





UNIDO's Hydrogen Strategy and Green Ammonia Project @3<sup>rd</sup> International Conference on Fuel Ammonia (ICFA) (29<sup>th</sup> Sep. 2023) Yuko Yasunaga, Deputy to the Director General and <u>MD/COR, UNIDO</u>





#### Agenda

- 0. How does UNIDO work? What is ISID (Inclusive and Sustainable Industrial Development)?
- 1. UNIDO's "Global Programme for Hydrogen in Industry"
- UNIDO's key activities for Hydrogen in "Global Partnership for Hydrogen in Industry" (Financing and investment, Global fora, Innovation, Policy and regulation, Skills and knowledge, Standards, etc.)
- 3. UNIDO's "Technical Cooperation Programme" for Hydrogen (GEF, GCF, Triangular cooperation)
- 4. UNIDO's Green Ammonia Project





## 0. How does UNIDO work? (from 2022 Annual Report)

- What is ISID (Inclusive and Sustainable Industrial Development)?











 (upper left) Solar power plant in Tunisia
(upper middle) Leather production factory in Ethiopia
(upper right) Food production skill development in Syria
(lower left) R&D promotion in Cambodia
(lower middle) DG at COP27 in Egypt





#### 1. UNIDO's "Programme for Hydrogen in Industry"

- UNIDO launched the "Global Programme for Hydrogen in Industry" in 2021.
  - Accelerated uptake of Green Hydrogen
  - Application in hard-to-abate industries (developing countries/transition economics)
- 2 pillars of the Programme:
  - 1) Global Partnership for Hydrogen in Industry
  - 2) Technical Cooperation Programme





#### Hydrogen: Opportunities for developing countries



Renewable hydrogen or green hydrogen (produced from renewable energy) creates unique opportunities for a net zero industrial development in the Global South.

It is key to decarbonisation of the hard to abate sectors including steel production, cement, chemical industries and heavy transport, altogether responsible for approx. 20% of global CO2 emissions.

**Opportunities:** 













Resilience Divirsified economy



lobs creation

Skills upgrading

Investment mobilisation wealth generation Energy security





### 2. UNIDO's key activities for Hydrogen in Global Partnership (1)

- Financing and investment
  - To scale and facilitate access to finance, UNIDO aims to create innovative finance assistance mechanism with UK (Hydrogen Breakthrough Agenda), WB and IRENA.
- Global fora
  - UNIDO is acting as coordinator of the International Hydrogen Trade Forum (IHTF), to stimulate international Hydrogen trade, reduce barriers and foster productive market conditions. (Co-led by Govt. of the Netherlands and UAE)
  - Membership includes: Australia, Brazil, Canada, Chile, Germany, Japan, Saudi Arabia, South Korea, the Netherlands, UAE, UK, US Uruguay and European Commission.





### 2. UNIDO's key activities for Hydrogen in Global Partnership (2)



- UNIDO aims at accelerating clean Hydrogen-related innovations in developing countries from demonstration to commercial level, in cooperation with UK through the Clean Energy Innovation Facility. (Currently in the inception phase)
- Policy and regulation
  - UNIDO is developing a <u>policy toolkit</u> for green Hydrogen to create a domestic market in developing countries and transition economies, with IRENA and German Institute of Development and Sustainability (IDOS).





## [UNIDO's Policy Toolkit for Green Hydrogen]

- UNIDO will develop a policy toolkit for green hydrogen for its launching at the COP 28.
- 1) Potential and global perspectives of green hydrogen;
- 2) Green hydrogen economy in the Global South;
- 3) Policies on local market creation (downstream), transport, storage and distribution (midstream), and green hydrogen production and backward linkages (upstream);
- 4) Options for international cooperation to support national policy making; and
- 5) Policy sheets and roadmaps





- 2. UNIDO's key activities for Hydrogen in Global Partnership (3)
- Skills and knowledge
  - UNIDO is cooperating with Hydrogen Europe and the Machinery and Equipment Manufacturers Association (VDMA) to develop a <u>skills map</u> for Hydrogen.
  - UNIDO launched the Technical Guidelines on Green Hydrogen Industrial Clusters in cooperation with the German Energy Agency (DENA), etc.
- **Standards** 
  - UNIDO is collaborating with ISO Tech Committee 197 ("Hydrogen Technologies") to increase insight in public/private sectors of developing countries/transition economies.





#### [UNIDO's Skills Map for Green Hydrogen]

- UNIDO will conduct the skills development in hydrogen within three segments:
- 1) Mapping: Critical and in-demand professions and skills along the hydrogen value chain will be identified.
- 2) National skills gap assessments: In-country assessments will be conducted to identify skills gap and promote an up-skilling and re-skilling workforce for green hydrogen in developing countries.
- 3) Capacity building: Key gaps in skills for hydrogen will be addressed and relevant trainings at the national, regional and global level will be developed.





#### 3. UNIDO's technical cooperation programme

- (Global Environmental Facility)
- UNIDO has developed a <u>Global Clean Hydrogen Programme</u> as the lead agency, to enhance national institutional capacities, creating enabling policy frameworks, improve technological readiness and financial mechanisms.



gef

GEF

- UNIDO is conducting a project in South Africa under the GCF Readiness Programme on Green Hydrogen for South Africa, to coordinate activities of the Hydrogen Society Roadmap. Project in Morocco is under final review.
- Triangular cooperation with Spain Costa Rica Panama (Central American region)





#### [GEF-8 Global Clean Hydrogen Programme]

- The Global Clean Hydrogen Programme addresses various components on policy, technical readiness, establishing green hydrogen industrial clusters, creating bankable projects and knowledge management.
- 1) **Policy component**; to develop policies, incentives, regulations and standards
- 2) Technical readiness component;
  - to examine production potential and conversion processes for application
- 3) Green hydrogen industrial clusters;
  - to identify a selection of clusters/companies with potential for the transition
- 4) Creating bankable project preparation;

to identify the economic feasibility and innovative financing options

5) Global knowledge products and tools; by organizing workshops and events





#### 4. UNIDO's green ammonia project

- With UNIDO's support, International Hydrogen Energy Center (IHEC) is cooperating with global enterprises to carry out the world's largest demonstration of hydrogen production by using renewable energy and of hydrogen application in metallurgical industry in Baotou (包頭), Inner Mongolia, China.
  - <u>5 GW</u> scale GH production by water electrolysis using renewable energy
  - GH to be used to build a green metallurgical project to produce <u>1.2 mil tons of green ammonia</u> and <u>1.1 mil tons of reduced iron (ammonia to be</u> <u>used as reduction agent)</u>.
  - 15<sup>th</sup> April, 2023, the construction of the <u>first 1.5 GW</u> scale demonstration project started, and is expected to be completed in 2025. The <u>first batch of 390,000 tons</u> of green ammonia will be supplied in early 2025.



#### SUSTAINABLE DEVELOPMENT

#### [Green ammonia to play a key role as a fuel for decarbonization]

- Carbon-free fuel no CO<sub>2</sub> emission
- Easy to handle in liquid form
- Combustible in industrial furnaces mixed with other fuels
- Technologies and skills for handling (production, transportation, storage and usage) are readily available by industries, and existing industrial infrastructures can be used with small modifications (with small additional investments).
- Can be used as Hydrogen carrier.
- Can also be used as a raw material for chemical industries such as fertilizers, etc. Developing fertilizer industry will also help developing countries' food security and nutrition.
  - Solar/wind-rich developing countries expect to create new industries and to promote agricultural production.





#### [Conceptual drawing - UNIDO's green ammonia project in Baotou]







# Thank you

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