RES4Africa Foundation

Knowledge Platform

Certification to foster hydrogen market

RINA

RES4AFRICA FOUNDATION

Hydrogen certification scheme

The Platform covers the following thematic areas:

- Technologies
- **Policies and regulations**
- Access to market
- Permitting
- Financing
- Operation
- Sustainability

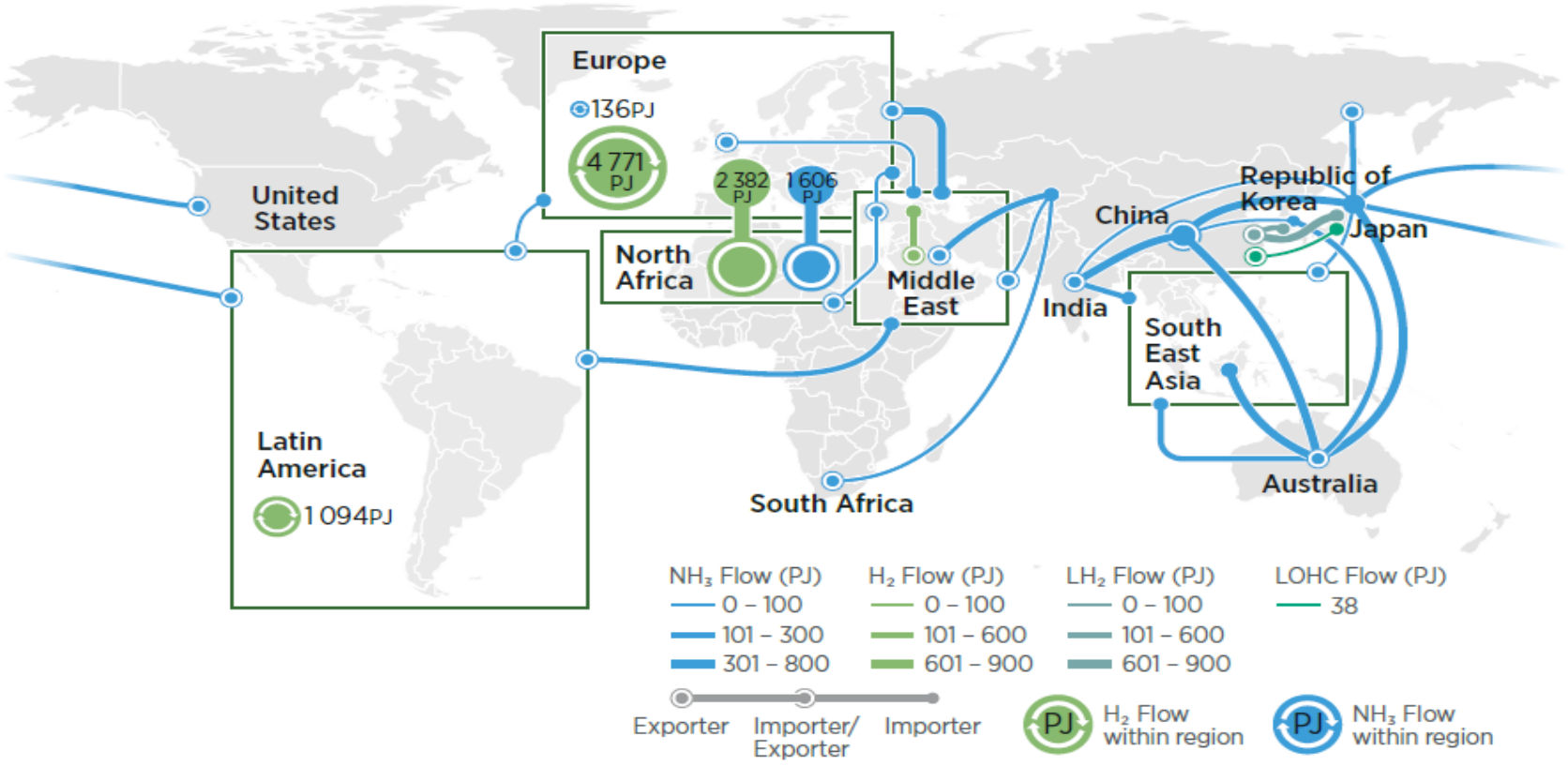
What is the context: A new global hydrogen market is forming, with public and private actors across the supply chain coming together. Today a cohesive certification system is missing.

Why is this relevant: A collaborative framework between importing and exporting countries for assessing and defining technical and Environmental, Social and Governance (ESG) elements to differentiate hydrogen is required to ease market participation for all the stakeholders.

What are the key questions:

- Why a hydrogen certification scheme?
- How is a certification scheme made?
- What is the status of hydrogen certification scheme?

An expanding network of hydrogen trade routes, plans and agreements



1 PJ = 10^{15} J

19,000

The energy used by 19,000 homes in a year – a city of ab. 50,000 inhabitants

A new global hydrogen market is forming and brings with it **geoeconomic and geopolitical shifts** compared to the O&G trade:

- From **few to many**: a broader market composed by many energy importers serving a small number of importing regions
- Potential importers are all the countries characterized by land availability and good quality renewables
- Traditional O&G exporting countries will be flanked by **new-comers**, like Chile, Morocco, Namibia, etc.

Technology transfer, infrastructure and investment at scale are necessary to make this possible

Source: IRENA, World Energy Transitions Outlook 2022

Africa’s extraordinary green hydrogen potential

Capturing a fraction of Africa’s massive solar energy resource to produce cheap and abundant green hydrogen, delivering affordable energy, accelerating and decarbonising growth across the continent and beyond.

1,230 GWp new solar energy generation	Tapping Africa's unparalleled solar potential in three hubs across Africa
50 Mt green hydrogen per year	to unlock vast amounts of green hydrogen
140 Mt green steel **160 Mt** green fertiliser	will decarbonise Africa’s heavy industry (steel, fertilizer mining, and transport) and strengthen its global competitiveness, saving an estimated 500 Mt in GHG emissions
3,800 Mm3 of clean fresh water, each year	whilst producing and distributing huge volumes of clean water for needs of the sector and households – up to 5% of domestic needs
< 2 €/kg Equivalent to €90 / barrel oil	at a price which competes well with oil, meaning Africa becomes an important player in international energy markets as they evolve and decarbonize

Africa combines good-quality **resources**, large areas of **land**, and a burgeoning energy sector.
Green hydrogen represents an opportunity to satisfy the growing energy needs of the continent while at the same time providing prospects for economic growth and industrial development through export of hydrogen and its derivatives.

Source: Corporate Value Associates

Certification to enable trade

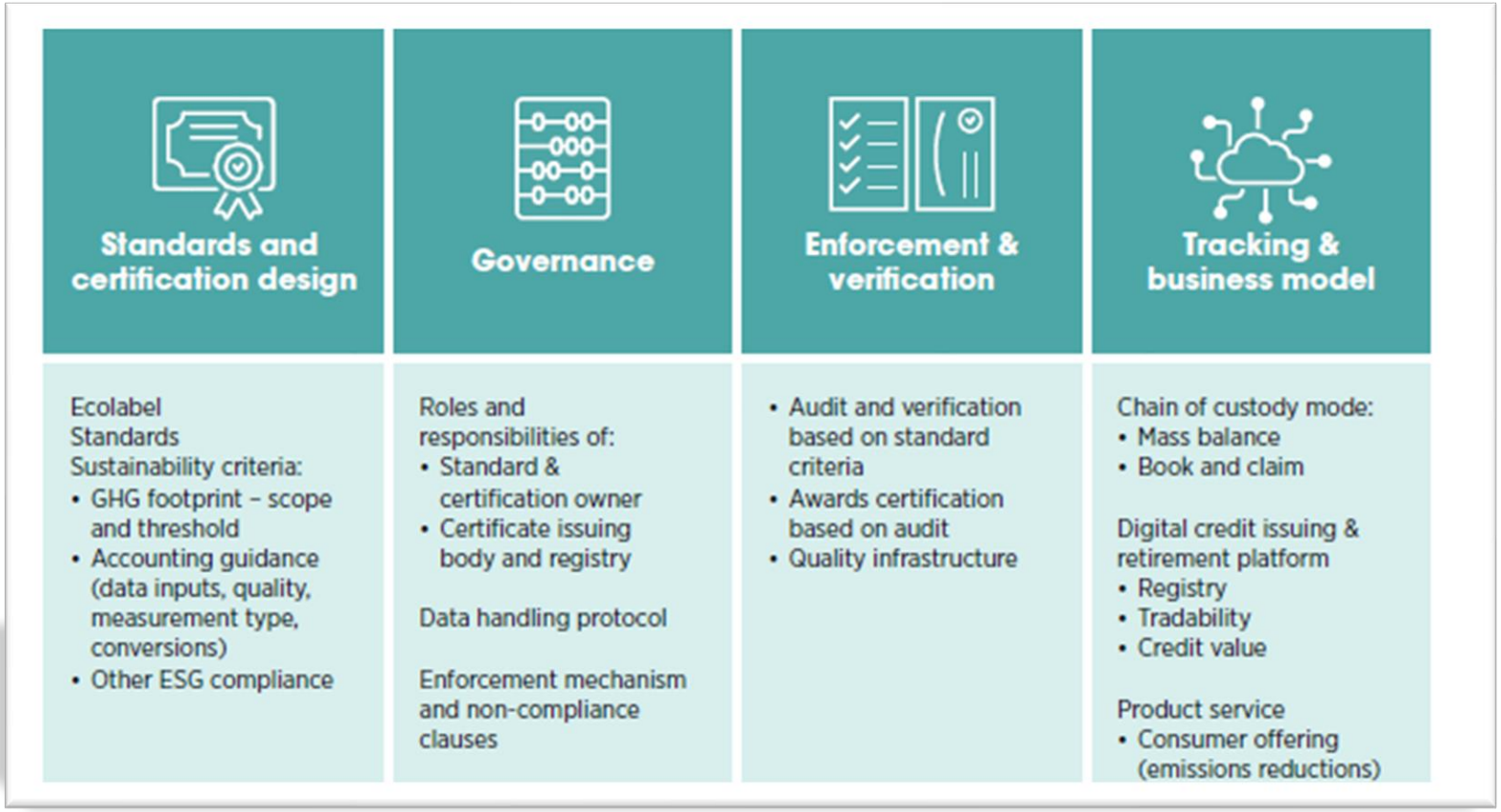
- **Certification** is an essential element of any trade, especially for the **development** of a **new trade in hydrogen**

- Certificates for hydrogen and its derivatives would contain information on **compliance with standards and regulatory requirements**, and enable verification through data on sustainability criteria, such as **carbon footprint** and **renewable energy content**, thereby allowing **differentiation** from other less green products. Certification would also allow compliance with additional **environmental, social and governance criteria** to be verified and would enable hydrogen consumers to signal demand for greener products by purchasing hydrogen that is certified as low carbon or renewable.

Why an hydrogen certification scheme?

A hydrogen certification system

- A successful certification system must capture the important technical components (as defined in the standard and certification design) and be embedded in an ecosystem of enabling operational components to ensure scalability



Source: IRENA 2023, Creating a global hydrogen market certification to enable trade

Design of standards and certification for hydrogen

Certification scope

System boundary

Which main emission sources from the hydrogen production supply chain are included?

Emissions accounting guidance

Methodology used to calculate the greenhouse gas (GHG) footprint across the system boundary for each emissions source, including criteria of additionality, temporal and geographic correlation

Emissions threshold (kg CO_{2eq}/kgH_2)

Defines the minimum carbon intensity value to differentiate the product

Labelling

Environmental, social and governance compliance

Green hydrogen should be produced, transported and used in ways that aim to minimize ESG consequences, while optimizing development opportunities

Certification: the status

- Certification schemes are evolving rapidly.
- Some schemes are wholly born out of industry, while some are based on government initiatives.
- Most mechanisms are designed for a specific country or region. There are gaps in standards and in ecolabelling and certification design, resulting in insufficient information in certificates to allow fair comparison across borders.
- However, the following mechanisms are working towards being recognized internationally: the Green Hydrogen Standard, CertifHy and the Zero Carbon Certification Scheme.

MANDATORY MARKET

California Air Resources Board Low Carbon Fuel Standard
European Commission* Renewable Energy Directive (RED II)
UK Department for Business, Energy & Industrial Strategy Low Carbon Hydrogen Standard
UK Department for Transport Renewable Transport Fuel Obligation
US Department of Energy** Clean Hydrogen Production Standard

Source: IRENA 2023, Creating a global hydrogen market certification to enable trade

European Commission Renewable Energy Directive (RED II)

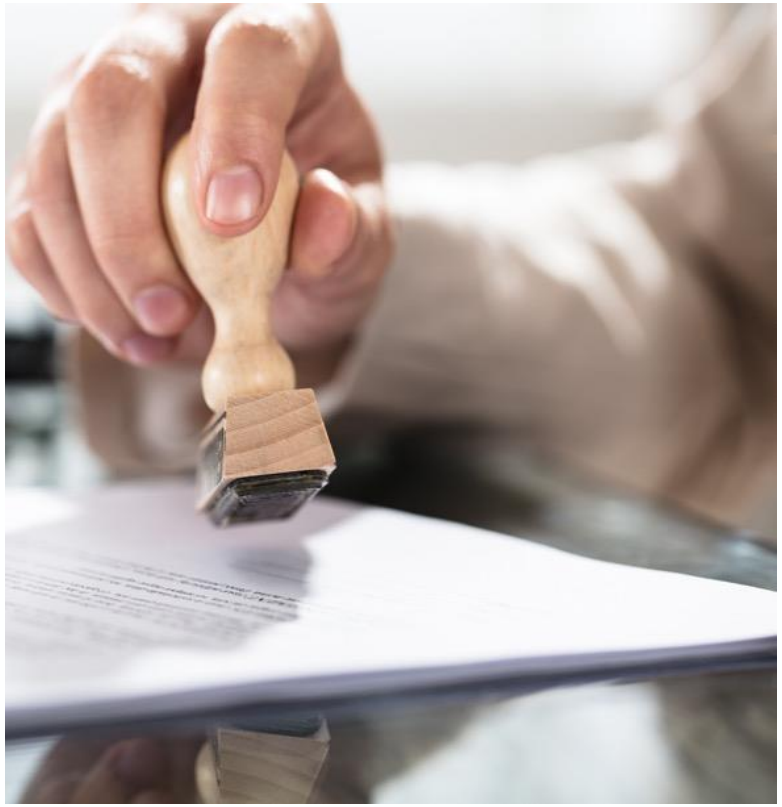
- Target for renewable energy consumption in the EU by 2030: **32%** (14% for transport) - **new proposal** sets this target at **45%** (REPowerEU).
- Low-carbon, renewable hydrogen and its derivatives, such as ammonia and methanol, are included in the category Renewable Fuels of Non-Biological Origin (**RFNBO**).
- Emissions threshold for RFNBOs: **70% GHG savings** compared to fossil fuel benchmark, equivalent to **3.384 kg CO_2 /kgH_2** (28,2 g CO2e/MJ) **-** life cycle GHG emissions savings.

- Criteria to be met for hydrogen produced via electrolysis to be considered fully renewable -the Delegated Acts were submitted to the European Parliament and the Council for approval in February. They both have 2 months to accept or object the Commission's proposal, with the possibility to extend to 2 further months-
  - the first Delegated Act defines when hydrogen, hydrogen-based fuels or other energy carriers can be considered as a renewable fuel of non-biological origin (RFNBO). The rules are to ensure that these fuels can only be produced from "**additional**" renewable electricity generated at the **same time** and in the **same area** as their own production.
  - The second Delegated Act sets the methodology to calculate GHG emissions savings from RFNBOs and recycled carbon fuels. The methodology takes into account the full lifecycle of the fuels to calculate the emissions and the associated savings.

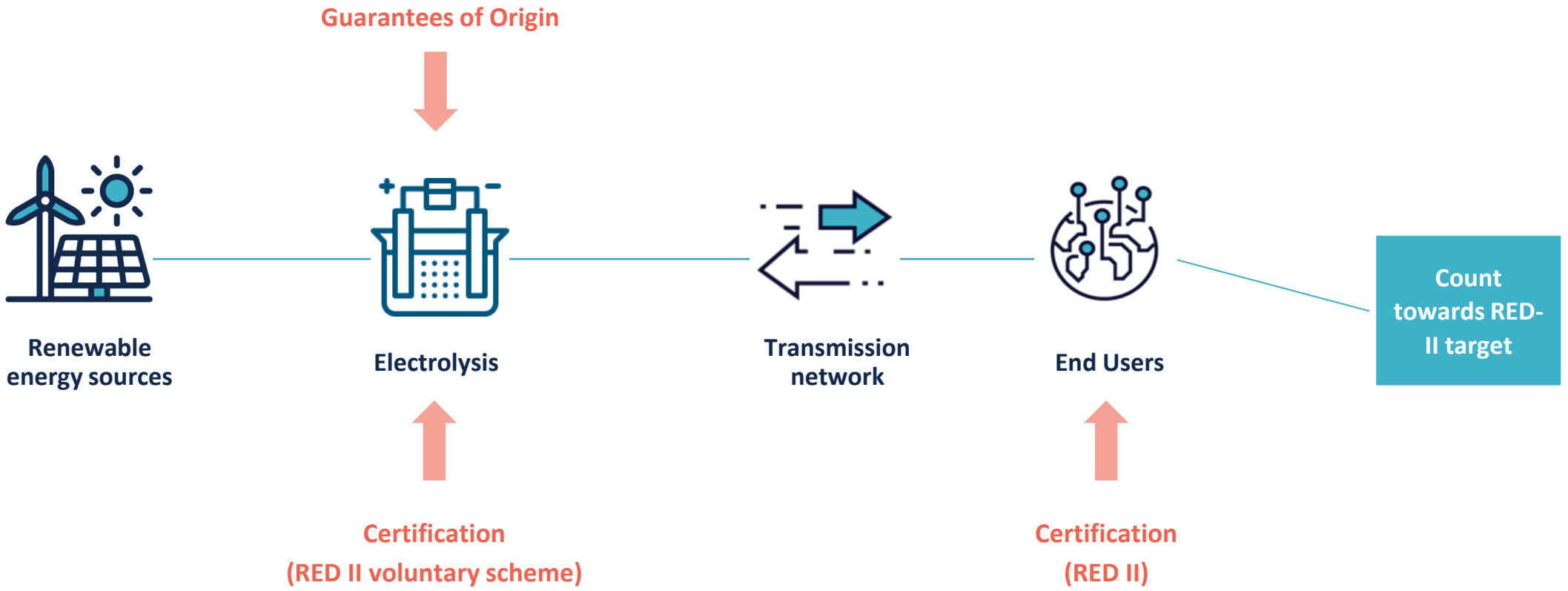
- The certification of **biofuels** has been already in place for more than a decade to certify the GHG emissions savings and sustainability criteria, including in countries outside the EU.

RFNBos Certification

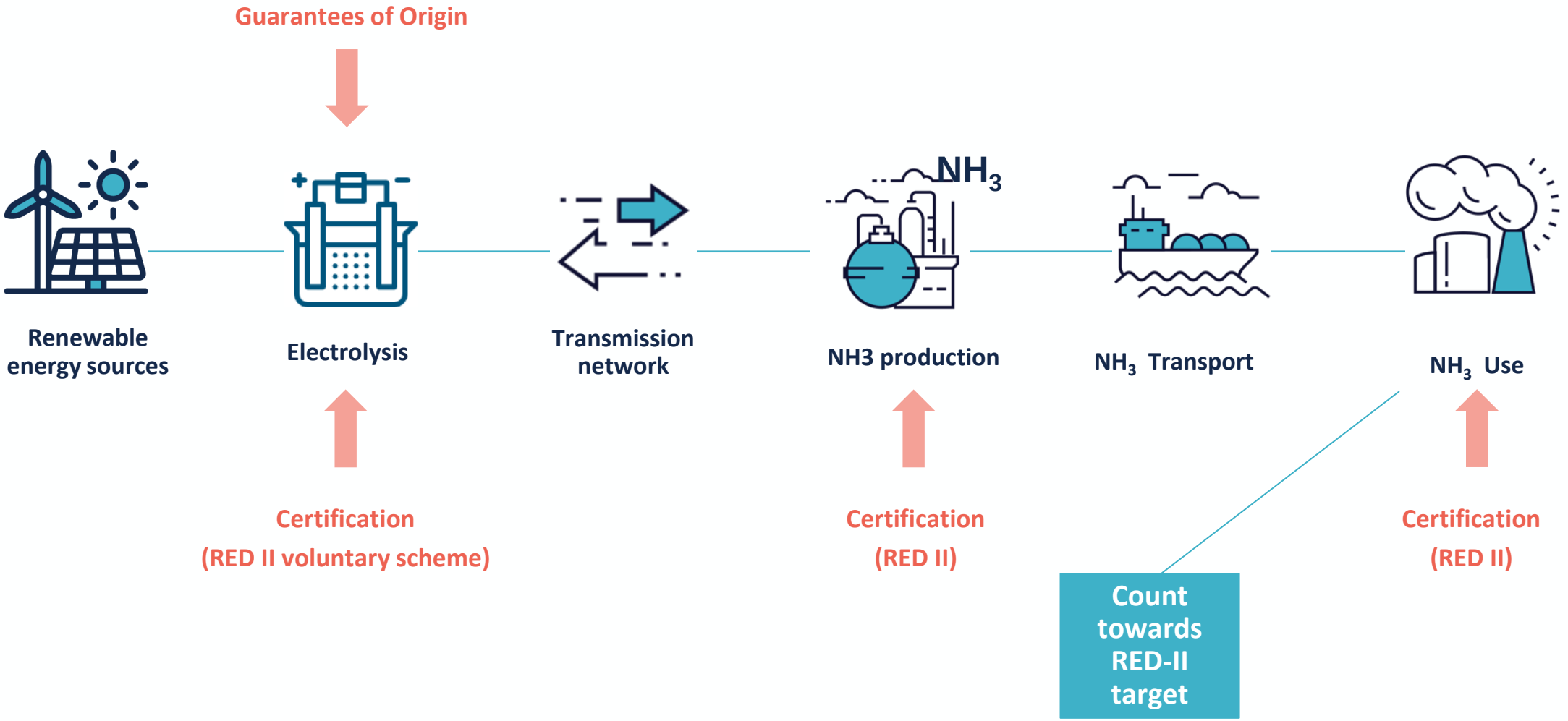
- **Today**, there is **no EU recognized scheme approved by EU** for renewable hydrogen (RED II).
- The procedure for certification can proceed as soon as the detailed criteria and calculation methodology for the life cycle emissions savings of RFNBOs will be finalized.
- **To prepare for the future**, RFNBOs producers can apply for certification on:
  - GHG savings target
  - Renewable origin of electricity used (GoOs)
- An example of a certification that can be applied for is the **ISCC PLUS certification**



Case of application 1: certification along the green hydrogen value chain



Case of application 2: certification along the green ammonia value chain



Conclusions

- Certification is an essential part of developing a global market for hydrogen.
- A cohesive and harmonized system is needed.
- Current regulations and schemes present gaps. More focused collaboration is required to overcome these gaps.
- The European Commission's RED II could be used as a best practice example for hydrogen certification. However, relevant aspects are still under finalization.

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