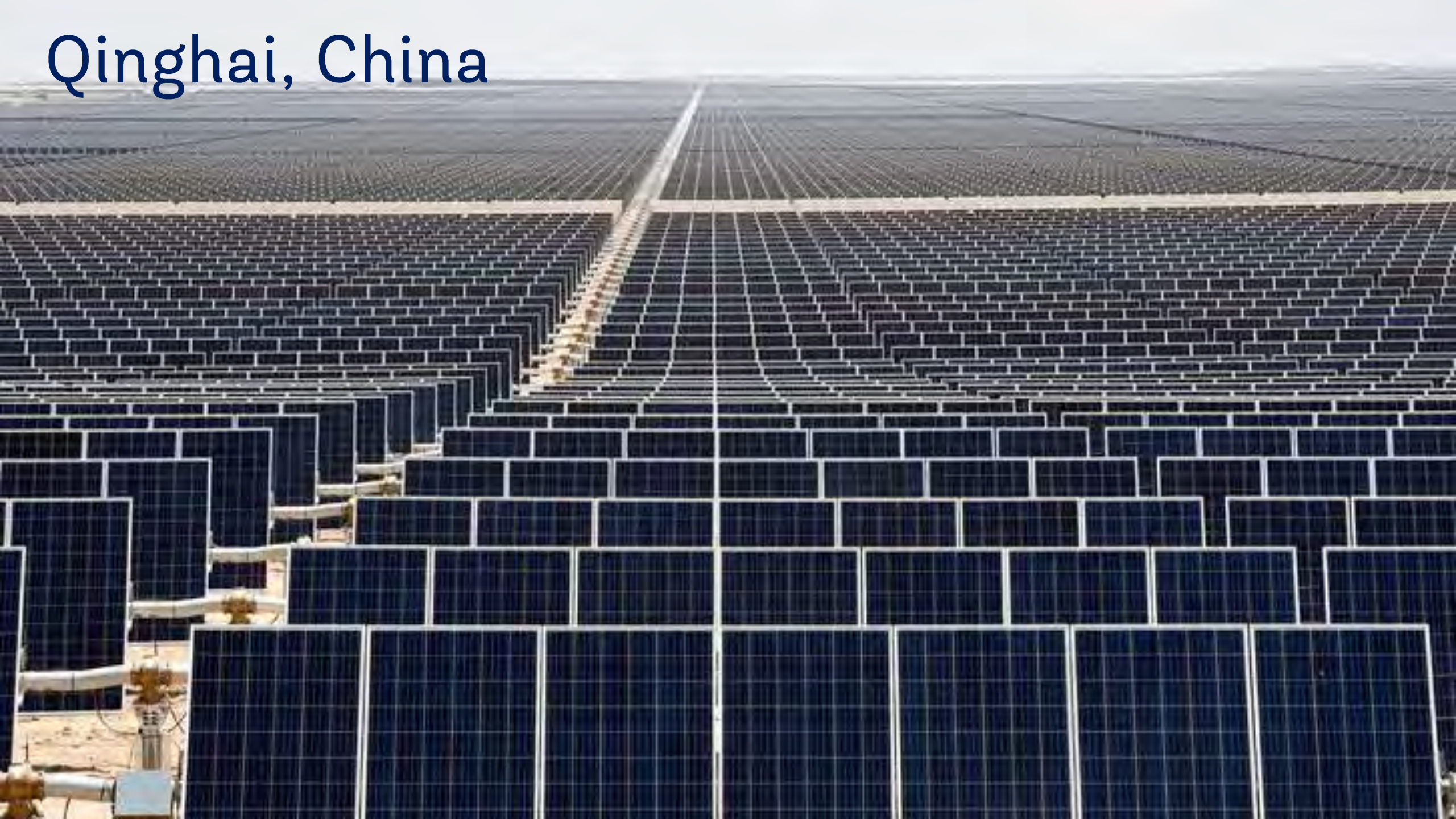
As distributed PV deployment increases, **new issues will arise** that need their own new solutions.

Policies to enable distributed PV **need not be costly**.

Ouarzarzate, Morocco

Sana’a, Yemen

Qinghai, China

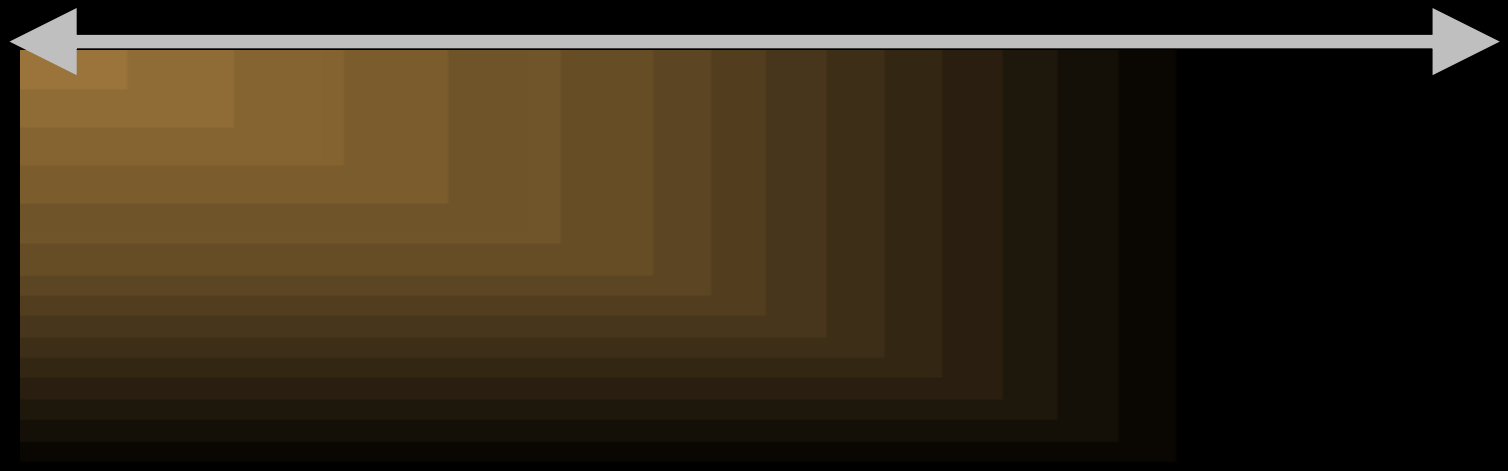



Wuhan, China

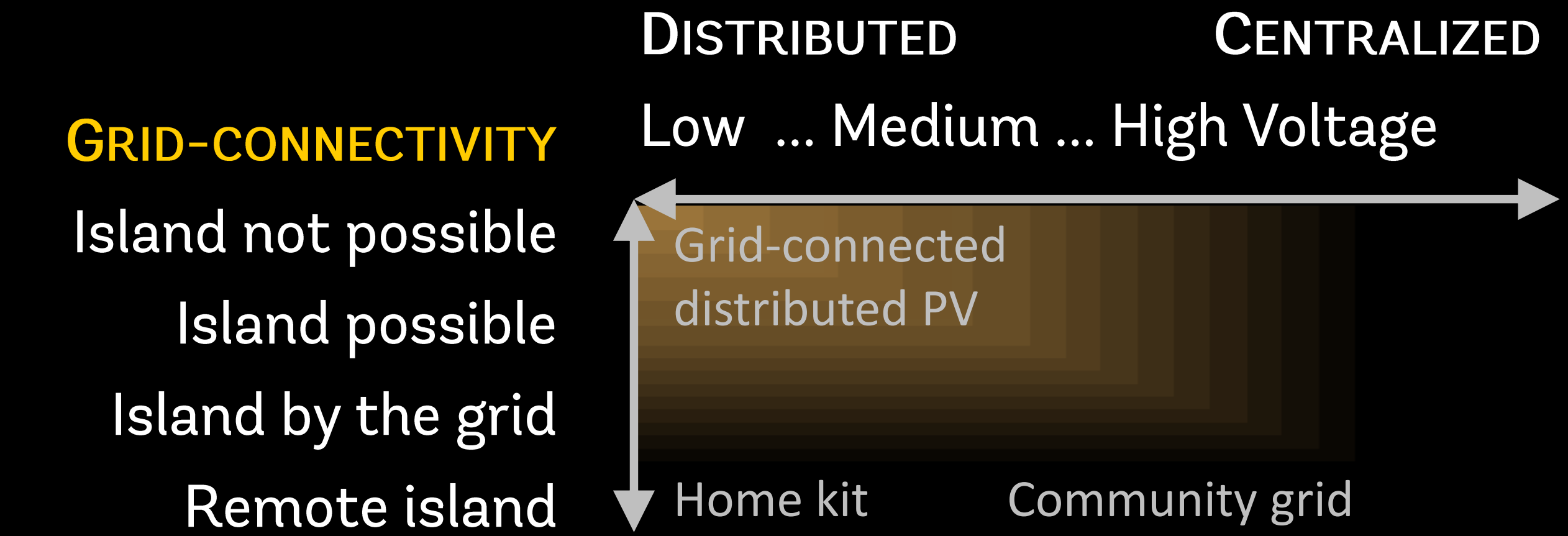
Spectrums of distributed solar

DISTRIBUTED CENTRALIZED

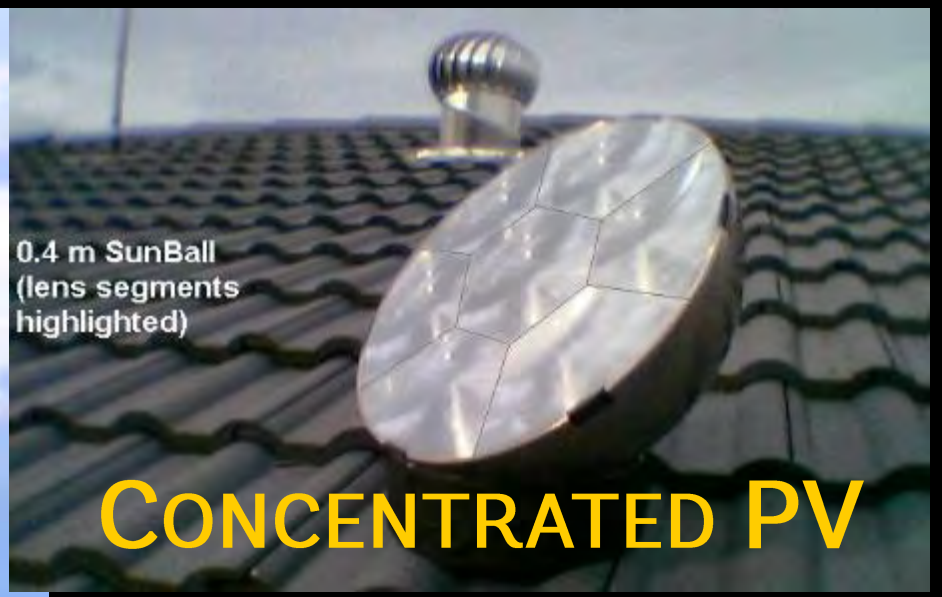
Low … Medium … High Voltage?



Spectrum of grid-connectivity



Spectrum of emerging technologies



Why distributed PV?

Basic objectives

Leave land for other uses...

Cheap bills...

Defer upgrades to central supply...

Clean air...

Back-up to grid...

Why distributed PV?

Basic objectives

Leave land for other uses…

Cheap bills…

Defer upgrades to central supply…

Clean air…

Back-up to grid…

Counter points

Other roof uses?

Cheap for whom?

Efficient demand?

Hosting capacity?

Other sources?

PV firm & safe?

Why distributed PV?

Basic objectives

Leave land for other uses…

Cheap bills…

Defer upgrades to central supply…

Clean air…

Back-up to grid…

Counter points

Other roof uses?

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Hosting capacity?

Other sources?

PV firm & safe?

Integrated approach

Stakeholder engagement.

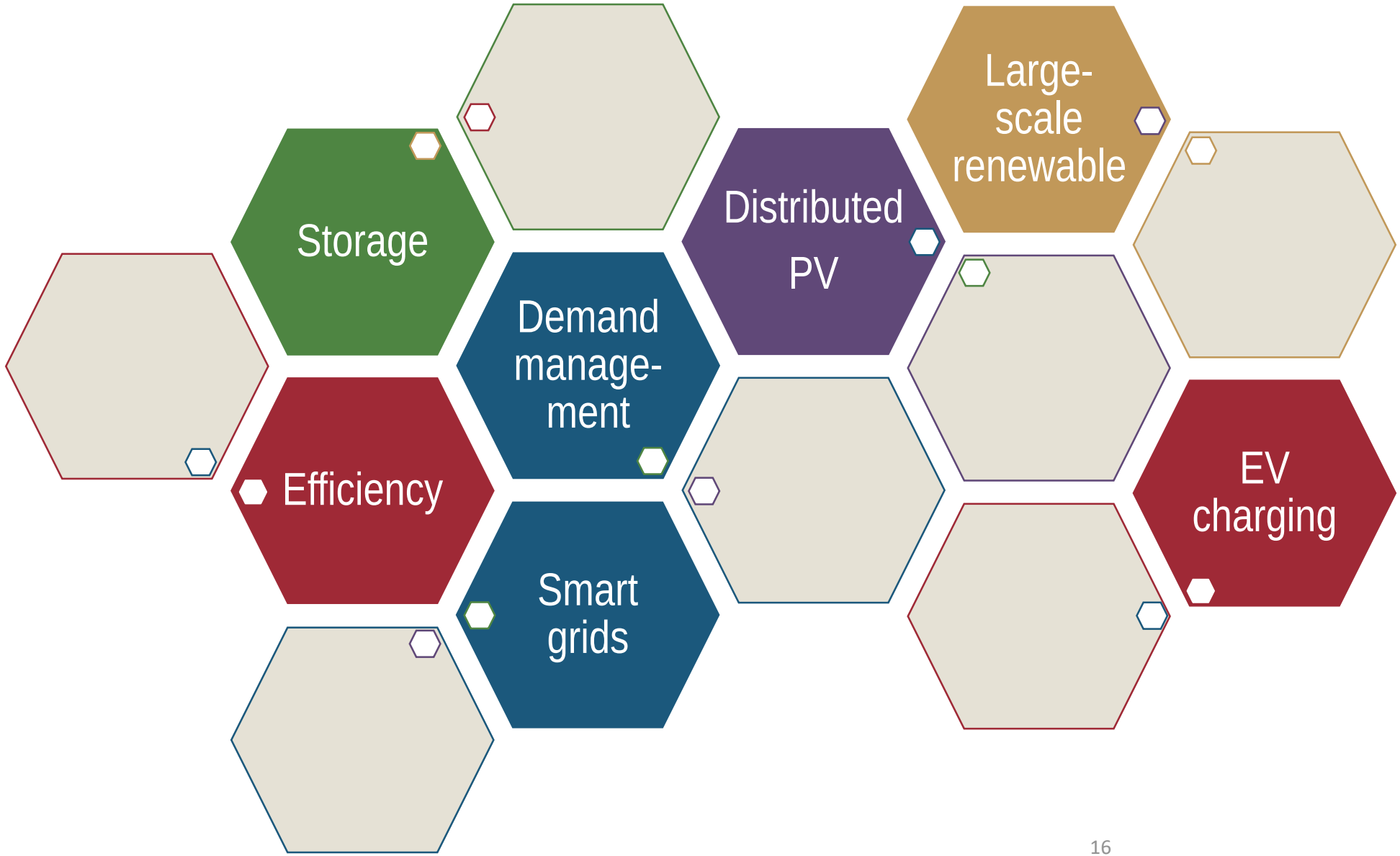
Efficiency as ‘first fuel’.

Integrated resource planning.

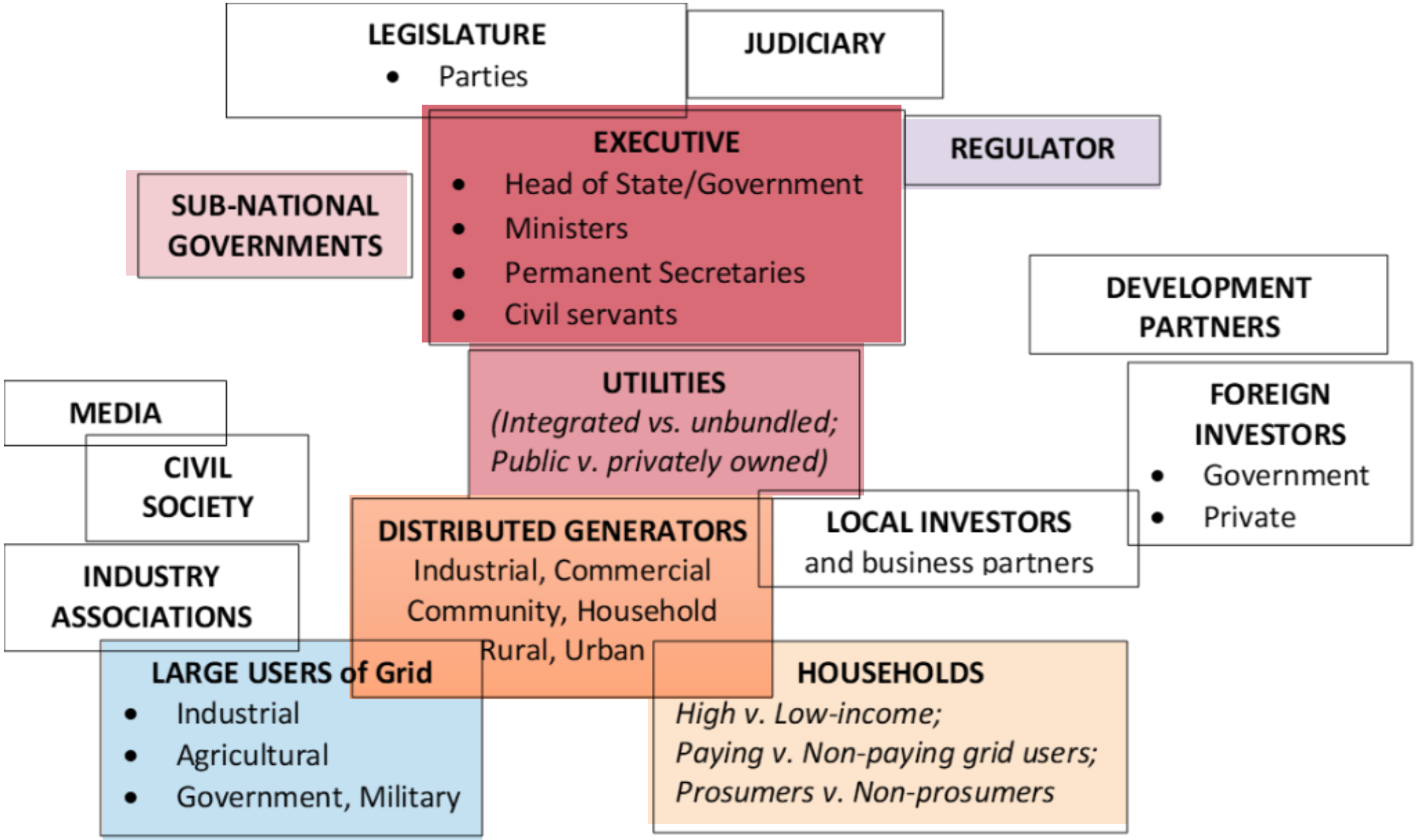
Resilience.

Learn & adapt.

PIECE OF PUZZLE: INCREASINGLY DIVERSE SOLUTIONS



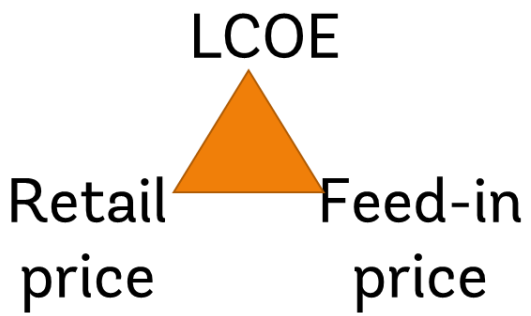
INCREASINGLY DIVERSE STAKEHOLDER ROLES



Stages of deployment raise different issues

Basic stage

Prosumer cost vs. prices



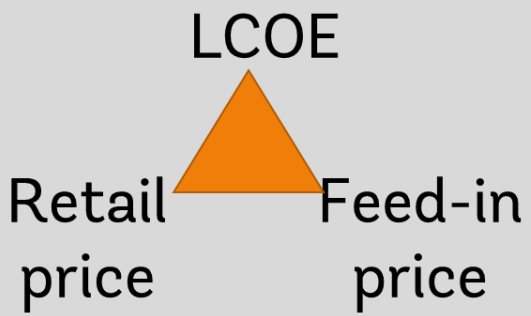
Connection & permits.

Standards.

Stages of deployment raise different issues

Basic stage

Prosumer cost vs. prices



Connection & permits.

Standards.

Developing stage

PV business models.

Access to finance.

Market structure.

Policy targets.

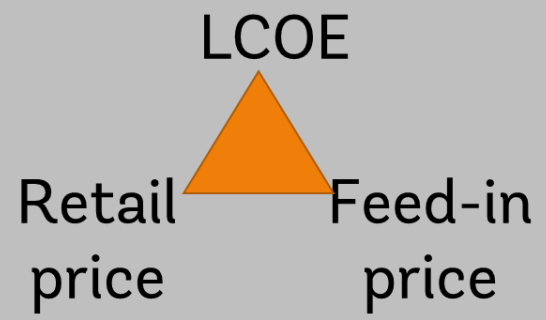
Legal certainty + flexibility.

R&D.

Stages of deployment raise different issues

Basic stage

Prosumer cost vs. prices



Connection & permits.

Standards.

Developing stage

PV business models.

Access to finance.

Market structure.

Policy targets.

Legal certainty + flexibility.

R&D.

Advanced stage

Grid modernization.

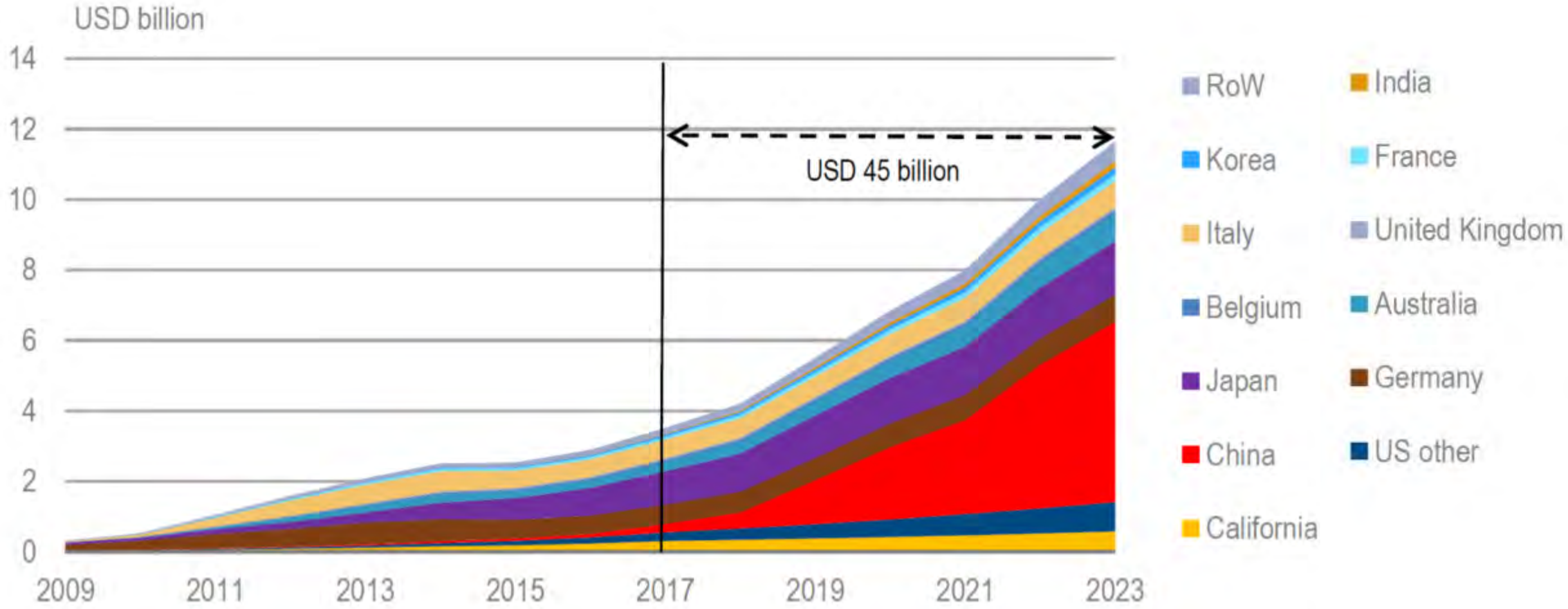
Advanced inverter use.

Utility costs, value, vs. revenue.

New pricing. New utility models?

‘Virtual’ community PV.

MORE SELF-CONSUMPTION = LESS UTILITY SALES*



*Under status quo tariff regime and market structure

IEA Renewables 2018

ESMAP 2019 Global Assessment of Distributed PV

- Objective to **increase investment** in grid-connected solar power through **knowledge and technical assistance**.
- November 2018 to June 2020
- Existing & proposed distributed PV World Bank engagements
  - e.g. Bangladesh, Brazil, China, Gaza, Maldives, Mexico, India, Pakistan, Philippines, Senegal, Turkey, Vietnam, & others.

Phase 1

- Topic brief: conceptual framework
- Knowledge platform for country teams
- Exchange and partnership with international experts

Phase 2

- Analytic tools and standards: survey and enhancement
- Implementation support
- Recommendations for policy, strategy and operations

Welcome feedback and suggestions for collaboration!

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Global perspective: key messages

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Policies to enable distributed PV **need not be costly**.

شكرا Merci

References:

- IEA (2018) Renewables 2018: Analysis & Forecasts to 2023.
- Flores-Espino (2015) Compensation for Distributed Solar. NREL.
- International Solar Alliance & Clean Energy Solution Center (2018) Online Training Course. See: Module 1 Policies for Distributed PV.

https://www.youtube.com/playlist?list=PLKRmGa9s99JVPzGrehc7bqIzfKt2yLQcx

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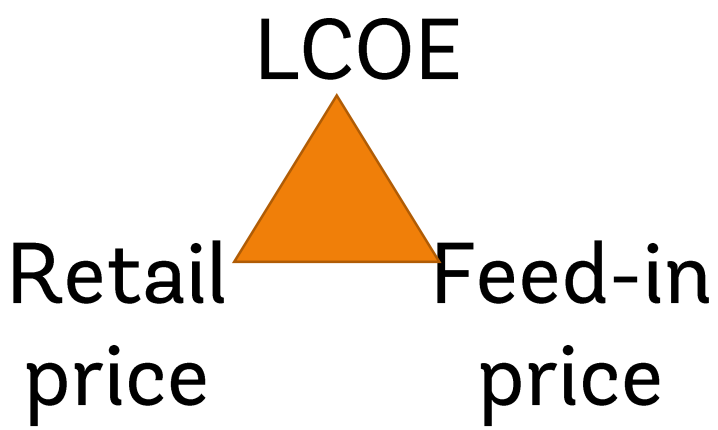
ANNEX SLIDES

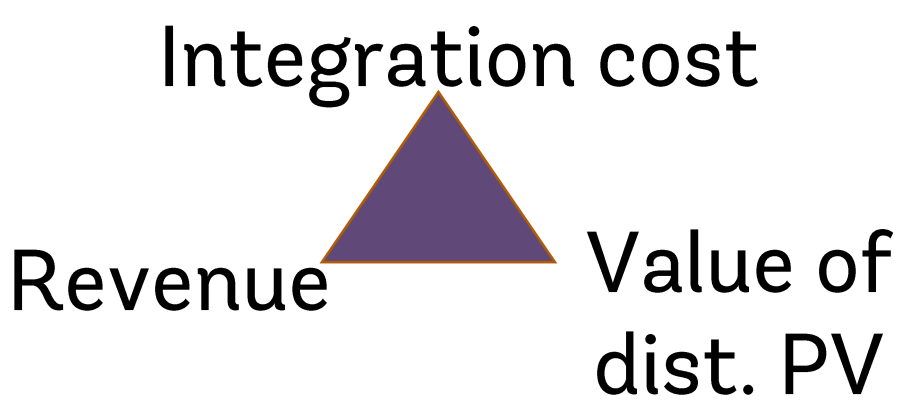
DISTRIBUTED GENERATION (DG) PRICING IS COMPLEX IN THEORY, SIMPLIFIED IN PRACTICE

- Distributed generation is only financial viable for consumers if the **levelized cost of energy is less than either the retail price or feed-in price** (or both) averaged over the system lifetime.
- Consumers have an **incentive to self-supply** only if the feed-in price is lower than the retail price.
- Utilities have an incentive to host only if the value to utilities is equal to or higher than the integration cost, so revenue is not adversely affected.

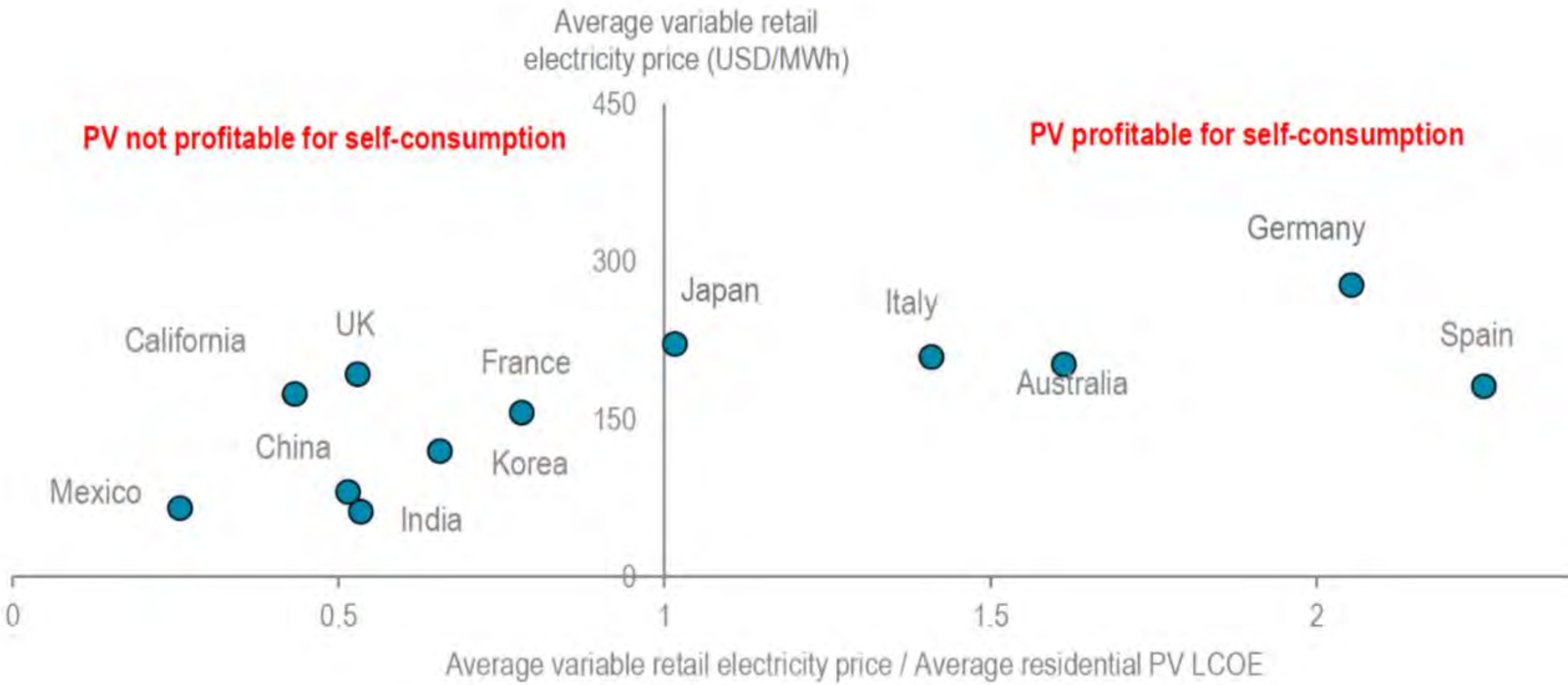
Prosumer perspective



Utility perspective



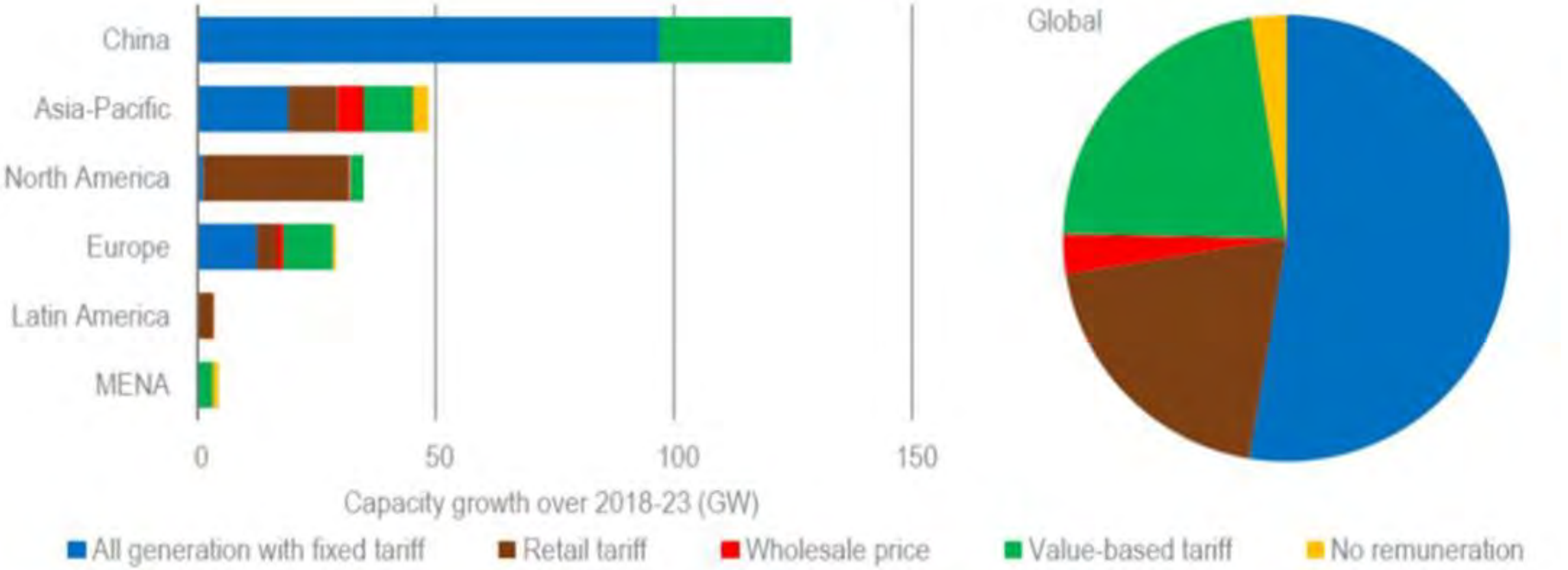
SELF-SUPPLY IS NOT PROFITABLE IN MANY COUNTRIES*



*Under status quo tariff regime and market structure

IEA Renewables 2018

POLICIES FOR REMUNERATION OF ALL OR EXCESS GENERATION FROM DISTRIBUTED PV



Source: IEA (2018)