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International Renewable Energy Agency

Renewable Energy Driving the Energy Transition

Trade and Environmental Sustainability Structured Discussions (TESSD)
World Trade Organization
17 May 2022
Geneva, Switzerland

1 The energy transition

Development and welfare for all

UN Sustainable Development Goals (SDGs)

Source: IRENA (2017) Rethinking Energy

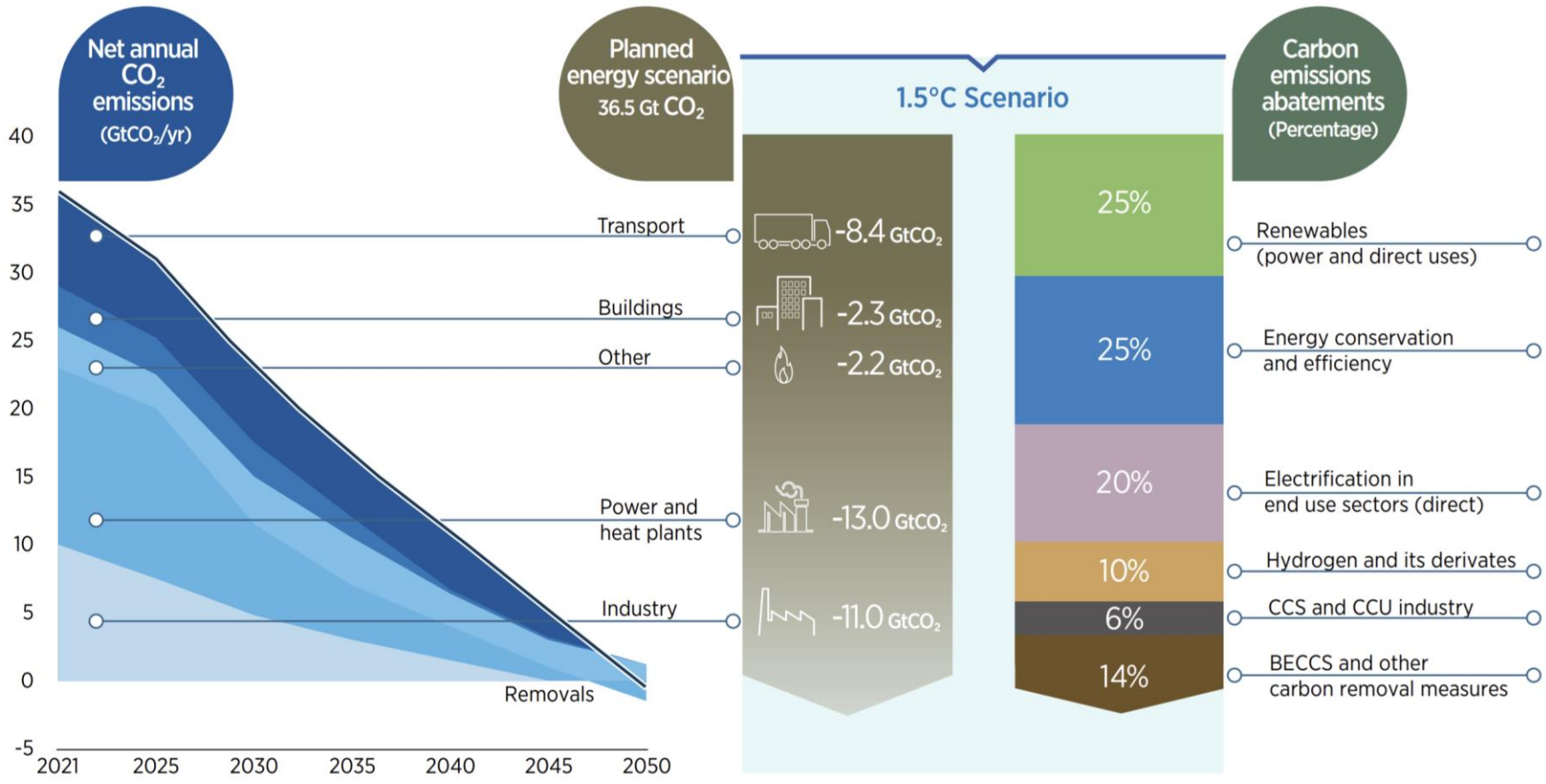
We need cleaner, affordable, reliable and abundant sources of energy

Energy accounts for two-thirds of total greenhouse gas emissions

- The Paris Agreement objectives can be met through a global transformation of the energy system towards clean energy

- This requires significant scaling-up of renewable energy deployment, enhanced energy efficiency, and electrification of end-use sectors

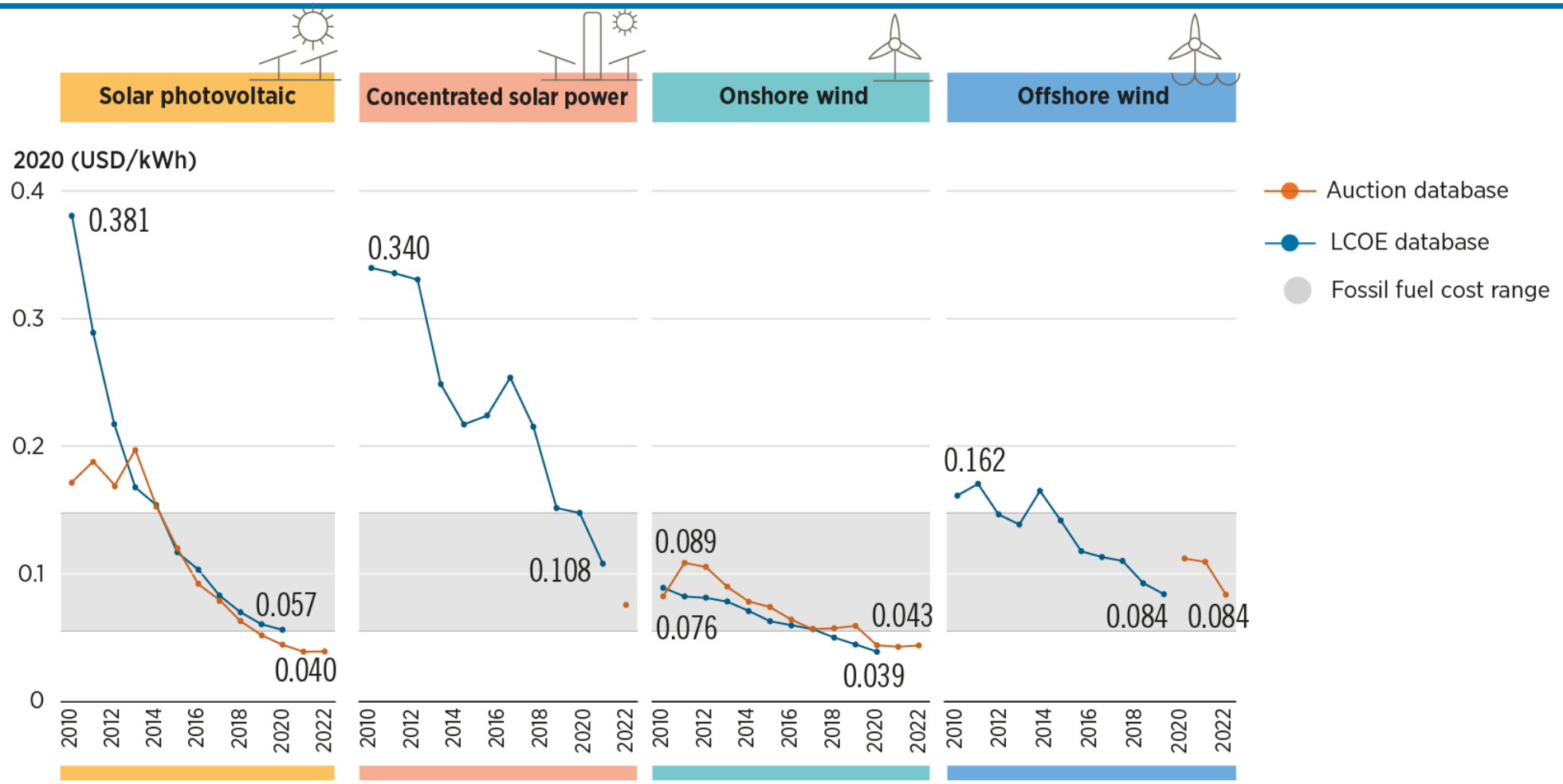
Global CO_2 emissions abatement under IRENA's 1.5° C Scenario and required energy solutions



Source: (IRENA, 2021a).

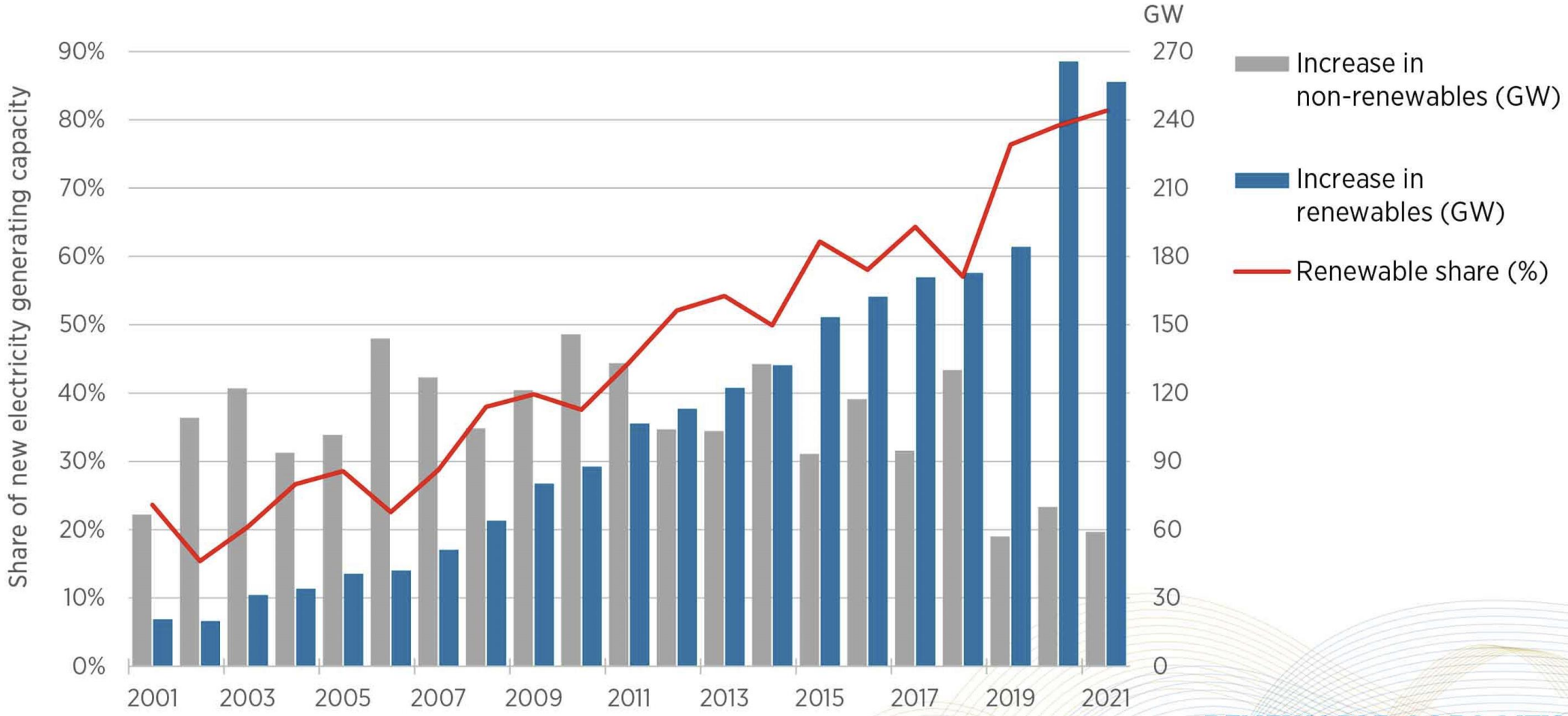
2 The progress

Renewables-based electricity is already the cheapest power option in most regions



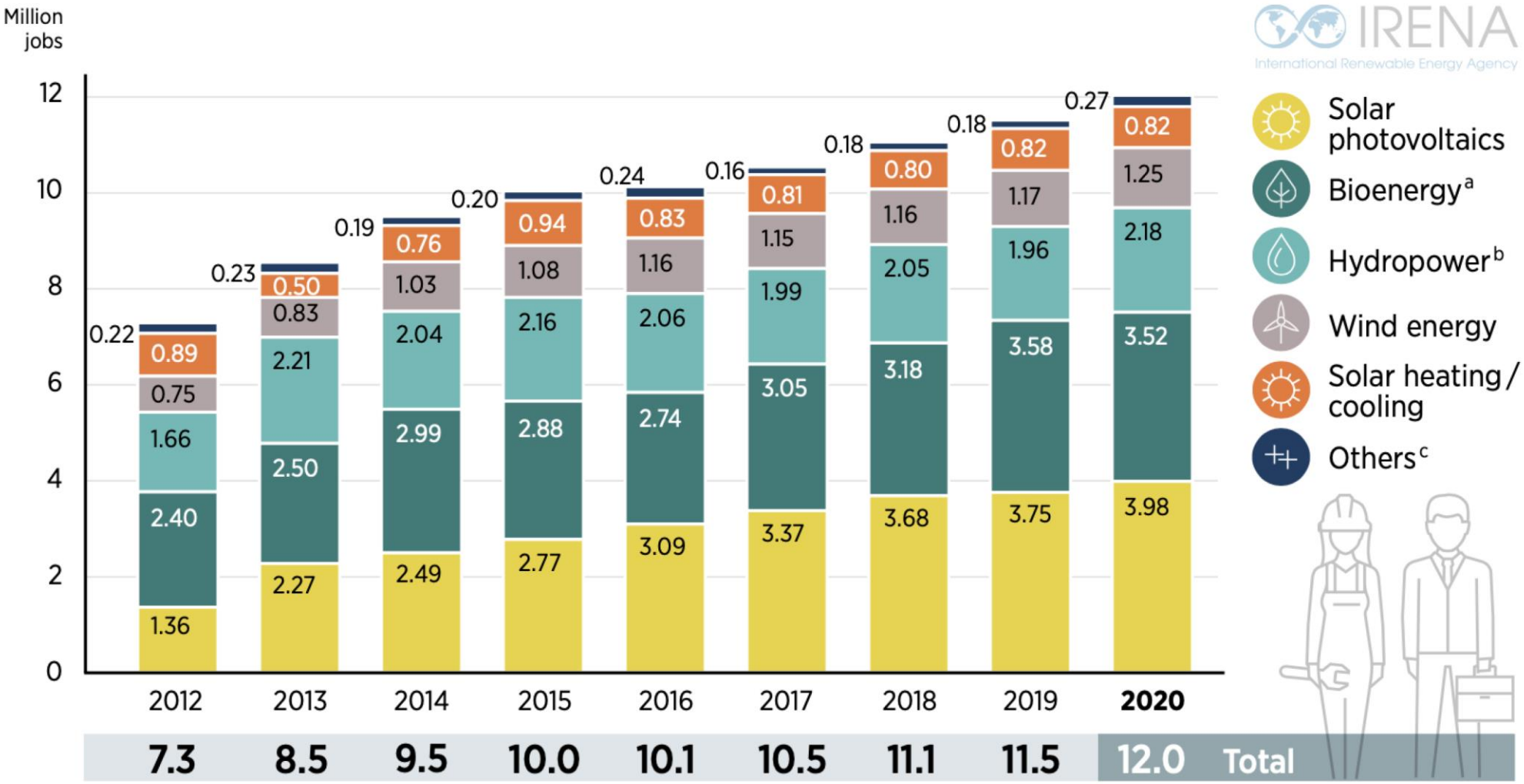
The global weighted average levelised cost of electricity from utility-scale solar photovoltaic (PV) projects fell by 85% between 2010 and 2020, concentrating solar power (CSP) by 68%; on-shore wind by 56%, and off-shore wind by 48%

Global capacity additions – Electricity generation



RENEWABLE CAPACITY STATISTICS 2022

Job creation in renewable Energy sector

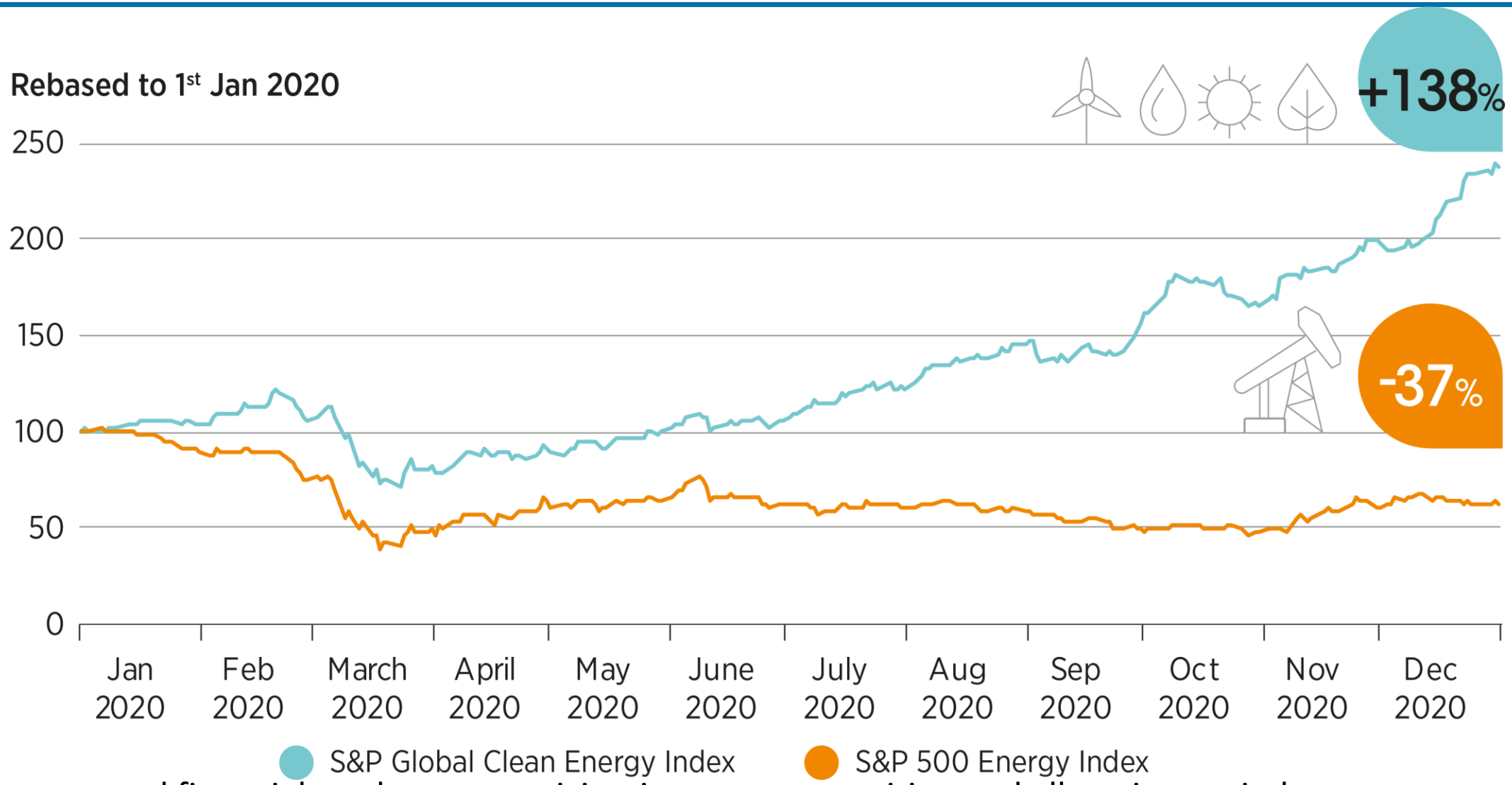


Under IRENA's 1.5C pathway, renewable energy could employ **43 million** people worldwide by **2050**

a Includes liquid biofuels, solid biomass and biogas.
b Direct jobs only.
c "Others" includes geothermal energy, concentrated solar power, heat pumps (ground based), municipal and industrial waste, and ocean energy.

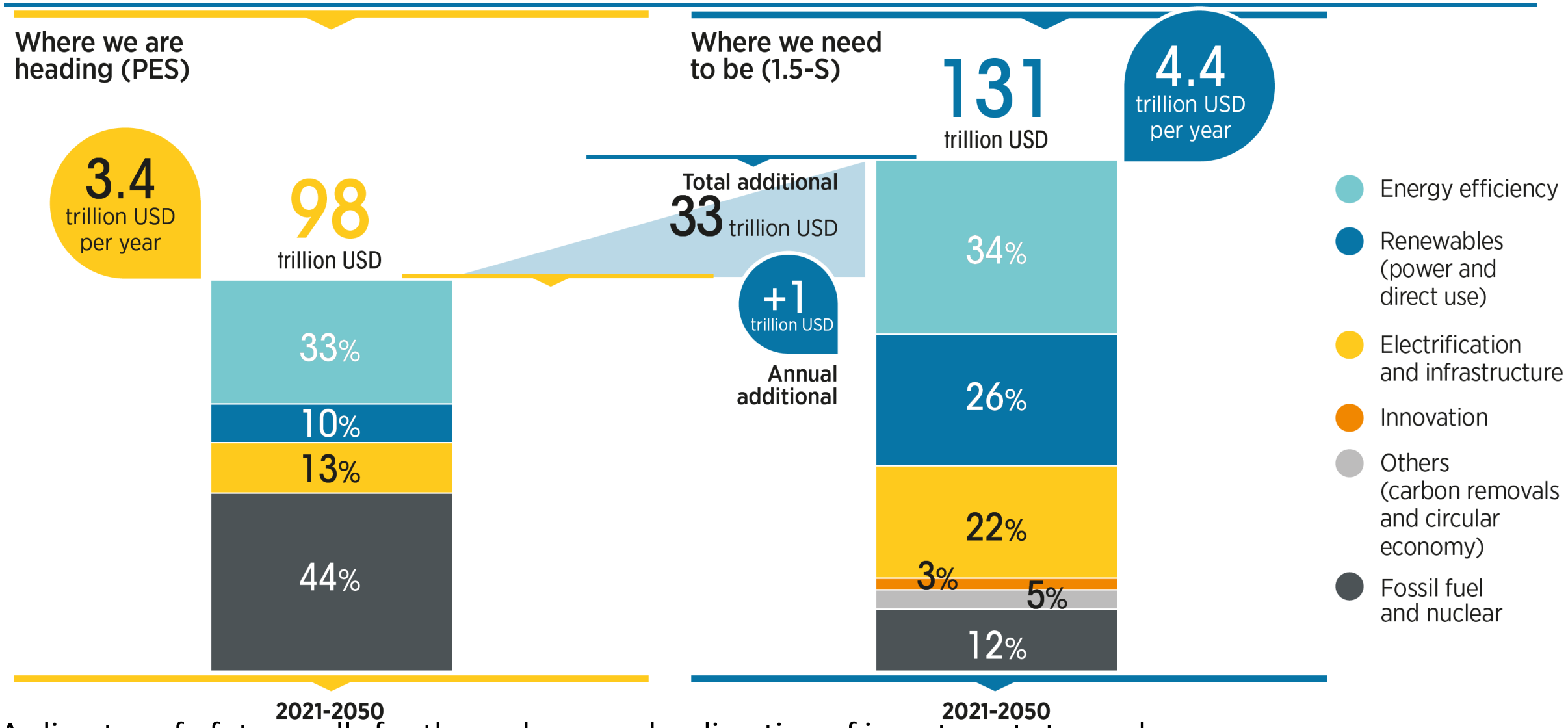
Source: IRENA jobs database.

Financial markets



Investors and financial markets are anticipating energy transition and allocating capital away from fossil fuels towards energy transition technologies, such as renewables.

Needed investments



A climate-safe future calls for the scale-up and redirection of investments towards energy transition technologies, away from fossil fuels.

3 Trade of Renewable Energy Products

How renewables create new trade

The transition to renewable energy will create new trade patterns. While trade in fossil fuels will decline, trade in at least three other areas will grow:

1. **Trade in renewable energy-related goods and technologies.** These include a wide range of goods and technologies, from solar PV panels to smart meters and batteries, as well as their components and parts (for example, blades for wind turbines or water wheels for hydropower) and related services (for example, engineering and installation services).
2. **Electricity trade** will increase because additional interconnections make grids more stable and resilient. Variable renewables, such as solar and wind power, require flexible and interrelated power systems that can balance supply and demand in real time. Electricity interconnections can be made between neighbouring countries, at a regional scale and possibly even inter-continentally.
3. **Trade in renewable energy fuels** may also grow significantly.[100] An example is hydrogen formed by electrolysis in regions that possess an abundant supply of renewable energy, such as Patagonia or the Australian desert. Besides hydrogen, a host of synthetic fuels may also be generated from renewable electricity, including ammonia, methane and methanol. Such fuels permit seasonal storage of renewable electricity (which only pumped hydro has been able to do to date), and use existing infrastructure (such as natural gas pipelines). They also have the potential to reduce emissions in hard-to-electrify sectors such as aviation and some industrial processes.[101]

While the potential to increase trade exists, the number of trade disputes related to renewable technologies has grown in recent years. Trade in renewable energy goods may be hampered by tariffs, discriminatory subsidies, and conflicting technical standards. Members of the WTO have started negotiations to open trade in environmental goods and services further. In the future, consideration will need to be given to governance issues, particularly standards and rules, to ensure a level-playing field in renewable energy trade.

Source: IRENA (2019) A New World: The Geopolitics of the Energy Transformation

Trade of PV technology – Joint analysis WTO & IRENA

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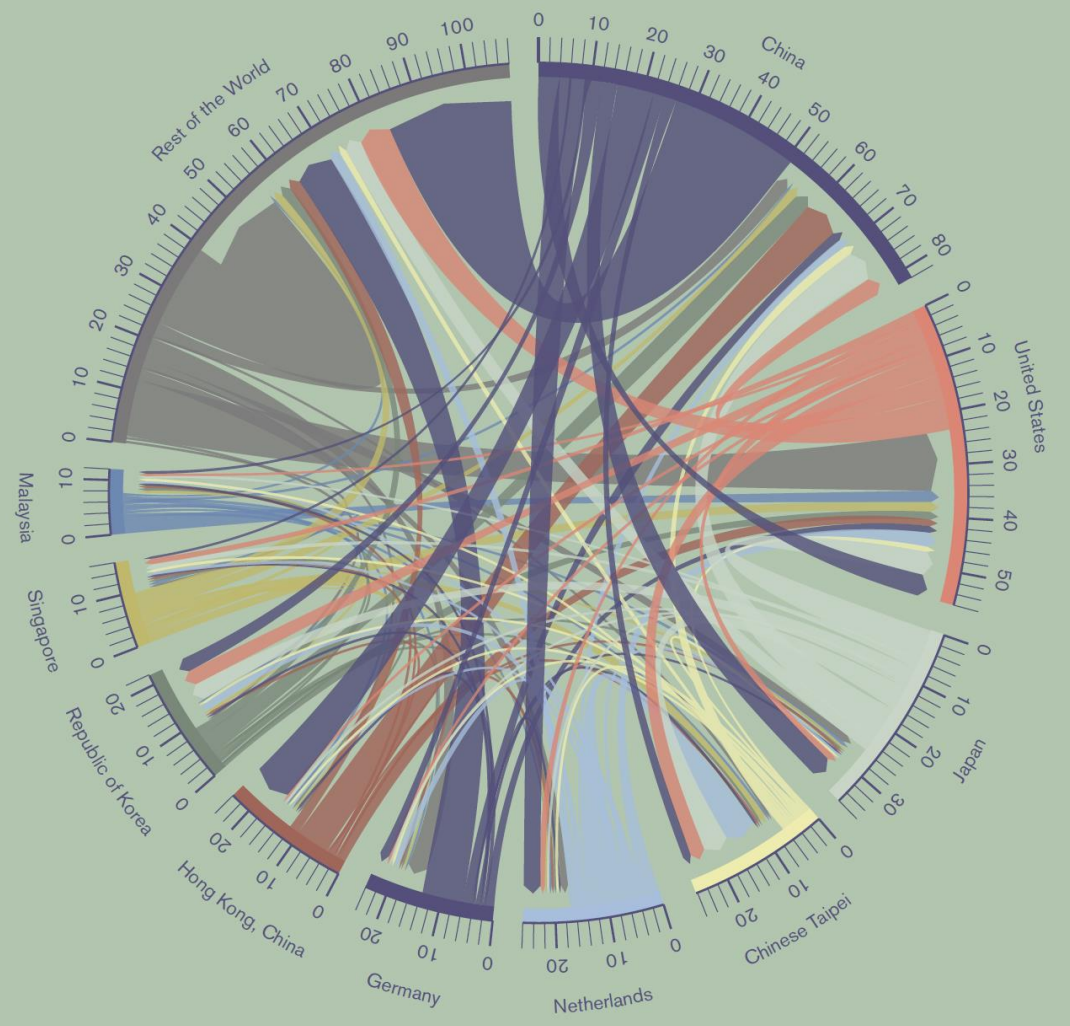
FIGURE 7

The 10 largest exporters of PV components and related machinery, 2019 (US$ billions)

Source: WTO Secretariat, based on data from the UN Comtrade database.



- solar PV supply chains have become increasingly globalized over the past two decades
- solar PV components increased significantly between 2005 and 2019
- In 2019, trade in these goods totalled slightly more than US$ 300 billion, up from around US$ 111 billion in 2005
- On average, tariffs range from a low of 2.2 per cent for PV cells to a high of 10 per cent for PV backsheet (the outermost layer of a PV module).

Quality Infrastructure to mitigate technical risk and facilitate trade

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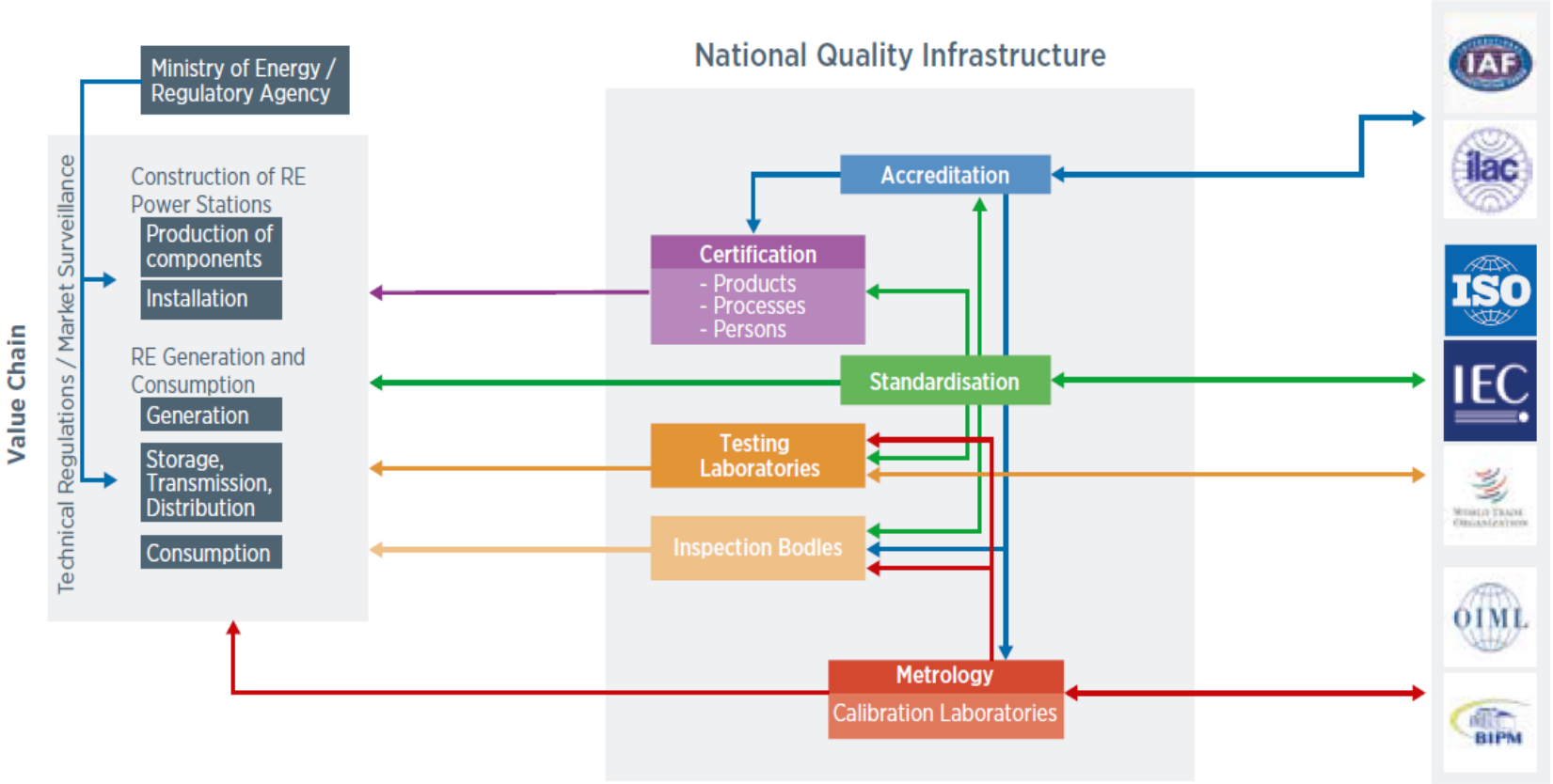
Which **instruments** do we have to mitigate technical risk and harmonise requirements in Globalised RET Markets worth USD trillion?



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

Role of standards – technical risk mitigation and expansion of trade

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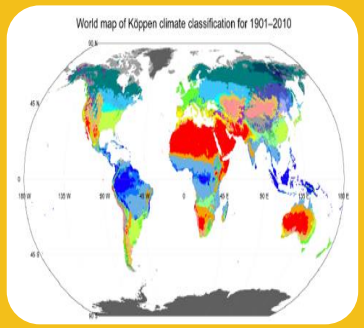
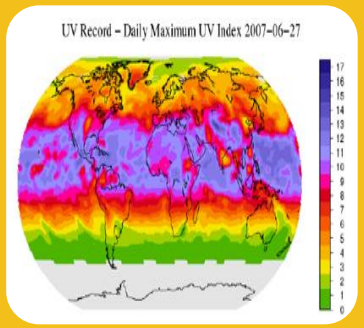
Conditions for PV systems in GCC region





Temperature: IEC open air conditions (-40oC - +40oC) | GCC -20oC - +55oC high humidity

Annual irradiance: Germany ~1 200 kWh/m2 | GCC ~2 300 kWh/m2 – UV double

Hail: IEC 25mm Ø | GCC 44mm Ø

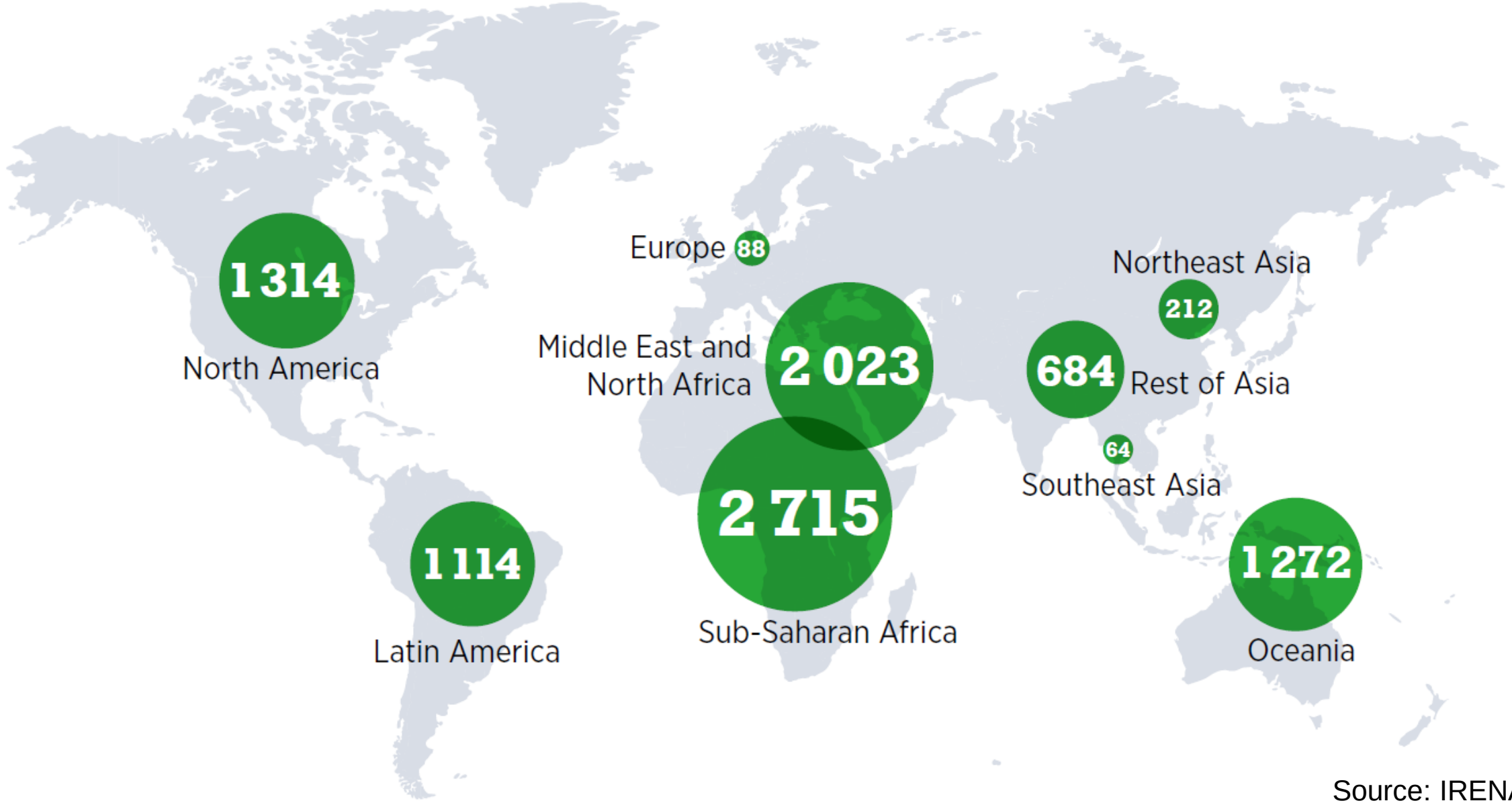
Sand: no international test methods – different types of sand

PV technology

- Future markets are in regions with different weather conditions – GCC, South East Asia, Latin America
- Current standards do not fully reflect the conditions of those regions
- Need to engage experts from those regions

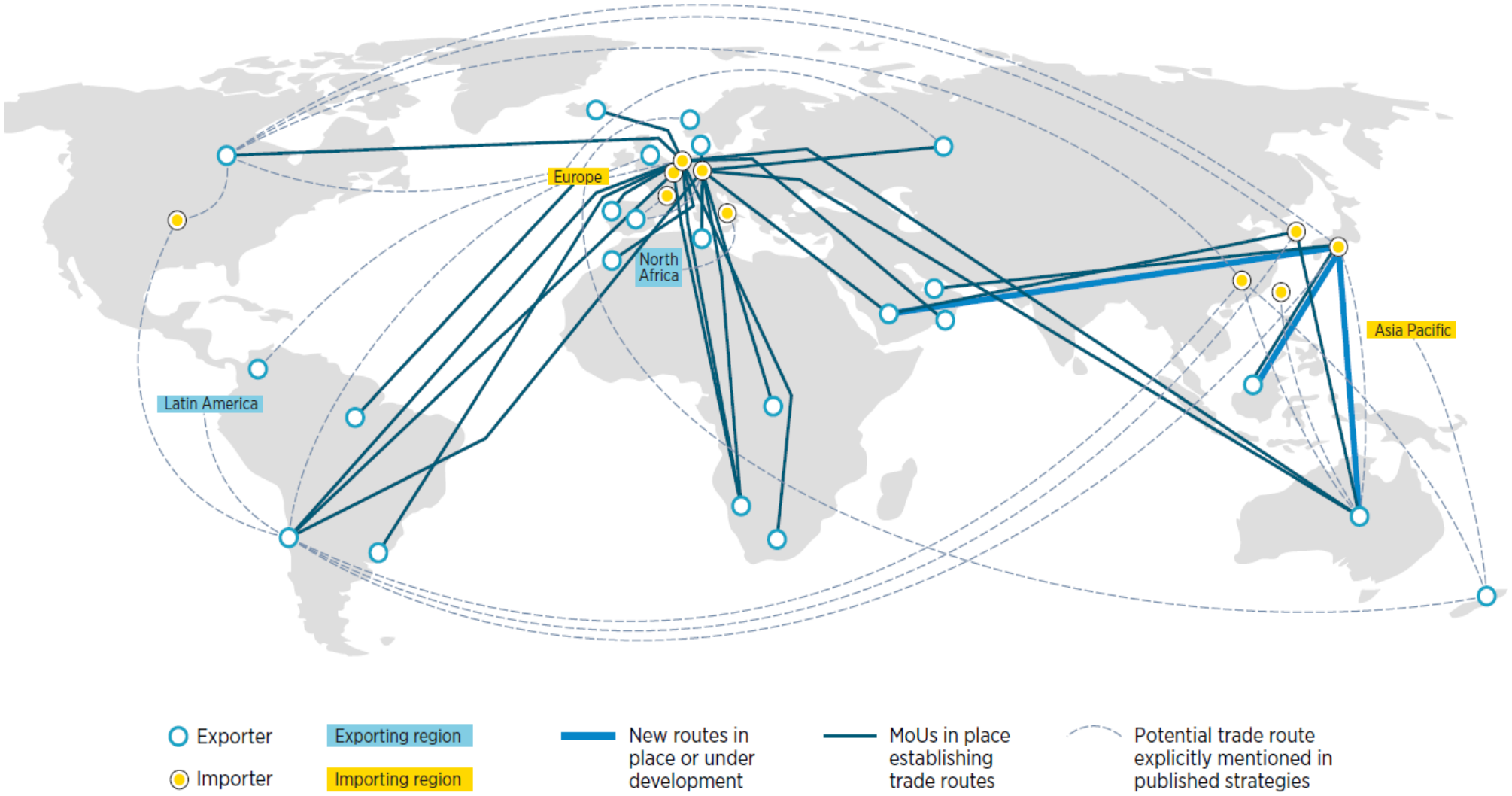
Source: IRENA (2017) Boosting Solar PV Markets: the role of quality infrastructure

Technical potential to produce green hydrogen



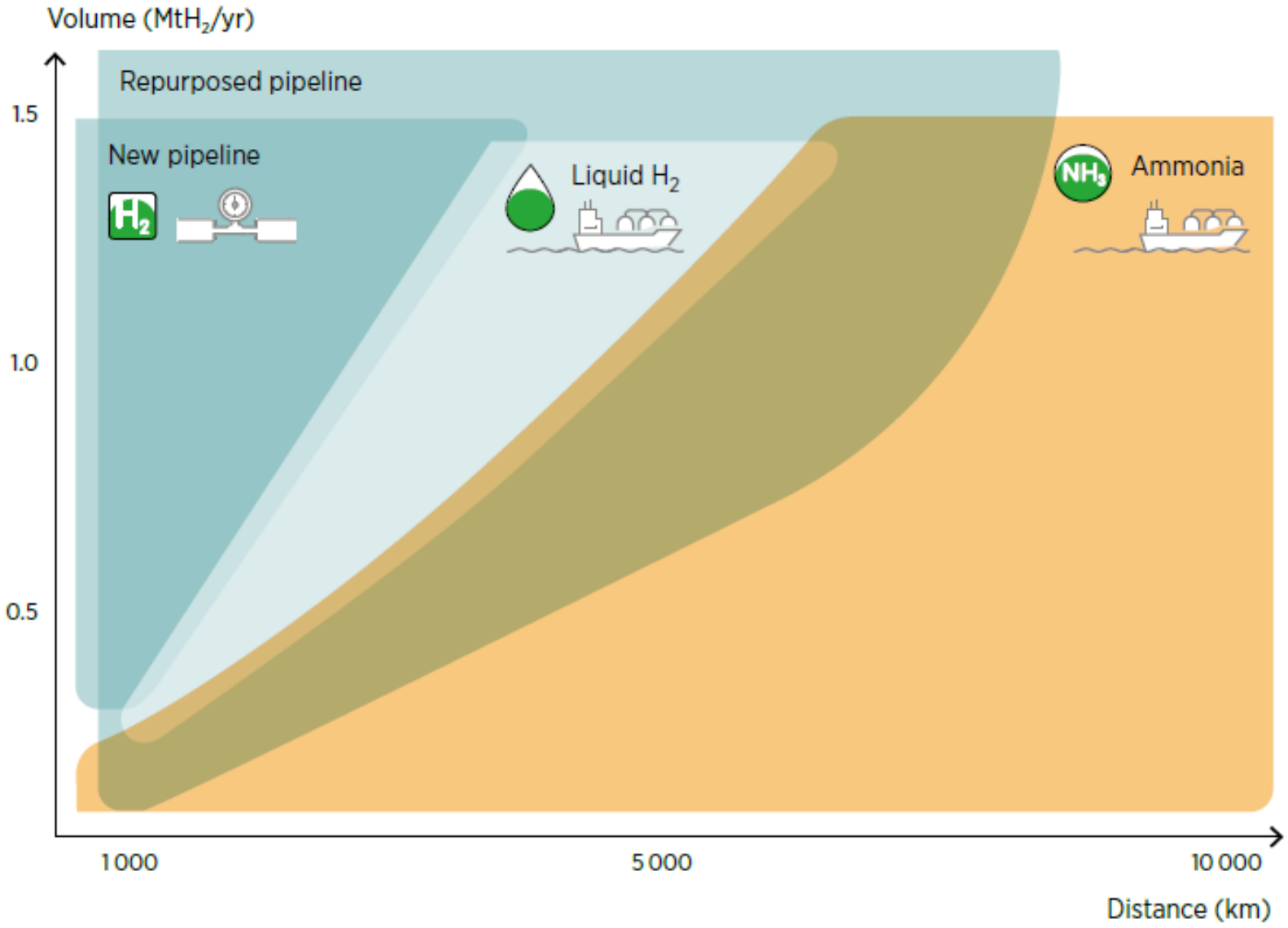
Source: IRENA

Hydrogen trade routes, plans and agreements



Source: IRENA

Cost efficiency of hydrogen transport considering volume and distance



Source: IRENA

Takeaways

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- The **energy transformation** is underway and standards will be key to implement the needed solutions at scale

- 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 services to communities and return on investment**

- **Harmonisation of technical requirements** to facilitate the globalisation of RE

- **Open, transparent and inclusive trade policies** can support further cost reductions, deployment and job creation in the solar PV sector

- Trade policies could build on past efforts to **reduce or eliminate solar PV tariffs**, which act as a hidden tax on solar PV equipment

- Tariff reduction initiatives should be complemented with efforts to **address broader technological, economic, policy and regulatory barriers** that hamper the deployment of solar PV.

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