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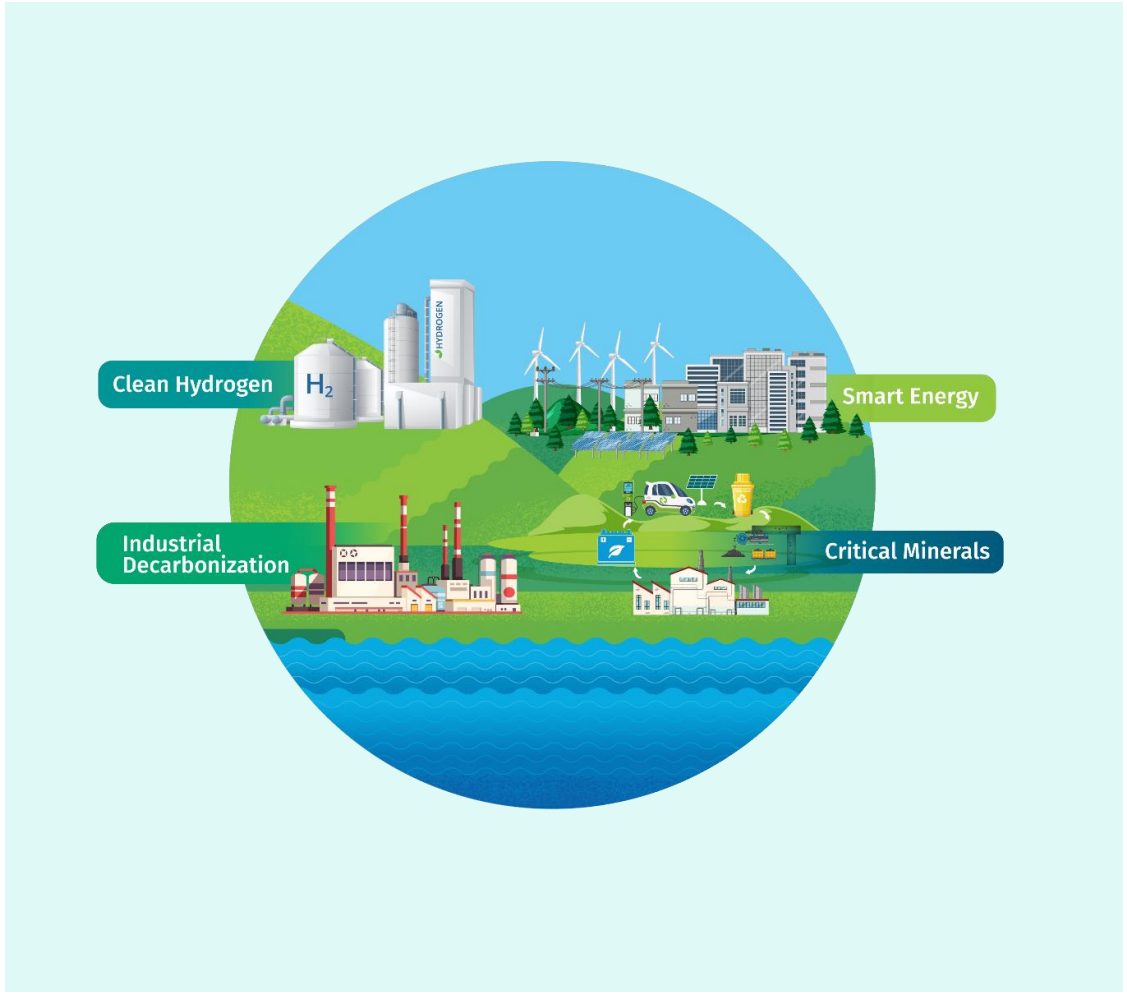
A2D
Accelerate to Demonstrate Facility



Accelerating Innovation in Smart Energy and Industrial Decarbonization

Market Assessment International Webinar

Accelerate-to-Demonstrate (A2D) Facility

Thursday, 28 November 2024, 14:00 – 15:00 CET

Our partners:

UK Government

KPMG

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Agenda

Time	Agenda item	Speaker
14:00 – 14:05	Opening remarks	Mr. Peter Warren, A2D Facility Manager, UNIDO
14:05 – 14:10	Overview of the A2D facility	Ms. Yi ZHANG, Project Coordinator on Smart Energy and Industrial Decarbonization, UNIDO
14:10 – 14:40	Market assessment presentation	Adela Roszkowski, Senior Manager, KPMG Austria Ruba Amarin, Director, KPMG US
14:40 – 14:55	Questions and answers	Moderated by: Ms. Yi ZHANG, Project Coordinator on Smart Energy and Industrial Decarbonization, UNIDO
14:55 – 15:00	Closing Remarks	Mr. Peter Warren, A2D Facility Manager, UNIDO

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UNIDO's role in advancing clean energy innovation

- UNIDO is the UN Agency for the promotion of inclusive and sustainable industrial development in developing countries.
- UNIDO focuses on three main priorities:

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Supporting sustainable supply chains so that developing country producers get a fair deal and scarce resources are preserved.

Limiting climate breakdown by using renewable energy and energy efficiency to reduce industrial greenhouse gas emissions.

Ending hunger by cutting post-harvest losses and developing agribusiness value chains.

UNIDO's expertise:

- Technical assistance and capacity building
- Investment and innovation funding
- Partnerships and collaboration
- Policy dialogues

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Examples of key UNIDO initiatives in smart energy

Global Alliance on AI for Industry and Manufacturing

Aim: Initiative fostering international partnerships to promote responsible AI development.

Launched at World AI Conference 2022 in Shanghai.

Accelerate-to-Demonstrate (A2D) Facility

Aim: Accelerating the commercialization of innovative smart energy solutions, especially the integration of advanced digital and intelligent technologies within the energy sector, through direct grant support to the beneficiaries in developing countries.

Launched on 15 May 2023.

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UNIDO 4IR Strategic Framework

Aim: Aims to enable everyone to address the challenges and reap the opportunities of the Fourth Industrial Revolution (4IR).

First session of the Development Dialogues took place in October 2021.

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Examples of key UNIDO initiatives in industrial decarbonization

Industrial Deep Decarbonization Initiative (IDDI)

Aim: IDDI, coordinated by UNIDO, is a coalition of governments working with the private sector to create an enabling environment for heavy industry decarbonization with an initial focus on steel, cement and concrete.

Launched in 2021 by UNIDO and the Clean Energy Ministerial.

INDUSTRIAL DEEP DECARBONISATION
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Accelerate-to-Demonstrate (A2D) Facility

Aim: Accelerating the commercialization of innovative industrial decarbonization solutions, especially energy-intensive sectors, in developing countries through direct grant support to the beneficiaries.

Launched on 15 May 2023.

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Global Matchmaking Platform

Aim: Supporting developing countries in moving forward with the industry decarbonization agenda by facilitating the alignment, coordination and matchmaking of existing international technical and financial assistance offers and private finance.

Launched on 5 December 2023.

CLIMATE CLUB | Global Matchmaking Platform

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Examples of key UNIDO initiatives in industrial decarbonization

Partnership for Net Zero Industries

Aim: Delivering support at the company-level and developing an initial list of feasible industry decarbonization technology solutions for heavy industry to develop bankable proposals for financing.

Launched on 5 December 2023.

Breakthrough Agenda

Aim: UNIDO, in cooperation with the Breakthrough Agenda, the World Bank and IRENA, developed a mapping exercise of financial and technical initiatives on clean hydrogen for developing countries. A2D Facility part of latest Breakthrough Agenda report.

BREAKTHROUGH AGENDA

Industrial Decarbonization Hub

Aim: collaborative platform co-organized by Brazil and the UK to mobilize and coordinate international assistance programmes to support Brazil's ambitions for industrial decarbonization and green industrialization. UNIDO leading the workplan implementation.

Launched on 26 March 2024.

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Overview of the Accelerate-to-Demonstrate (A2D) Facility

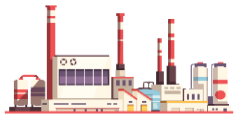
The Challenge

35% of the emissions reductions needed by 2050 come from technologies that are still in development and have not reached markets at commercial scale (IEA, 2023).

The Solution

The A2D Facility aims to accelerate the commercialization of innovative clean energy solutions in developing countries by supporting catalytic and scalable demonstration projects in:

- **Critical minerals**
- **Clean hydrogen**
- **Smart energy**
- **Industrial decarbonization**



Initial Funding and Timescales

- **Initial contribution of ~USD 80 million** from the UK Government (DESNZ)
- Initially operates from **April 2023 to March 2029**
- Projects supported through calls-for-proposals (first call in July 2024)
- **Grants of USD 1-5 million** per project.
- Main SDGs-of-focus:

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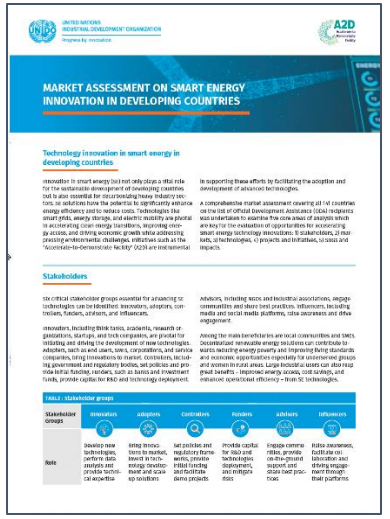
Market assessment on accelerating innovation in smart energy and industrial decarbonization

What: the large-scale market assessment presents new evidence and analysis, is covering the landscape of smart energy and industrial decarbonization stakeholders, markets, technologies, projects and initiatives, Sustainable Development Goal (SDG) impacts.

Purpose: it fills an important gap in the data, evidence and analysis on smart energy and on industrial decarbonization in developing country contexts.



Access the report at https://a2dfacility.unido.org/ or scanning the QR code.

MARKET ASSESSMENT ON SMART ENERGY AND INDUSTRIAL DECARBONIZATION INNOVATION IN DEVELOPING COUNTRIES

International Webinar

28.11.2024

Enabling industrial growth in developing countries while limiting GHG-emissions requires concerted efforts – and investments – to accelerate clean technology innovation

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Funded by UK Government

Developed by KPMG

KPMG

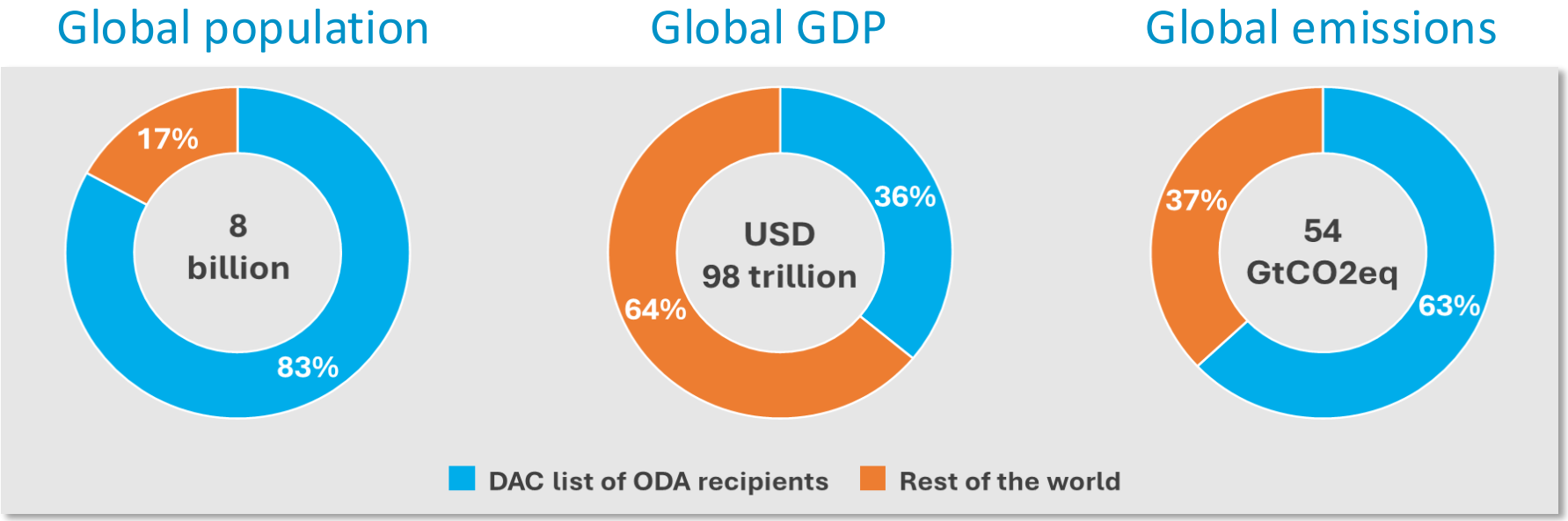
Presenters

Decarb Hub IDAS

Adela Roszkowski
Senior Manager
KPMG Austria

Ruba Amarin
Director
KPMG US

While emissions and exposure to climate risks are increasing in developing countries, poverty, access to energy and industrialization remain key challenges



The 141 countries on the OECD list of Official Development Assistance (ODA) recipients represent 83% of the global population, yet they account for 63% of global emissions and 36% of global GDP.

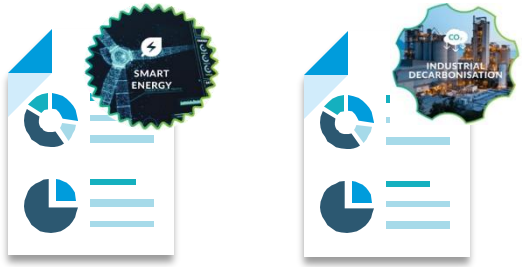
While there is a decline in poverty levels in some regions, GDP per capita significantly lags global averages, and the absolute number of people living in poverty has steadily increased over time.

Electricity demand is projected to double in developing countries. Their energy systems present an opportunity for transformation but require investments in infrastructure and innovation.

2 thematic areas – 2 market assessments – with 2 overlapping x-cutting thematic areas

Structure and overall approach

2 market assessments were conducted - **smart energy** and **industrial decarbonization**



...covering **5** core areas of analysis

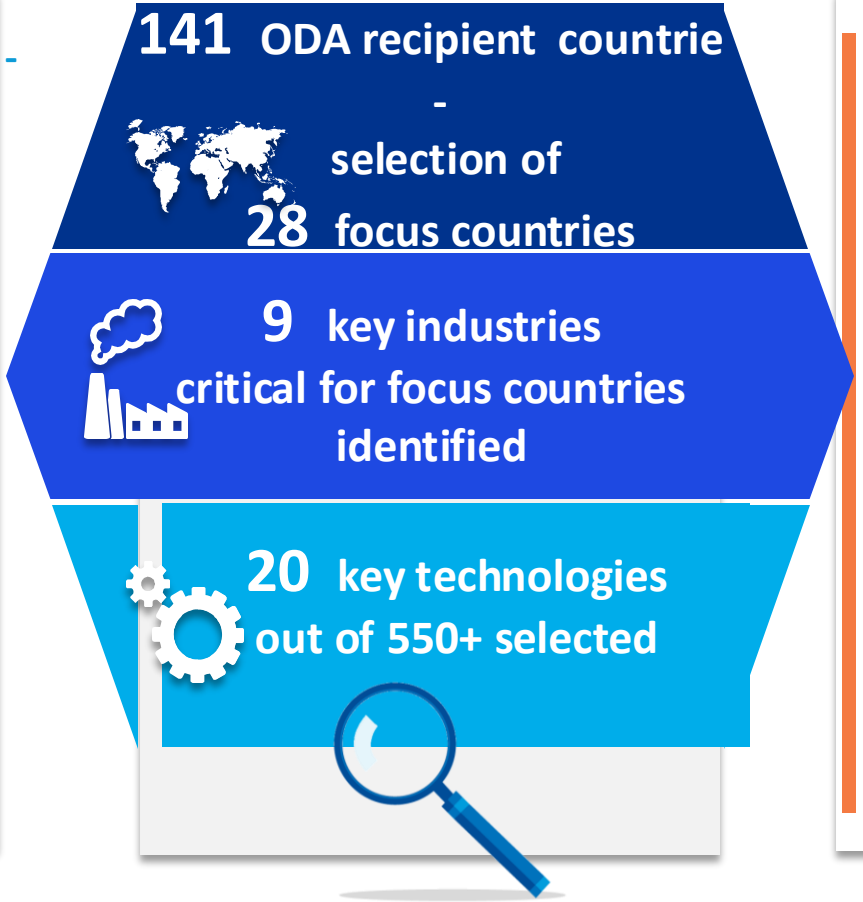

Projects and initiatives


Technology landscape


Impacts and SDGs

x-cutting areas

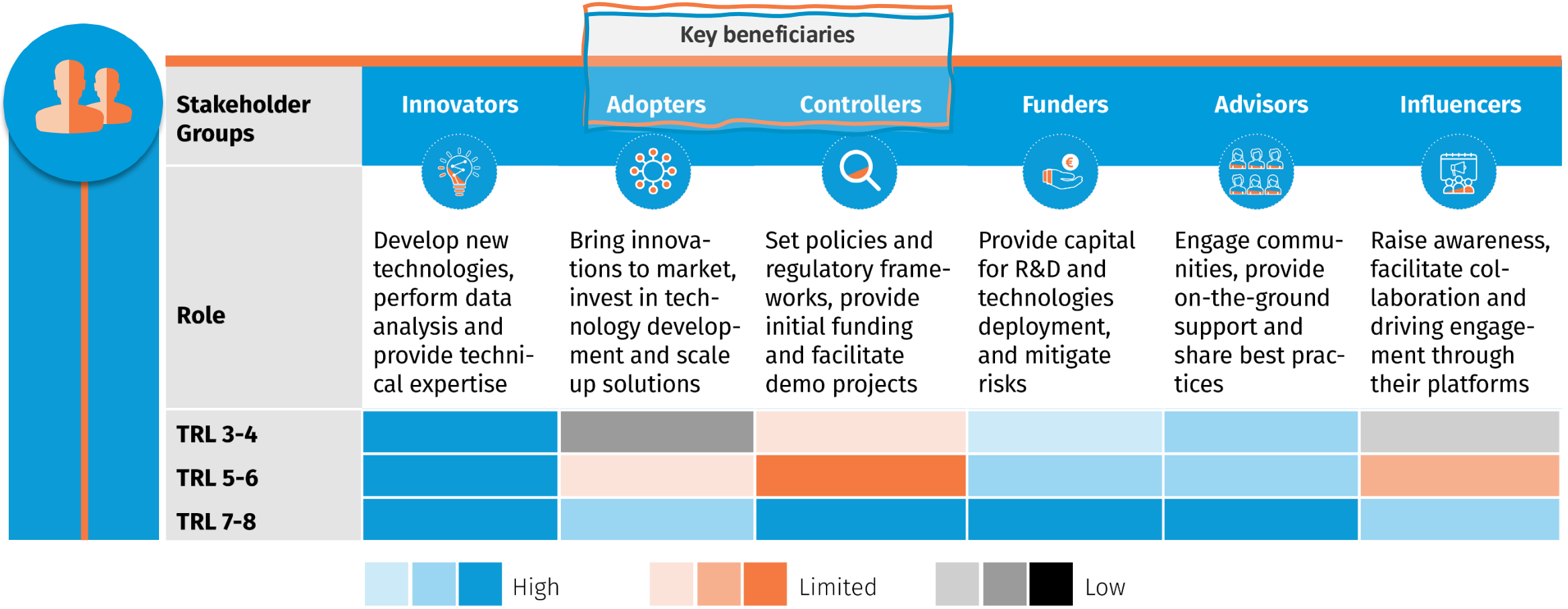
Delineation of assessment scope



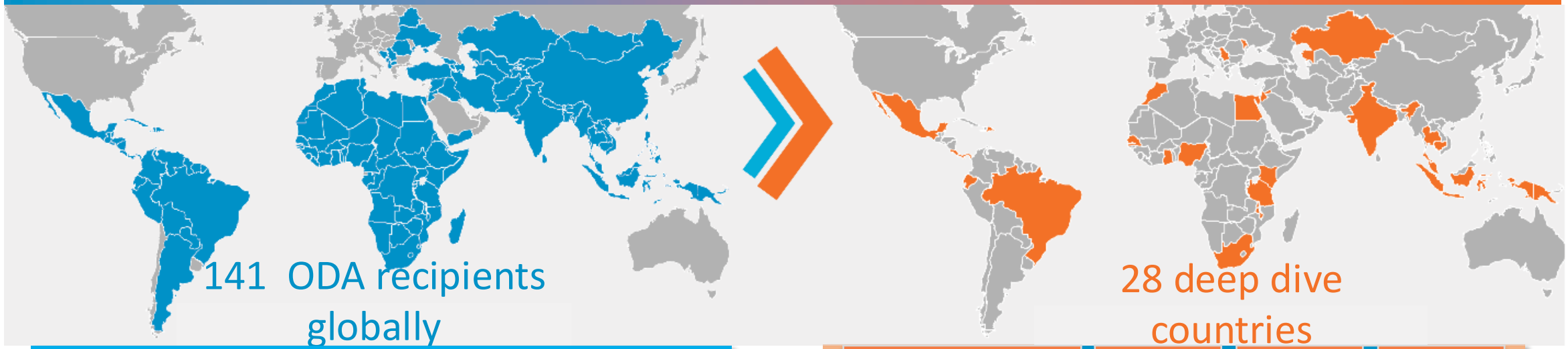
Results

- **Assessment grid** for comprehensive country performance evaluation
- **Thematic area specific** findings
- Results on **x-cutting themes**
- **Projects** data base
- **28** deep dive **country profiles**

Six key stakeholder holder groups playing a critical role in driving technology innovation in smart energy and industrial decarbonization have been identified



While all 141 countries included in the list of ODA recipients are covered by the two market assessments, 28 deep countries provide the focus for deep dives and extended analysis



141 ODA recipients globally

28 deep dive countries

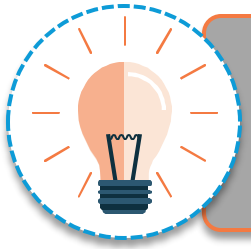
While the assessments provide a global view covering all 141 ODA recipient countries, a representative set of countries has been selected for deep dive analysis. These deep dives look at these countries as suitable environments for advancing and leveraging innovative technology solutions in smart energy and industrial decarbonization, they also provide an overview of existing and planned relevant projects.
The selection of deep dive countries involved a nuanced approach based on performance in relevant indicators (including exclusion criteria) as well as regional, sub-regional and income-level representation.

Africa		Asia	Americas	Europe
Malawi	Egypt	Cambodia	Domin. Republic	Moldova
Rwanda	Morocco	India	Costa Rica	Serbia
Tanzania	Ghana	Jordan	Mexico	
Senegal	Nigeria	Kazakhstan	Panama	**Oceania**
The Gambia	Mauritius	Indonesia	Brazil	Papua New Guinea
Kenya	South Africa	Malaysia	Ecuador	
		Thailand		

Several ODA recipients provide strong enabling environments for technology innovation in SE and ID – but current policies do not explicitly address the promotion of technology innovation

ODA recipient countries **vary significantly across a wide range of dimensions**, incl.:

- Income levels
- Economic performance
- Political stability
- Corruption
- Contribution towards SDGs
- Emission reduction ambitions
- Access to clean energy
- Maturity of policy frameworks



Performance across these dimensions determines the extent to which these countries provide **enabling environments for technology innovation**.

High-potential markets include:


South Africa


Mexico


India


Brazil


Thailand

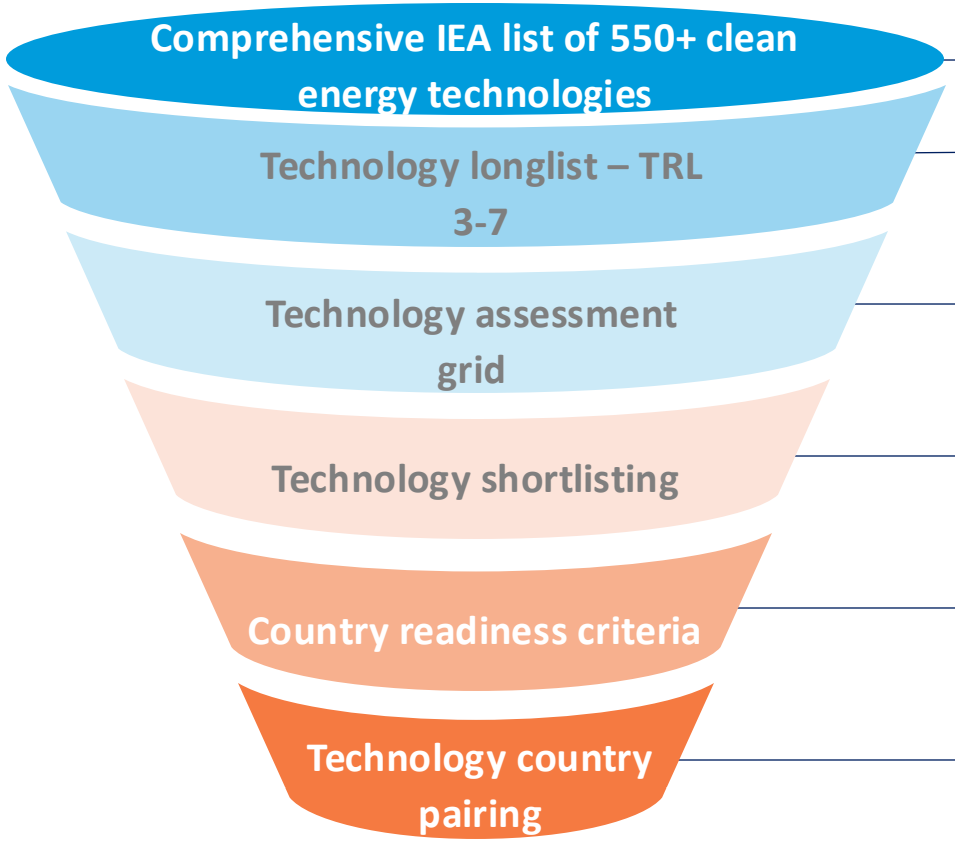
- They provide **strong enabling environments** and **policy frameworks oriented towards sustainability.** There is also a continued **effort to reduce the costs of renewable energy technologies**, thus making them more accessible.
- **Yet few policies address innovative technology solutions specifically** – this highlights a **need for more targeted policies that support the development and deployment of cutting-edge technologies** in both SE and ID.
- Moreover, there are **severe limitations due to outdated infrastructure and competitive pressures** in global markets (esp. when critical importers have limited concern for sustainability).

Industry selection is based on the sector's contribution to global GHG-emissions, availability of suitable technologies within focus TRL range, and their relevance for ODA countries

Aluminum	Iron and steel	Metallic products	Chemicals and plastics	Cement and concrete	Power and utilities	Pulp and paper	Textile	Transport
Key challenges within the context of GHG-emission reductions								
– Intensive energy consumption & high emissions during the **smelting process**.	– One of the **largest industrial sources of global emissions**.	– Energy-intensive manufacturing processes, esp. in **metal treatment and shaping**.	– Complex **production processes** consuming large amounts of energy and emitting various GHGs.	– **Calcination process** is inherently carbon-intensive and difficult to abate.	– Substantial direct emissions from fossil fuel combustion; **central role in the energy transition**.	– Heavy use of energy, **water and raw materials** - significant carbon and chemical emissions.	– Extensive **water and energy usage**, along with pollution from dyes and treatments.	– Significant **fossil fuel combustion in vehicles**. – **Technology & infrastructure constraints**.
Examples								
Contribution to manufacturing GVA and emissions		**Contribution to manufacturing GVA**		**Production capacity mn metric tonnes**		**Consumption in TWh**	**Production capacity mn metric tonnes**	**Contribution to manufacturing GVA**		**Percent of total emissions**	
Kazakhstan	45%	Nigeria	32%	India	410	India	1460	Brazil	10.2	Cambodia	70%	Ghana	54%
South Africa	15%	Malaysia	17%	Brazil	63	Brazil	580	Indonesia	10.0	Mauritius	26%	Costa Rica	49%
Nigeria	15%	The Gambia	17%	Indonesia	62	Mexico	300			Nigeria	20%	Ecuador	37%
Ghana	14%	Thailand	16%	Egypt	50	Indonesia	310	*Two of the ODA countries feature in global top 10 producers*		The Gambia	10%	Panama	34%
India	14%	Morocco	16%	Mexico	50	South Africa	200			Jordan	8%	Malaysia	31%

GVA = gross value added by the sector

An initial IEA longlist of 550+ relevant technologies relevant for both thematic areas was matched with technological attributes and country requirements to achieve technology focus



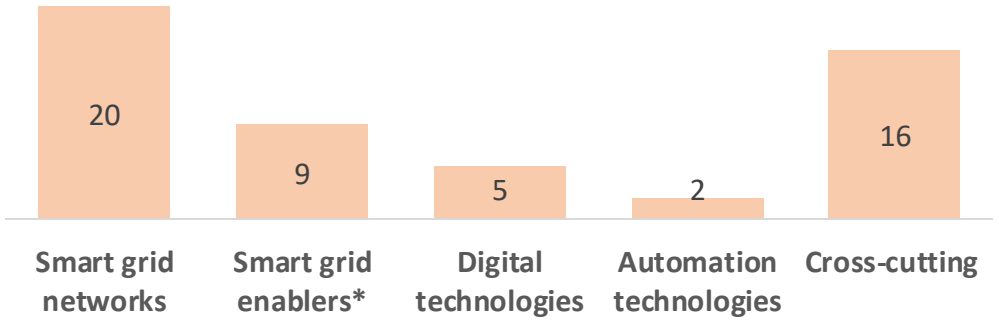
- Initial list of **550+ clean energy technologies** across TRLs*
- Longlist of technologies **aligned with smart energy** and **industrial decarbonization** and within **TRL 3 –7**
- Technologies assessed based on **TRL** and across **key technology attributes** such as affordability, technical feasibility, scalability, potential impact and degree of innovation
- Technology shortlist based on their **evaluation score for each thematic area;** 5-10 technologies for smart energy and for industrial decarbonization, respectively
- Framework to **assess country readiness** encompassing enabling factors such as innovation readiness, macro and demographics, and industry focus
- **Focus technologies for each focus country** based on technology attributes and respective country requirements – presented in the results section of this document

* Two sources were used: the IEA clean energy technology guide (covering both SE and ID technologies) and Entsoe-E technopedia (covering SE)

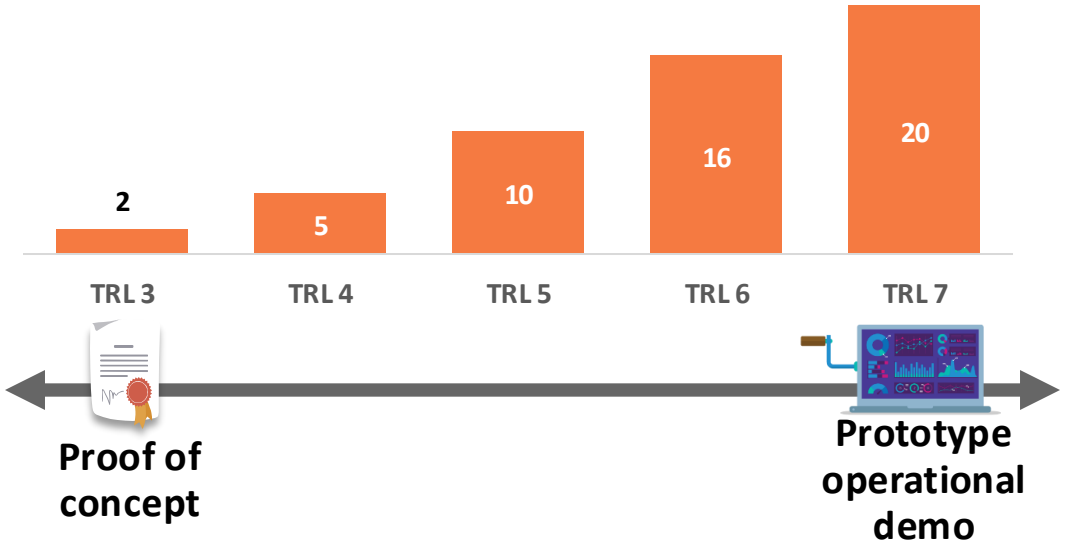
52 technologies were shortlisted and then further assessed for relevance for each country

Most shortlisted SE technologies are in post conception phase and almost 50% of them are in prototype or pilot testing phase; the technologies can be grouped into 5 technology groups, 4 of which are smart energy specific, and 1 which covers SE-ID cross-cutting technologies (i.e., relevant for both).

Number of technologies by tech groups



Number of technologies by TRL



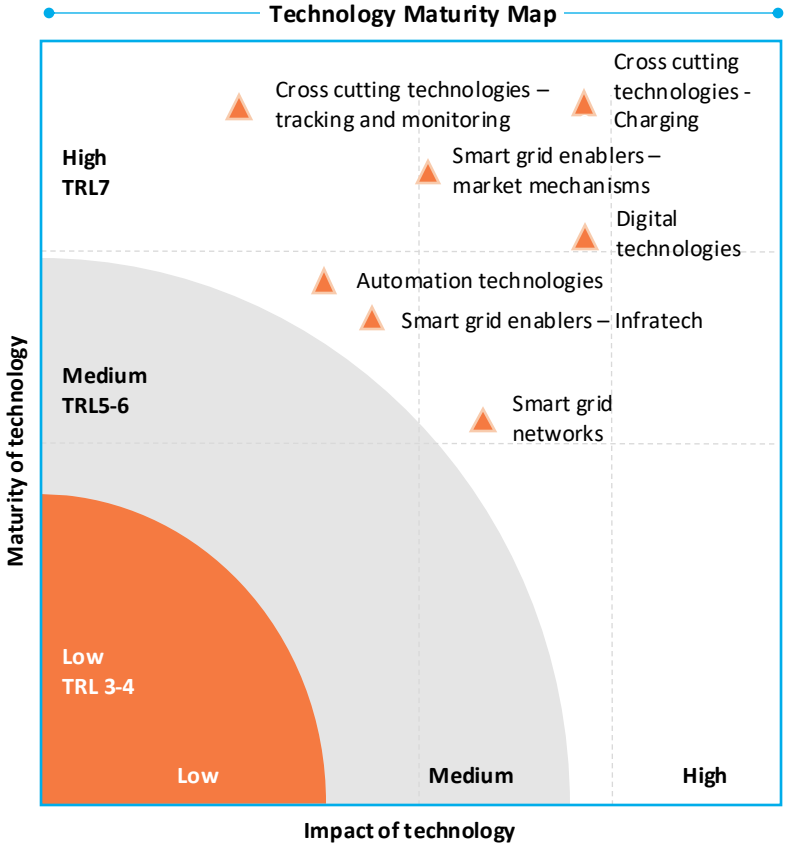
*Smart grid enablers include smart grid Infratech and smart grid market mechanisms

Sources: **Smart Grid (Entsoe); Other technologies (IEA)**; KPMG Analysis,

Smart energy technologies are mostly focused on development of smart grid networks and are more prevalent in comparatively large countries with high energy demand

Key smart energy technology groups

Technology groups	Application and R&D initiatives	Key regions with ongoing activities
Smart grid networks	A smart grid allows devices to communicate between suppliers to consumers, allowing them to manage demand, protect the distribution network, save energy and reduce costs. A smart grid provides a two-way flow of electricity, thus helping in adoption of net metering mechanisms[3].	Americas, Asia and Africa
Smart grid enablers - infratech	Refers to infrastructure technologies that support smart grid development. These could include hardware, communication protocols, sensors, and monitoring systems.	Americas, Asia and Africa
Smart grid enablers - market mechanisms	Market mechanisms in smart grids typically involve pricing models, demand response programs, and energy trading platforms. These mechanisms aim to optimize energy distribution, encourage efficiency, and enhance grid stability.	Americas, Asia and Africa
Digital technologies	Digital technologies can help integrating the growing share of renewables into the existing infrastructure by delivering flexible electricity systems that provide demand side solutions and energy storage[5].	Asia
Automation technologies	Automation and Artificial Intelligence (AI) can solve challenges related to rising power demand, efficiency, changing supply and demand patterns, and provide analytics needed for optimal management[7].	Asia
Cross cutting technologies	These are technology that fall under both thematic areas – smart energy and industrial decarbonization. These include charging technologies , tracking and monitoring technologies etc.	Asia, Americas, Europe and Africa



Sources: 1. C2ES; 2. World Summit on Small Wind; 3. Science Direct – Smart Grids; 4. EEPower; 5. European Commission; 6. Softengi; 7. IFC; 8. AGL; 9. IEA – Grid integration of electric vehicles; 10. US Department of Energy

Most relevant SE technologies allow for effective integration of renewables and critically enhance the efficient use and distribution of energy

Smart energy refers to systems and applications using digital technologies (Internet of Thigs, Machine Learning, Artificial Intelligence, Blockchain, etc.) which enable more efficient usage, delivery and distribution of energy.

Technology	TRL	Technology type	Application
Virtual Power Plants (VPP)	7	Smart grid enabler – market mechanism	Power and Utilities
Electric vehicle demand response	7	Smart grid enabler – market mechanism	Mobility
Automated and connected vehicles	7	Cross cutting: tracking and monitoring	Mobility
Digital twin (DT)	6	Digital technologies	Multi-sector
Industrial demand response for frequency balancing & voltage control	6	Smart grid enabler – market mechanism	Multi-sector
Voltage Source Converters (VSC)	6	Smart grid networks	Power and Utilities
Ultra-fast charging	6	Cross cutting: charging technologies	Mobility
Distributed ledger technology / Blockchain	6	Digital technologies	Multi-sector
Rail-to-grid energy storage system	5	Smart grid network	Mobility
AI & ML in power systems	4	Automation technologies	Power and Utilities

Technology Readiness Levels (TRLs)

Focus TRLs

- TRL 9 – Actual system proven in operational environment
- TRL 8 – System complete and qualified
- TRL 7 – System prototype demonstration in operational environment
- TRL 6 – Technology demonstrated in relevant environment
- TRL 5 – Technology validated in relevant environment
- TRL 4 – Technology validated in lab
- TRL 3 – Experimental proof of concepts
- TRL 2 – Technology concept formulated
- TRL 1 – Basic principles observed

Most smart energy projects are impacted by technological and environmental constraints

32 relevant SE projects across the 28 focus countries were identified and analyzed

SE

Primary Stakeholder	Primary market constraints	Funding mechanism	Technology category
IGOs 4%	Social constraints 0%	Multiple 4%	Digital Technologies 8%
Foreign government 4%	Economic constraints 17%	Subsidies 4%	Automation technologies 8%
Research institutions 8%	Political and legal constraints 29%	Crowdfunding 4%	Smart grid enablers - Infratech 13%
Government owned enterprise 8%	Technological and environmental constraints 54%	Incentives 8%	Smart grid networks 25%
Government 13%		Loans 13%	Smart grid enablers-market mechanisms 46%
Private organization 29%		Equity 25%	
Energy utility 34%		Grants 42%	

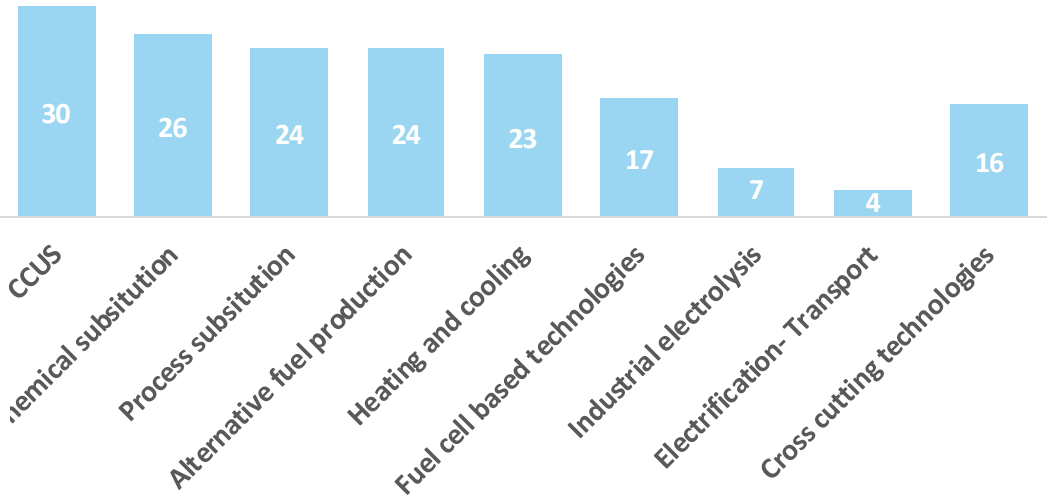
Avg. funding: 24.5 mln USD
Funding range: 0.4 mln USD – 59 mln USD

ID

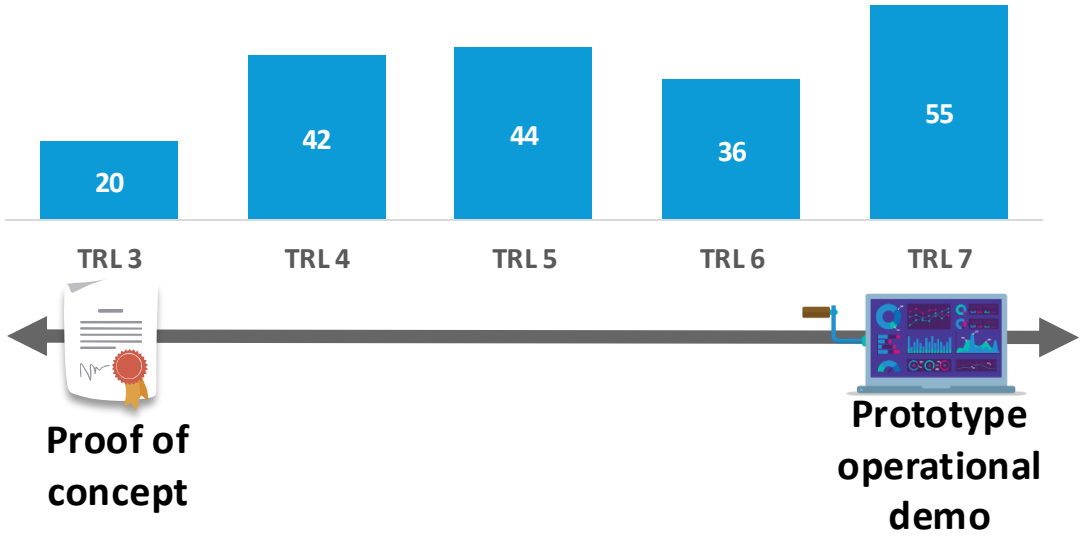
About 200 ID technologies were shortlisted and assessed for their relevance in each country

Most of the technologies in scope are in post conception phase and almost 50% of them are in prototype or pilot testing phase.
The technologies can be classified under 9 distinct groups, 8 of which are industrial decarbonization specific, and 1 additional group covering SE-ID cross-cutting technologies (I.e., relevant for both). CCUS is the technology group receiving most attention at present.

Number of technologies by tech group



Number of technologies by TRL

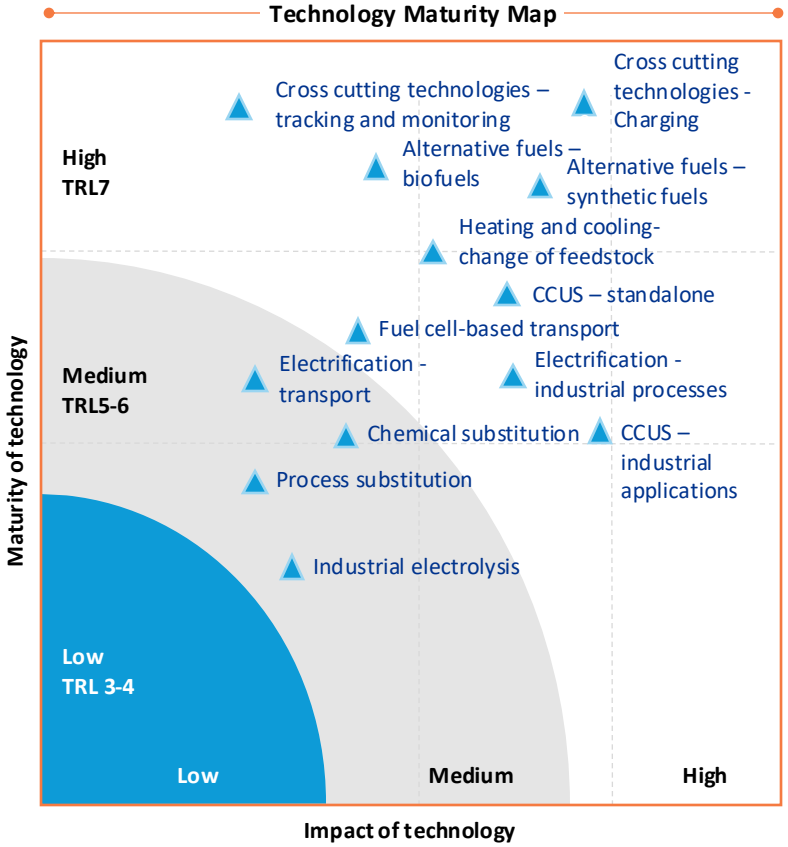


Source: 1.Smart Grid (Entsoe); 2. Other technologies (IEA); 2.KPMG Analysis

In industrial decarbonization mature technologies are seeing comparatively wider adoption in developing countries

Key industrial decarbonization technology groups

Technology groups	Application and R&D initiatives	Key regions with ongoing activity
CCUS	– Carbon capture, utilization, and storage (CCUS) involves capturing carbon dioxide emissions from industrial processes / power plants and storing or utilizing them to prevent release into atmosphere.	Asia, Africa, Americas, Oceania
Altern. fuel production	– Alternative fuel production aims to create cleaner and more sustainable fuels. Initiatives include developing biofuels (from crops, algae, waste), synthetic fuels (produced from renewable energy sources), and hydrogen	Asia, Africa, Americas
Heating and cooling	– Research and development efforts in heating and cooling technologies focus on improving energy efficiency, using renewable energy sources, and reducing greenhouse gas emissions. It involves transitioning from fossil fuel-based systems to low-carbon or zero-carbon alternatives. This could include the use of renewable energy sources, heat pumps, and thermal storage.	Asia and Africa
Electrification	– Electrification involves transitioning from fossil fuels to electricity for various applications (e.g., transportation, heating, and industrial processes).	Asia, Africa, Americas
Industrial electrolysis	– Industrial electrolysis is used to produce hydrogen or other chemicals through electrochemical processes. Research focuses on efficiency improvements and cost reduction.	Asia, Americas, EU
Fuel cell-based technologies	– Fuel cells generate electricity and heat through an electrochemical reaction, contributing to ultra-clean baseload power and providing a backup solution. This involves the use of mainly vehicles powered by fuel cells (which generate electricity from hydrogen) for transportation.	Asia, Americas, EU
Process substitution	– Process substitution involves replacing energy-intensive or environmentally harmful processes with more sustainable alternatives	Asia, Africa, Americas
Chemical substitution	– Chemical substitution aims to replace hazardous or polluting chemicals with safer alternatives. This involves replacing high-emission chemicals or materials with lower-emission alternatives.	Asia, Americas, EU
Cross cutting technologies	– These are technology that fall under both thematic areas – smart energy and industrial decarbonization. These include, Cross cutting: charging technologies , Cross cutting: tracking and monitoring technologies etc.	Asia, Americas, Europe, Africa



Sources: 1. C2ES; 2. World Summit on Small Wind; 3. Science Direct – Smart Grids; 4. EEPower; 5. European Commission; 6. Softengi; 7. IFC; 8. AGL; 9. IEA – Grid integration of electric vehicles; 10. US Department of Energy

ID technologies reduce emissions at different levels, incl. energy source, materials and process

Industrial decarbonization is the process of strategic reduction or elimination of carbon GHG emissions from industrial sectors by switching to low-carbon energy sources, adopting cleaner production methods, and improving energy efficiency.

Technology	TRL	Technology type	Application
Chemical absorption (full capture rates)	7	Chemical substitution	Cement and Concrete
Biorefining	7	Alternative fuel production	Biofuels
Chemical methanation	7	Alternative fuel production	Synthetic fuels
Solid oxide fuel cells	7	Fuel cell-based transportation	Mobility
Electricity in the Bayer process	7	Electrification – industrial processes	Aluminum
100% electrolytic hydrogen DRI	6	Process substitution	Iron and steel
CCUS: post combustion solid absorption	6	CCUS	Multi-sector
Biomass gasification: ammonia	5	Process substitution	Ammonia
Cracking of ammonia into hydrogen for gas turbines	5	Fuel cell-based transportation	Power and Utilities
CCUS: membrane separation	4	Electrification – industrial processes	Aluminum

Technology Readiness Levels (TRLs)

Focus TRLs

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- TRL 1 — Basic principles observed

Private organization play the most critical role in driving ID related technology innovation

24 relevant ID projects across the 28 focus countries were identified and analyzed

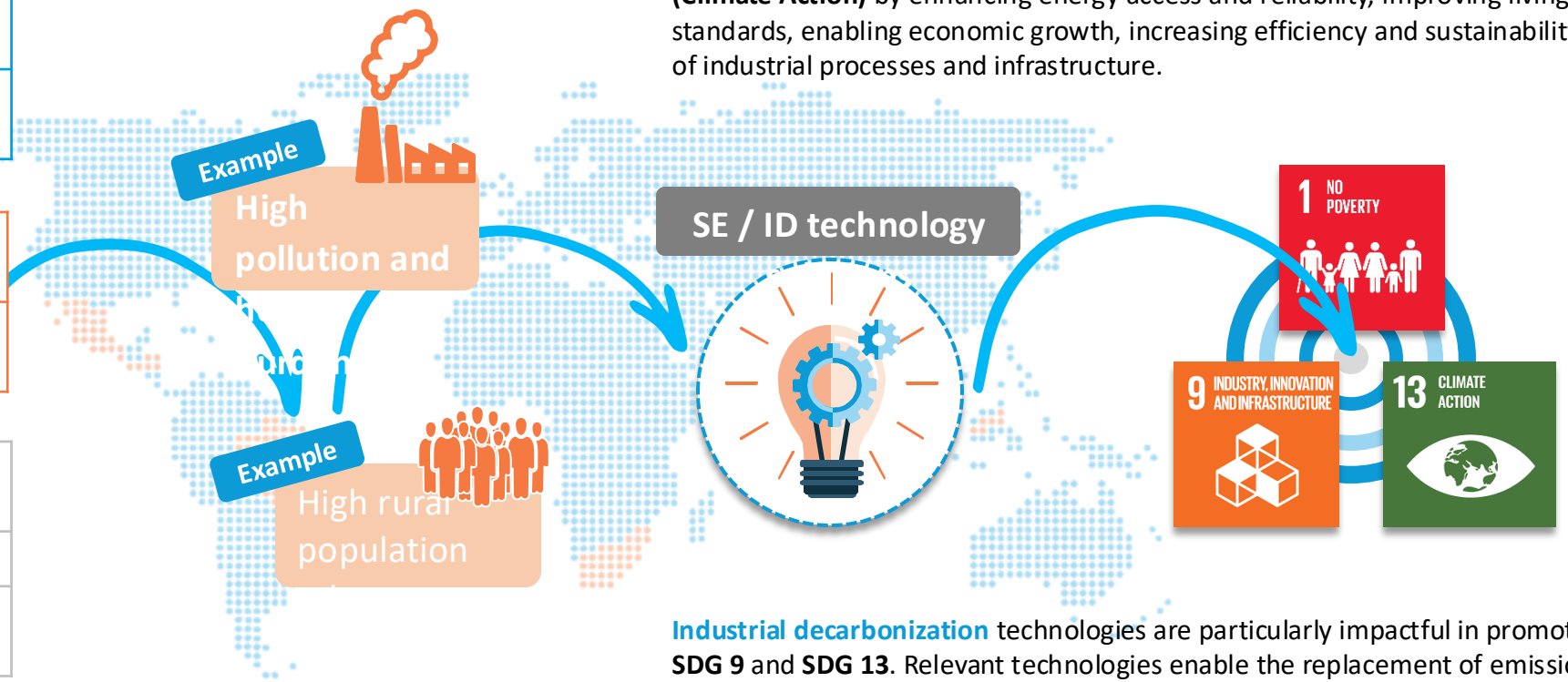
ID

Primary Stakeholder	Primary market constraints	Funding mechanism	Technology category
Energy utility 3%	Social constraints 3%	Multiple 3%	Fuel cell technology 3%
Government 9%	Political and legal constraints 19%	Public-Private Partnership 3%	Chemical substitution 6%
Research institution/ university 13%	Economic constraints 28%	Subsidies 6%	Heating and cooling 9%
Government owned enterprise 22%	Technological and environmental constraints 50%	Incentives 16%	Alternative fuel production 13%
Private organization 50%		Equity 28%	Process substitution 25%
		Grants 44%	CCUS 44%

Avg. funding: 141.4 mln USD
Funding range: 4000 USD – 765 mln USD

Interventions in innovative clean energy technologies have the most transformational impacts when economic, environmental, and social benefits converge

Environmental	Commitment to decarbonization goals
	Strong presence of heavy industry sectors
Social	High pollution and health burdens
	High rural population rate
Economic	Macroeconomic relevance of local SMEs
	Rapid industrial growth
	Presence of energy-intensive export sectors



Smart energy technologies hold substantial potential for promoting **SDG 1 (No Poverty)**, **SDG 9 (Industry, Innovation, and Infrastructure)** and **SDG 13 (Climate Action)** by enhancing energy access and reliability, improving living standards, enabling economic growth, increasing efficiency and sustainability of industrial processes and infrastructure.

Industrial decarbonization technologies are particularly impactful in promoting **SDG 9** and **SDG 13**. Relevant technologies enable the replacement of emission-intensive processes with low-carbon alternatives, thereby improving efficiency and significantly reducing greenhouse gas (GHG) emissions.

Off-grid solutions show how innovative, decentralized systems like mini-grids and standalone solar power can provide clean, reliable electricity to remote and underserved areas, enhancing quality of life and fostering economic growth

Kenya

- High **rural population rates and advanced policy frameworks** give countries such as Kenya (rural population rate: 75%) a strong potential for transformational impact.
- Kenya has an ambitious policy environment which strengthens the potential for impact. Examples include: 1) National Energy Efficiency and Conservation Strategy; 2) Green Economy Strategy and Implementation Plan; 3) Energy Transition and Investment Plan

KOSAP
KENYA OFF-GRID SOLAR ACCESS PROJECT

Kenya Off-grid Solar Access Project for Underserved Counties

- **Name of the technology:** mini-grids and standalone solar power systems
- **Project description**: a flagship initiative by the Government of Kenya aimed at increasing access to modern energy services in underserved counties by deploying mini-grids and stand-alone solar home systems. It will provide implementation support and build capacity.
- **Expected impact**: improved energy access to communities facing energy poverty

illustrative

Impacting SDGs...

- reduction of energy poverty and overall poverty levels through affordable and clean energy accessibility

- strengthening resilience and sustainability of energy infrastructure in rural and remote areas via innovative solutions

- mitigation of climate change impact through the use of renewable energy and reduction of GHG emissions

Co-benefitting SDGs..

ID

CCUS technologies provide a notable example of how technologies can contribute to climate action while fostering infrastructure development for continued economic and industrial development

India

- The **size of the populations** and the **economic growth of countries** such as India make them critical for realizing global decarbonization goals and transformational impacts.
- The **relevance of hard-to-abate sectors** (e.g., cement and steel) adds to the transformational potential
- Fossil fuel dependence: Reliance on coal and other fossil fuels in heavy industries such as steel and cement

Indian Oil Corporation Koyali refinery project

- **Name of the technology: CCUS**
- **Project description**: The project provides Indian Oil Corporation with a technically and economically viable solution for **capturing up to almost 0.7 mtpa (million tonnes per annum) of carbon dioxide** from its Steam Methane Reforming (SMR) based Hydrogen Generation Units (HGU) at a very competitive cost structure
- **Expected impact:** Substantial reduction of the refinery's carbon footprint, contributing to national and global climate goals by mitigating greenhouse gas emissions

illustrative

Impacting SDGs…

- by enabling companies in hard-to-abate industries such as cement, steel, or chemicals, to stay in business while improving their environmental impact.

- through the removal of GHG-emissions from the atmosphere helping heavy industries to align with global efforts to mitigate climate change and limit global temperature rise.

Co-benefitting SDGs..

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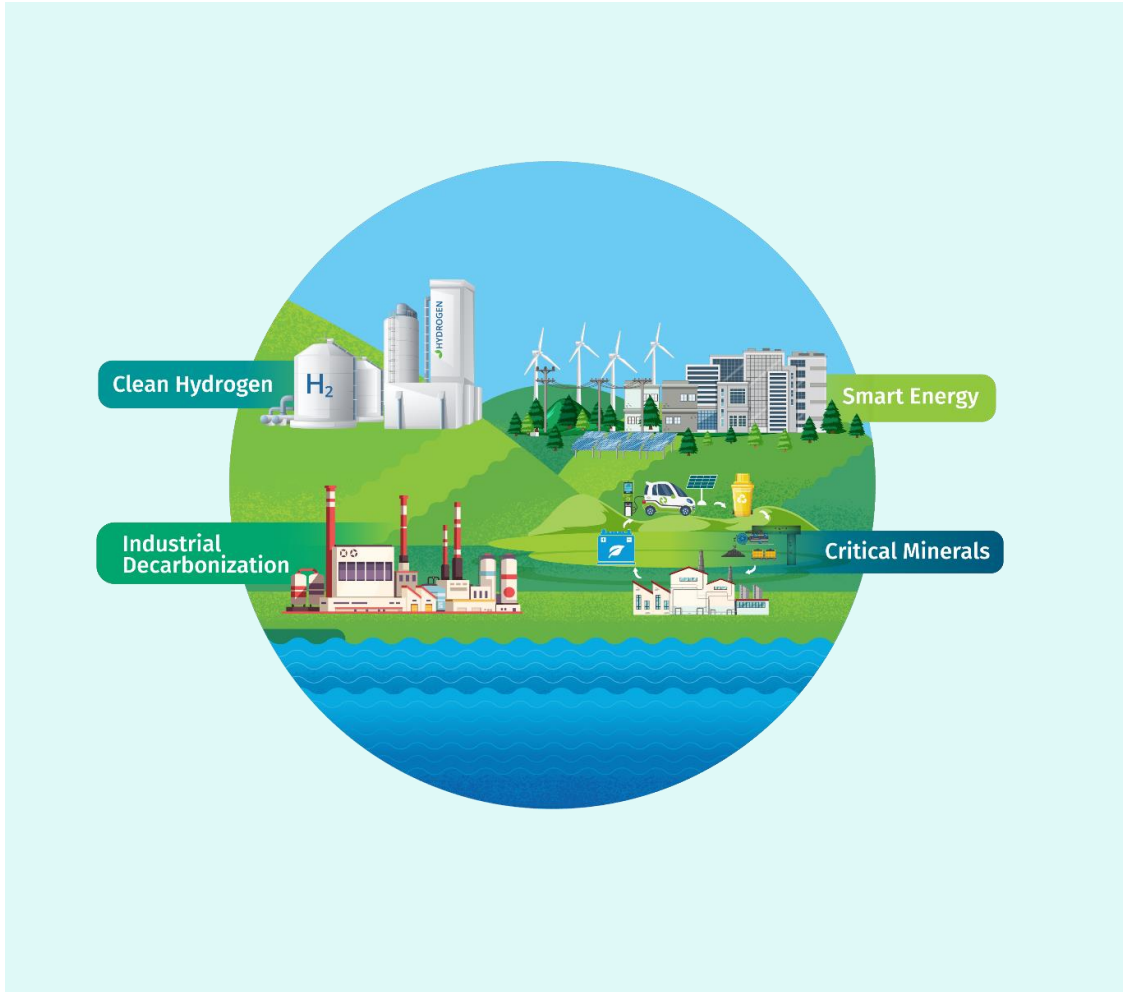
A2D
Accelerate to Demonstrate Facility



Accelerating Innovation in Smart Energy and Industrial Decarbonization

Market Assessment International Webinar

Accelerate-to-Demonstrate (A2D) Facility

Thank you!

Our partners:

UK Government

KPMG

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A2D Accelerate to Demonstrate Facility

Further information on the A2D Facility:

- A2D Facility Website: a2dfacility.unido.org
- A2D Facility LinkedIn Account: Accelerate-to-Demonstrate (A2D) Facility
- A2D Facility Mailing List: Join the mailing list here
- A2D Facility Year 1 Annual Report: Access the Annual Report here