VIRTUAL EDITION

IRENA INNOVATION WEEK 2020

Renewable solutions for industry sector transformation

7 October 2020 • 8:00-11:00 AM CEST • Virtual

#IVIW2020

MISSION POSSIBLE PLATFORM

IRENA
International Renewable Energy Agency

Welcoming remarks

Dolf Gielen

Director

IRENA Innovation and Technology Centre

Ministerial perspectives on the way ahead

H.E. Andreas Feicht

State Secretary for Energy
Federal Ministry for Economic Affairs and Energy
Germany

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IRENA INNOVATION WEEK 2020

You are all **muted** during the session to avoid background noise

If you have **questions for our panelists**, please use the Q&A

The session is **livestreamed & recorded**. Recording will be available in a public domain. No Chatham House rules apply

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Session overview

8:00-8:30	Setting the scene
8:30- 9:10	Panel I: Solutions to decarbonise the iron & steel sector
9:10- 9:20	Digital break
9:20-10:00	Panel II: Solutions to decarbonise the cement and lime sector
10:00– 10:10	Digital break
10:10– 10:50	Panel III: Solutions to decarbonise the chemical and petrochemical sector
10:50- 11:00	Closing remarks

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IRENA INNOVATION WEEK 2020

Setting the scene

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Setting the scene

Anthony Hobley

Executive Director

Mission Possible Platform
World Economic Forum

Claire O'Neill

Managing Director
Climate & Energy

World Business Council for
Sustainable Development

Paul Durrant

Head of End-use Sectors &
Bioenergy

IRENA Innovation and Technology
Centre

Setting the scene

Anthony Hobley

Executive Director

Mission Possible Platform
World Economic Forum

Anthony Hobley
Executive Director of Mission Possible
Opening Presentation

IRENA Innovation Week
7 October 2020

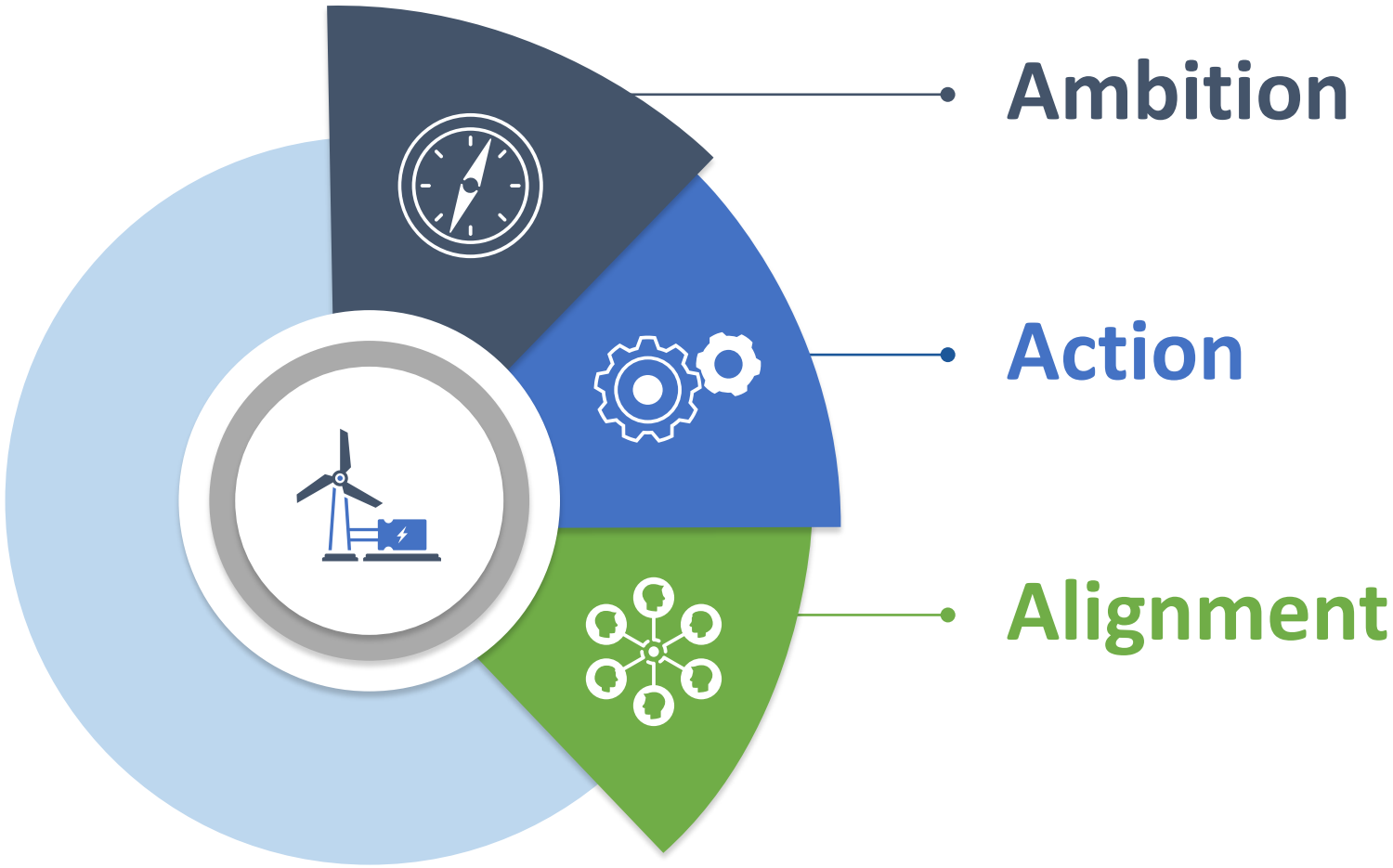
Winning slowly is the same as losing.

When it comes to climate change, winning slowly is the same as losing.

In this decisive decade for climate action, we need a paradigm shift that complements existing, country-centric strategies with a powerful new approach that speaks the language of industry sectors in the global economy. The Mission Possible Partnership brings together the world's most influential organizations in the realms of corporate leadership, industry expertise, global supply chains, and finance to **elevate sectors to the level of nations in the fight against climate change**.

We have begun to build sector transformation platforms designed to enable major global industries to prosper while putting them onto a pathway to net zero emissions. Beginning with seven of the most energy-intensive global industries, these platforms build on growing momentum, consumer expectations, and analytical tools to design and execute pathways to net zero emissions for industries, their customers, their suppliers, and their capital providers. **And ambitious sectors, in turn, can enable ambitious national commitments.**

THE DECISIVE DECADE FOR ACTION



Ambition

Action

Alignment

THE REAL ECONOMY IS NOT A SIDE EVENT

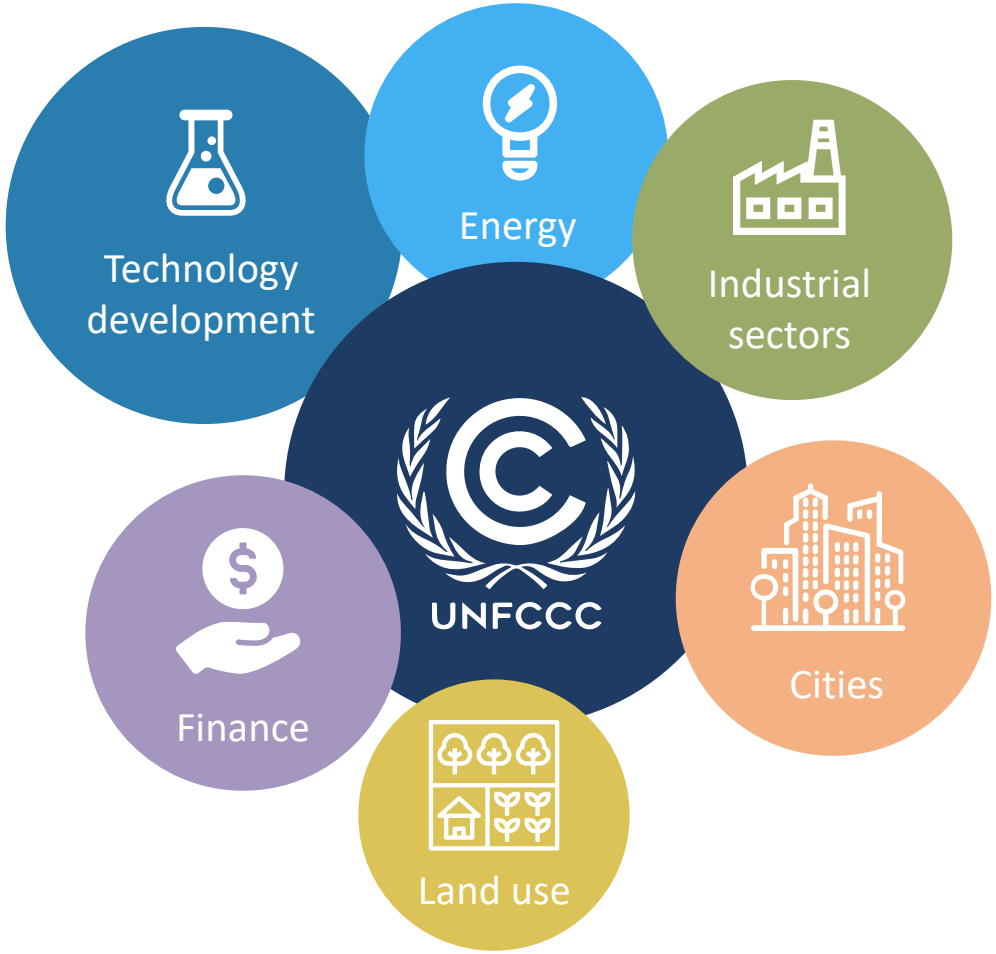
COP 1 – 25 (1995 – 2019)

Negotiation of a **global climate agreement** and its rulebook takes center stage. Climate action streams related to innovation, sectors, finance, and other topics relegated to the sidelines.

PARADIGM SHIFT

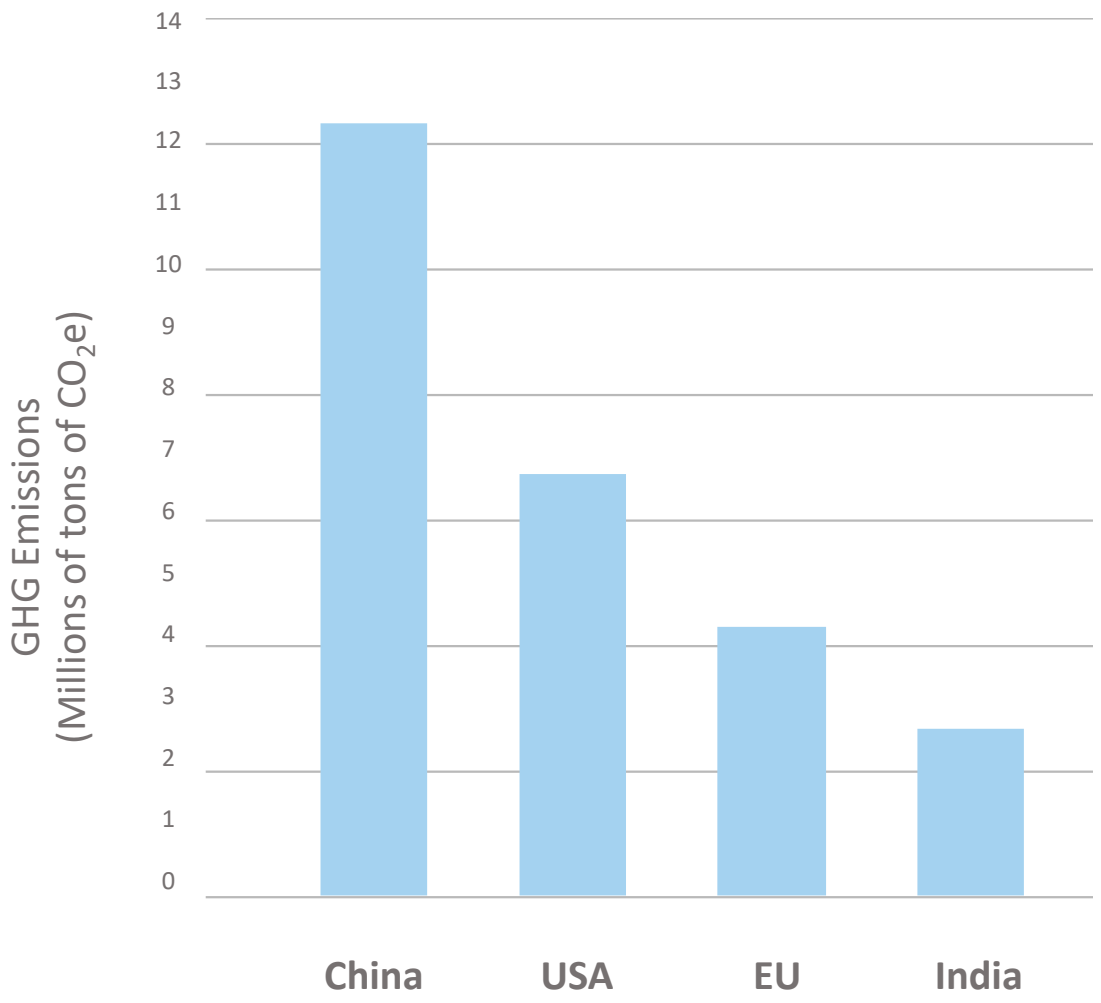
COP 26 onwards (2021 -)

Going forward, a broader agenda to drive change in the **real economy** must take center stage.



BUSINESS DOESN'T STOP AT THE BORDER. NEITHER DO EMISSIONS.

For 30 years, the world has mainly focused on climate action as a project among nations. The Paris Agreement was a breakthrough in that project – but it also reinforces the sovereign boundaries within which nations formulate their plans in siloes.

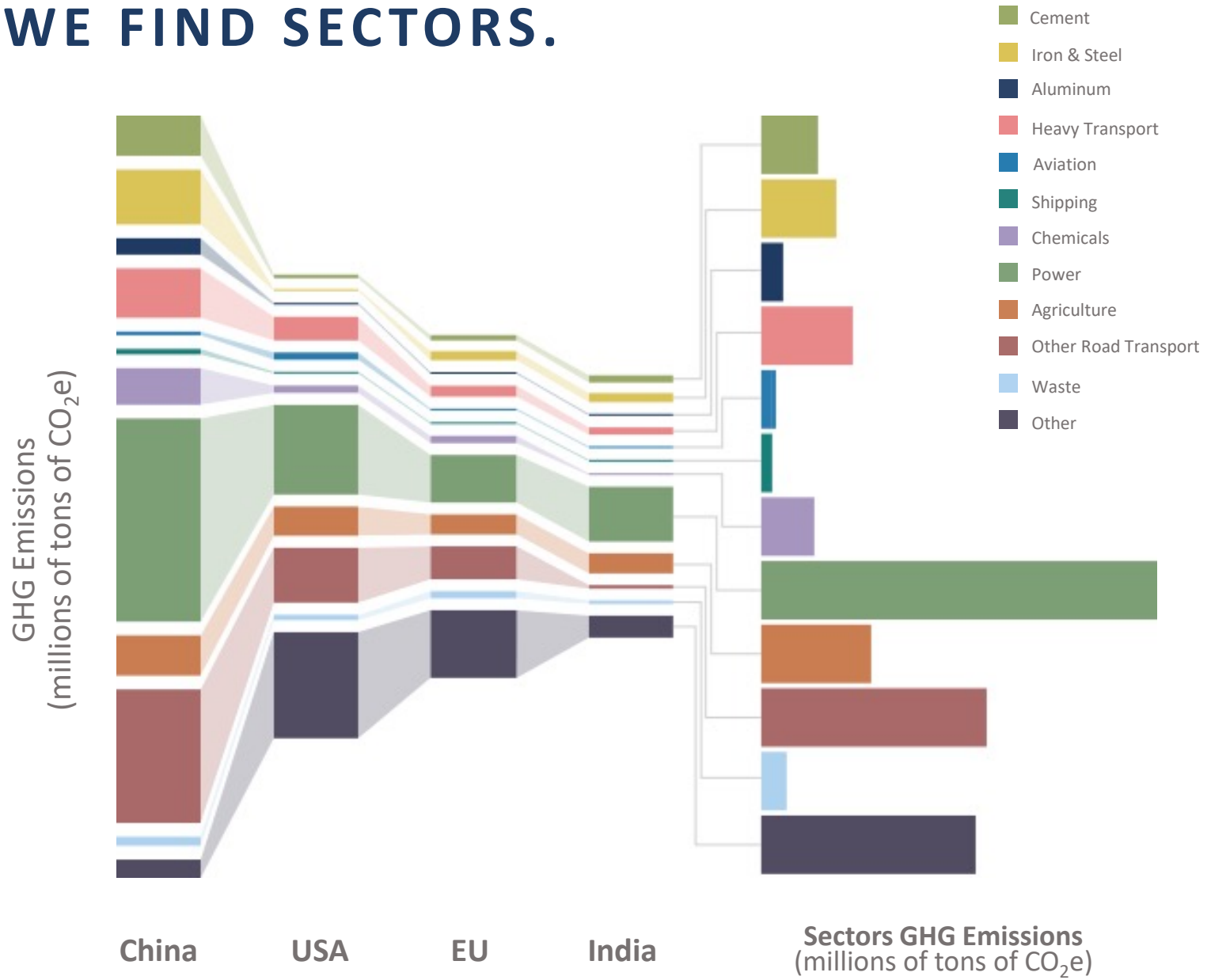


SOURCE: IEA, 2018

WHEN WE SCRATCH THE SURFACE OF THE NATIONAL MODEL, WE FIND SECTORS.

To go far enough – and fast enough – in scrubbing carbon from the global economy, the climate action architecture needs *both* the Paris Agreement's Nationally Determined Contributions *and* cross-cutting sector transformation platforms.

Only one element of this architecture exists today.



Mission Possible Platform

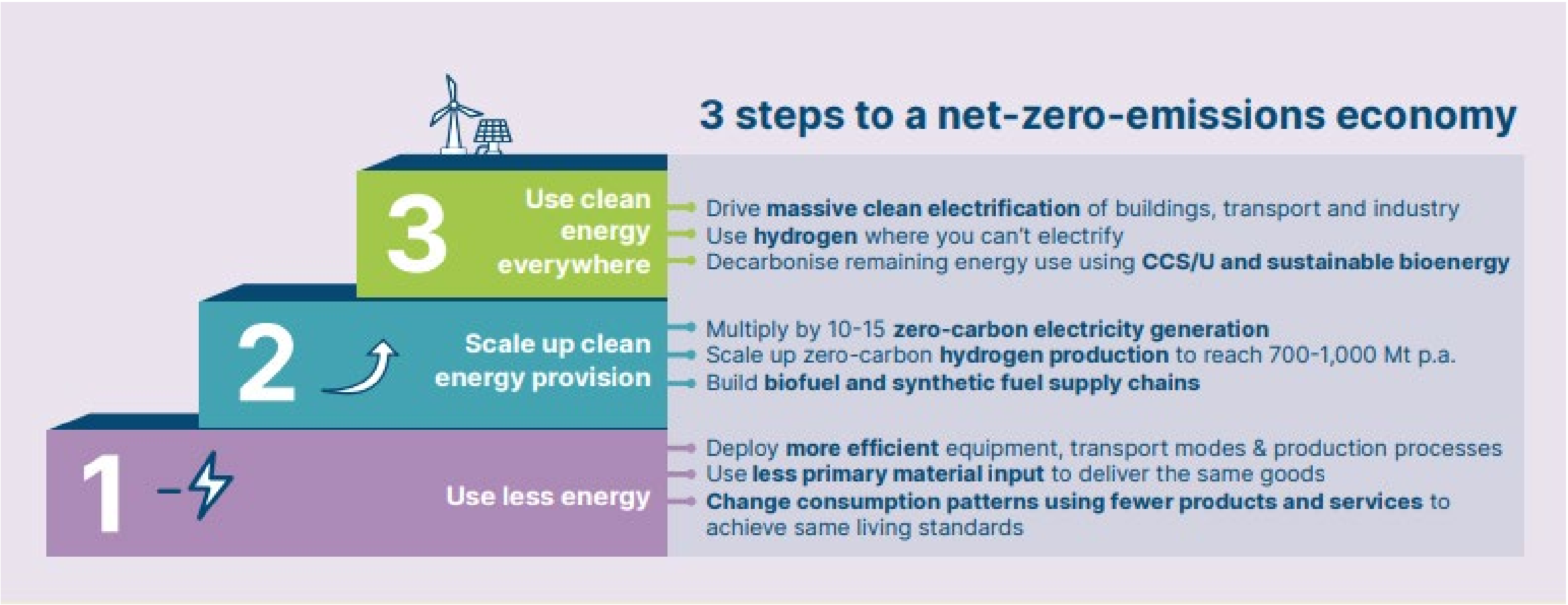
- A coalition of public and private sector partners working on the industry transition towards net-zero greenhouse gas emissions by 2050.
- Aims to take action against the 2018 Mission Possible report by the Energy Transitions Commission, outlining pathways that carbon intensive sectors can take to reach net-zero CO2 emissions by 2050.
- Covering 7 of the most energy-intensive global industries—aviation, heavy-duty road transport, shipping, aluminum, chemicals, cement and steel
- Takes a sectoral approach and is designed to deliver a package of GHG emissions reduction measures and innovations
- Brings together over 300 companies and the world's most influential organizations in the realms of corporate leadership, industry expertise, global supply chains, and finance to elevate sectors to the level of nations in the fight against climate change.

MISSION POSSIBLE PARTNERSHIP: ACTION AREAS

Seven high-ambition sector industry groups already in formation.

Getting to Zero Coalition	Clean Skies for Tomorrow	Clean Road Freight Coalition	Aluminum for Climate	Clean Cement Coalition	Low-Carbon Emitting Technologies	Net-Zero Steel Initiative
A coalition convened by Global Maritime Forum and the Friends of Ocean action to mobilize industry for commercialized zero emission vessels by 2030, with 124 companies and 14 supporting governments.	An initiative comprised of 70 high ambition CEO champions and organizations convened by WEF and the RMI to establish a net-zero emissions coalition.	An initiative of 10 high ambition CEO champions convened by WEF to establish a net-zero emissions coalition launching in September.	An initiative of 10 high ambition CEO champions convened by WEF to establish pathways towards a net-zero carbon emissions.	The cement workstream will build on the GCCA sustainability charter and emissions reduction commitments to reduce in line with the Paris Agreement.	A coalition of 21 companies focused on chemical industry emissions reduction led by the Chemistry and Advanced Materials Governors Community at the WEF.	An initiative of 15 high ambition CEO champions convened by WEF and ETC to establish a net-zero emissions coalition launching in September.

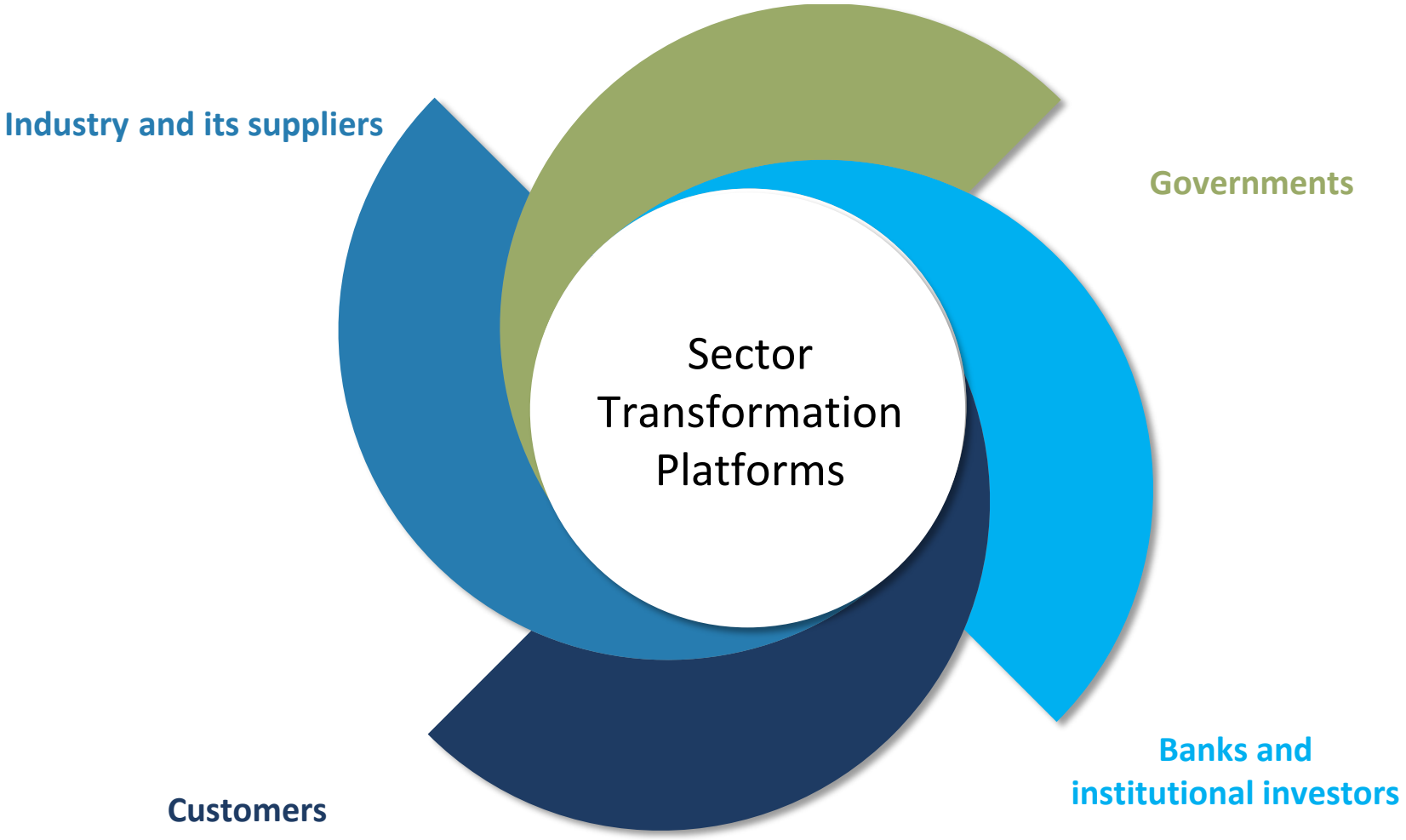
ENERGY TRANSITION FOR A NET-ZERO ECONOMY



Source: *Making Mission Possible ETC Report September 2020* https://www.energy-transitions.org/wp-content/uploads/2020/09/Making-Mission-Possible-Executive-Summary-English.pdf

HOW WE CAN SET FLYWHEELS OF PROGRESS SPINNING WITHIN EACH SECTOR

Each sector transformation platform brings together leading players from an industry, its customers, its suppliers, its capital providers, *and governments* to set a flywheel of progress spinning. These are the critical actors needed to influence and enable an industry's transformation process.



THE SECTOR DECARBONIZATION PLATFORM

A REPLICABLE, FOUR-STEP APPROACH THAT CAN BE TAILORED TO INDIVIDUAL SECTORS

FORGE A SHARED VISION

▸ **Convene high-ambition stakeholders** within a dedicated net-zero sector initiative:

- Industry players across value chain
- Major buyers across value chain
- Lenders
- Shareholders
- Asset managers
- Governments
- International governing bodies

SELECT NET ZERO ROADMAP & METRICS

▸ **Develop comprehensive roadmap to net-zero by 2050 with 5-year increments**

- Demand projections
- Technology deployment curves
- Clean Energy Scaling
- Policy & demand prerequisites
- Corporate investment needs
- Infrastructure investment needs
- Asset retirement plan
- Role of transitional offsets and nature-based solutions
- Resulting GHG trajectory

▸ **Align on relevant metrics** of climate-alignment:

- CO2 emissions targets
- Other relevant KPIs demonstrating sectoral decarbonization

COMMIT TO ACTION

▸ **Agree on relevant targets & commitments** with a focus on 2025-2035 timeframe:

- Emissions targets
- Investment commitments
- Demand signals
- Procurement rules
- Lending guidelines
- Investment principles
- Gov't RD&D
  Gov't procurement
- National policies

SUPPORT IMPLEMENTATION

▸ **Develop practical resources and toolkits** to help operationalize commitments:

- Collaborative R&D
- Blueprint for zero-carbon value chain pilots
- Green product labels & standards
- Demonstration & scale-up financing blueprints
- Assessment tools
- Monitoring of commitments
- Develop emissions traceability protocols to underpin commitments and enable verification
- Integrate metrics into existing climate disclosure frameworks

Setting the scene

Claire O’Neill

Managing Director
Climate & Energy

World Business Council for
Sustainable Development

Setting the scene

Paul Durrant

Head of End-use sectors and Bioenergy

IRENA Innovation and Technology Centre

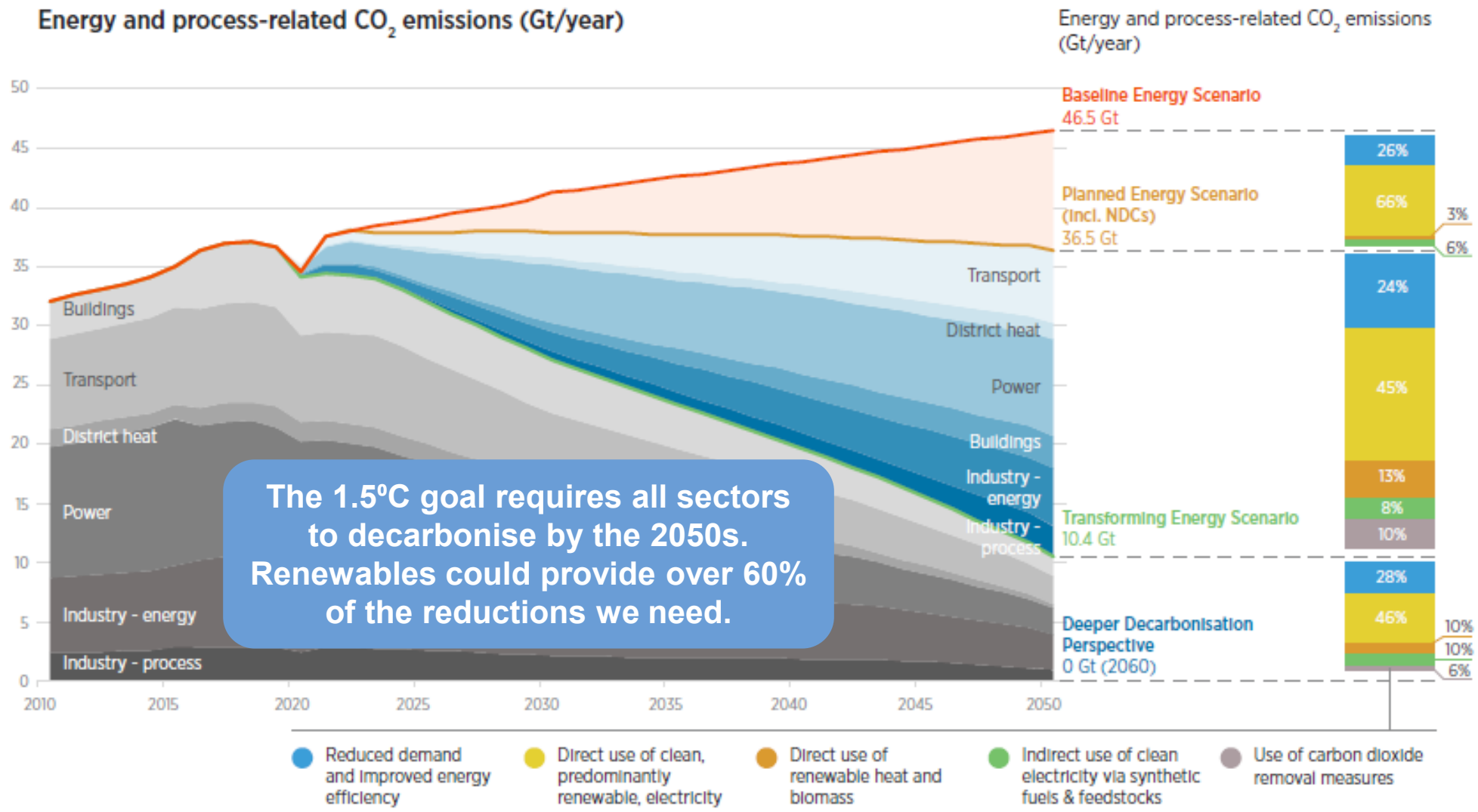
IRENA
International Renewable Energy Agency

Reaching Zero with Renewables

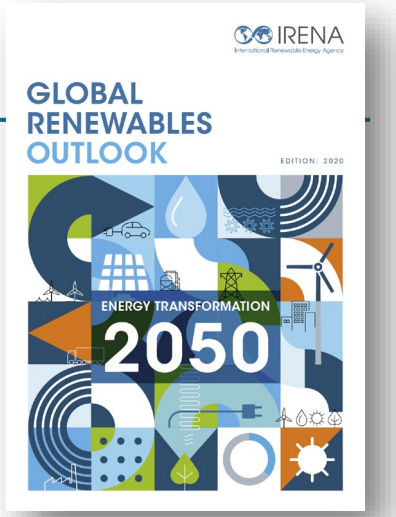
Eliminating CO2 emissions in industry & transport in line with the 1.5-degree-C goal

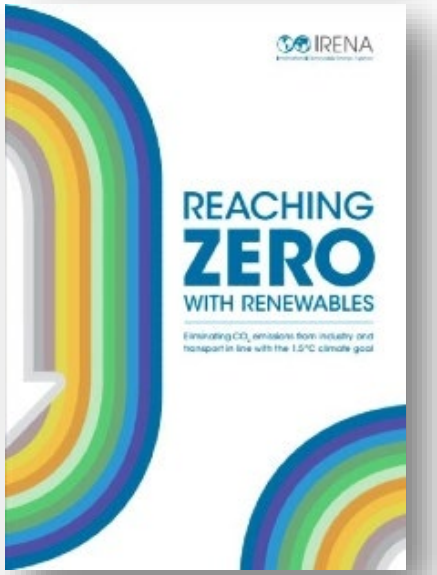
IRENA Innovation Week 2020 - Session 5, 7th October 2020

Decarbonisation Pathways



The 1.5ºC goal requires all sectors to decarbonise by the 2050s. Renewables could provide over 60% of the reductions we need.





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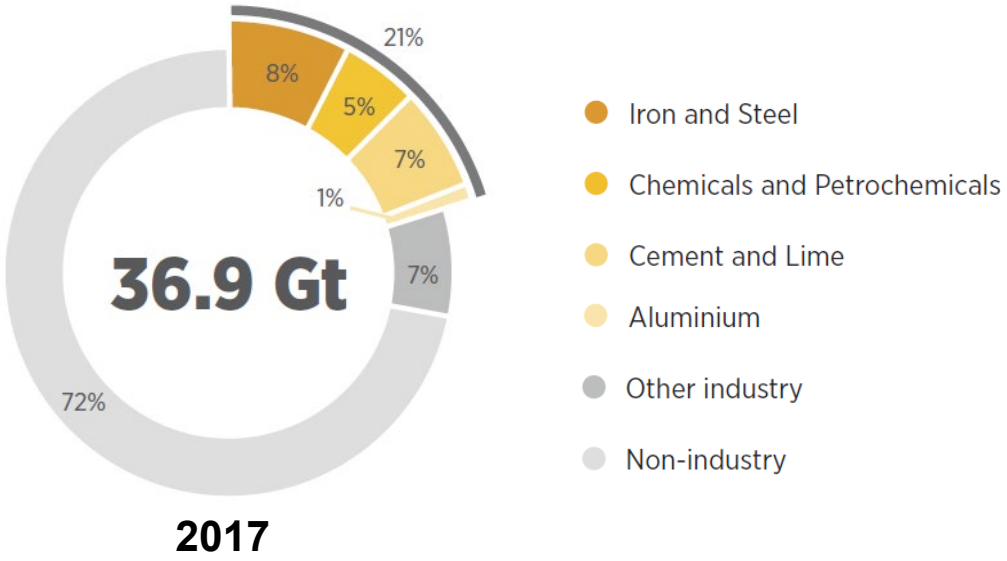
Industry & Transport – Shares of Energy & Process Emissions

Industry

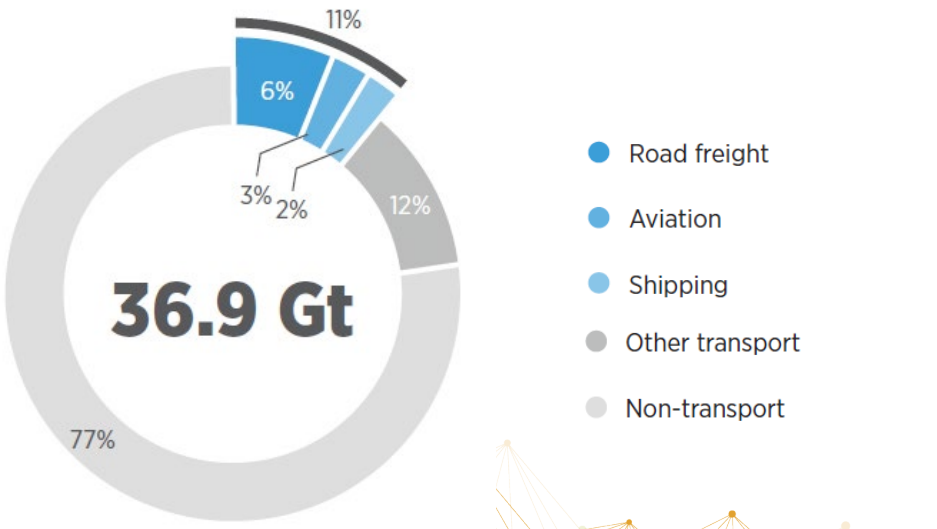


2017

Annual emissions in Industry increase by 1 GT/yr from 2017 to 2050 PES

Emissions of 11.4 GT/yr remain in 2050

Transport

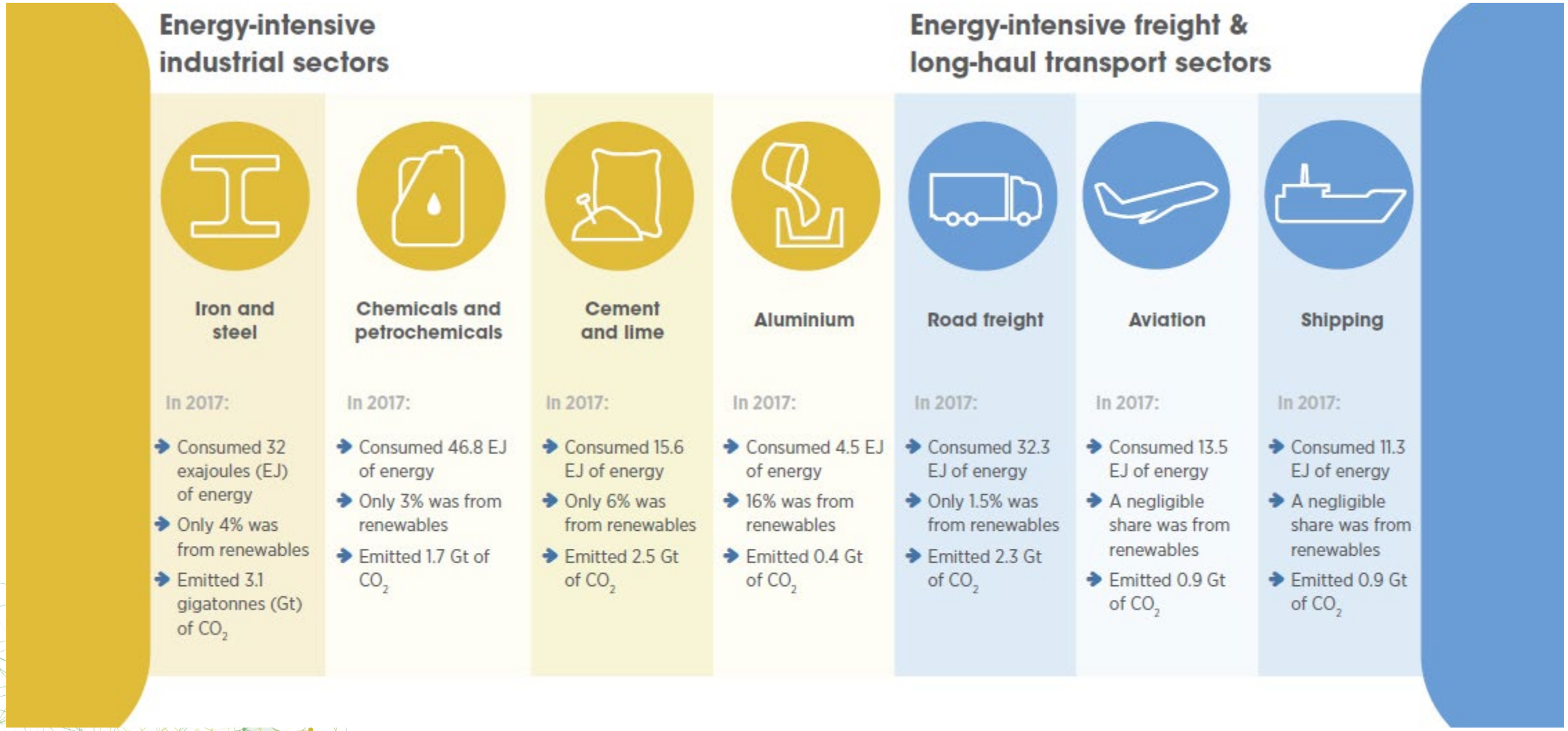


2017

Annual emissions in Transport increase by 0.1 GT/yr from 2017 to 2050 PES

Emissions of 8.6 GT/yr remain in 2050

Seven challenging sectors



These seven will account for **38% of energy and process emissions and 43% of final energy use by 2050** unless major policy changes are pursued.

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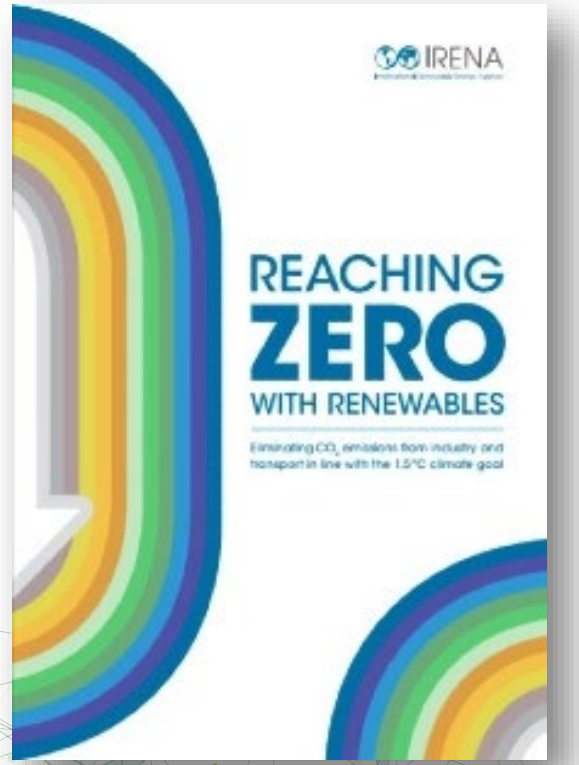
1.5 degrees - Exploring pathways to zero emissions

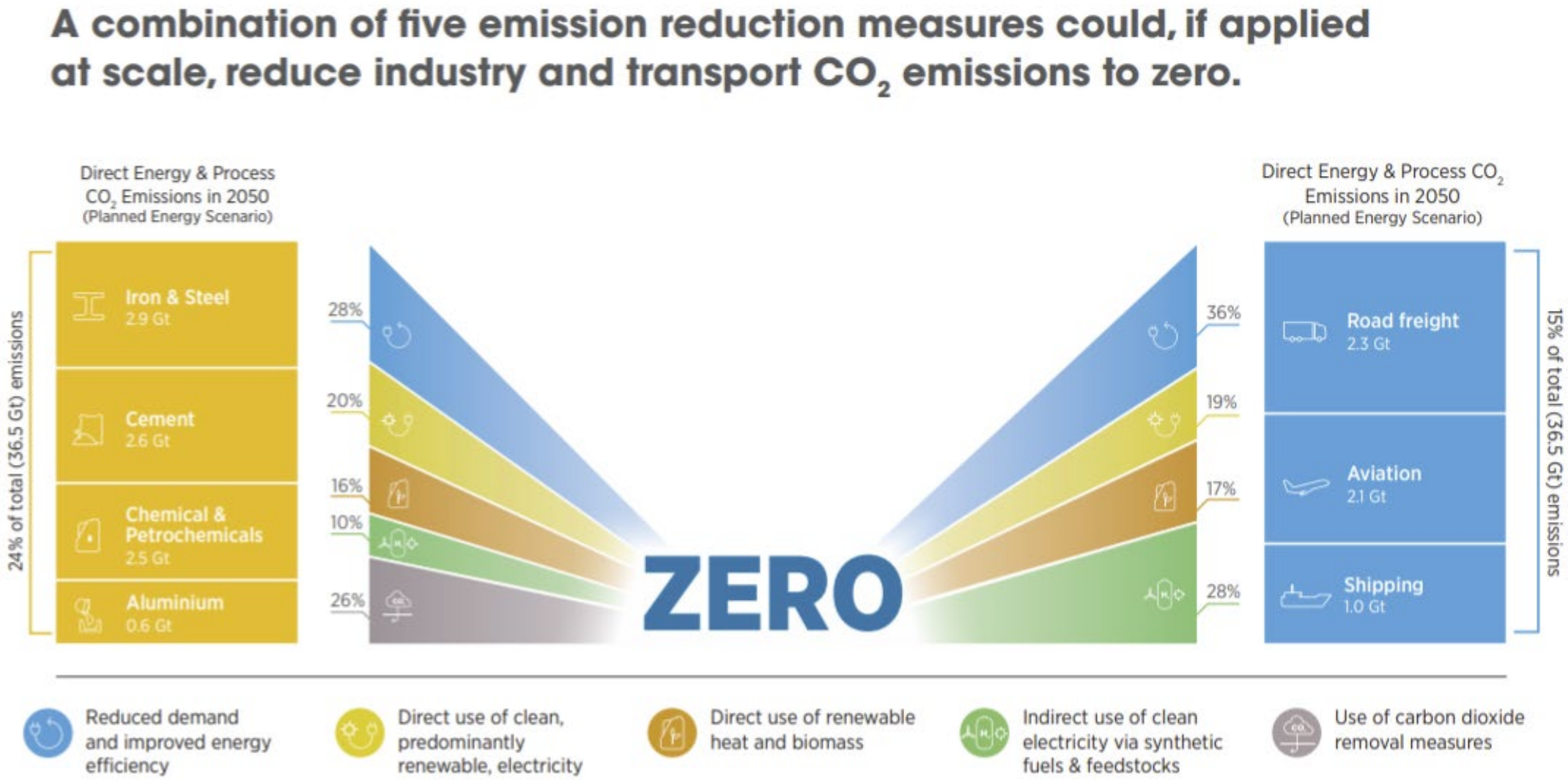
IRENA's Reaching Zero with Renewables report explores specific options in depth



Released 21 September 2020

- Seven key sectors covering 32% of 2017 emissions and 38% of 2050 reference case emissions
- Technology options identified for 22 Gt emissions reduction in 2050
- **Renewables accounts for 54% of the economic emission abatement potential**

5 measures for reaching zero



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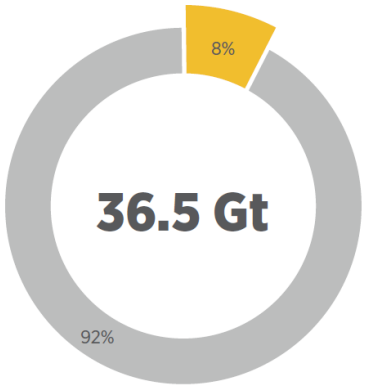
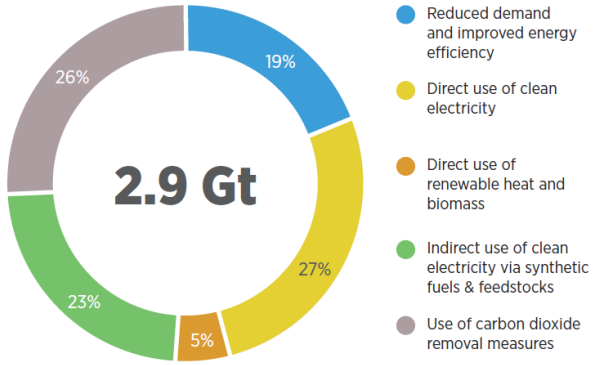
Iron & Steel – Options for reaching zero

Iron and steel share of total energy and process-related CO_2 emissions in 2050 Planned Energy Scenario (Gt).



Estimated role of key CO_2 emission reduction measures to reduce steel Planned Energy Scenario emissions to zero.



2 options compatible with reaching zero emissions

Hydrogen-based direct reduction of iron and electric arc furnace-based steel production

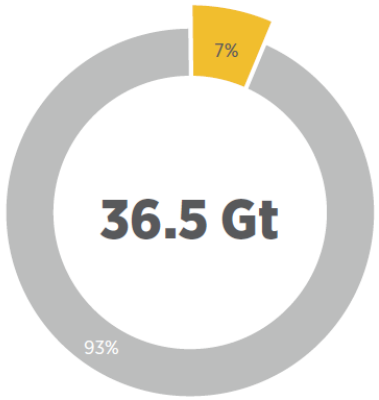
- Produce iron via the direct reduction process using clean, preferably green, hydrogen as a reducing agent.
- Produce steel using electric arc furnaces.
- Source all heat and electricity inputs from renewables.

Capturing and storing process and waste emissions, and using renewables for energy

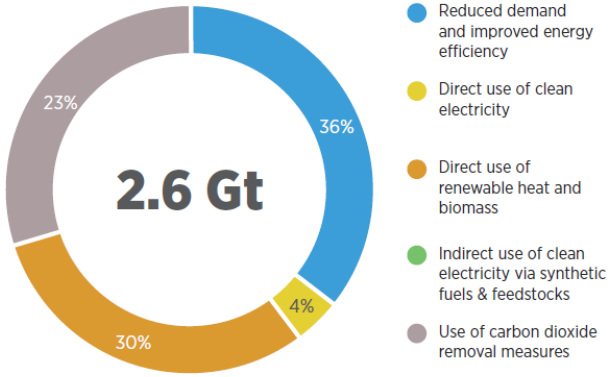
- Apply CCUS to existing iron and steel production processes.
- Source all heat and electricity inputs from renewables.

Cement – Strategy for reaching zero

Cement share of total energy and process-related CO_2 emissions in 2050 Planned Energy Scenario (Gt).



Estimated role of key CO_2 emission reduction measures to reduce cement Planned Energy Scenario emissions to zero.



- Reduced demand and improved energy efficiency
- Direct use of clean electricity
- Direct use of renewable heat and biomass
- Indirect use of clean electricity via synthetic fuels & feedstocks
- Use of carbon dioxide removal measures

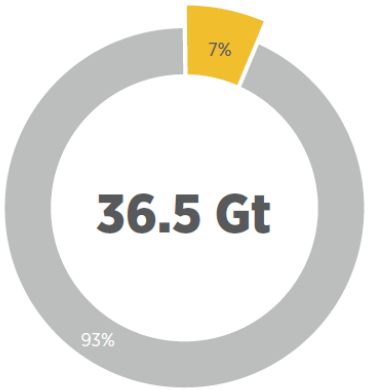
1. Reduce demand for conventional cement (through a combination of material efficiency, alternative construction techniques, alternative cement types and alternative building materials).
2. Eliminate energy emissions for all cement (through fuel switching to renewables).
3. Reduce process emissions from conventional cement (through reduction in clinker use, i.e., by lowering ratios of clinker-filler and/or the use of alternative binders).
4. For the remaining emissions:

   Apply CCS to a proportion of plants.

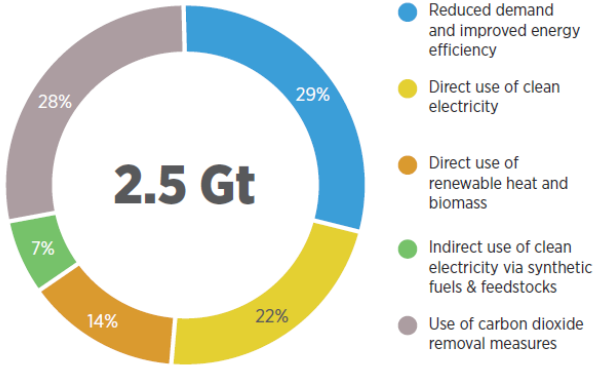
   Offset emissions from the remaining unabated plants through negative emission technologies – for example, BECCS, concrete reabsorption or CO_2 stored in wood used for construction.

Chemicals & Aluminium – Options for reaching zero

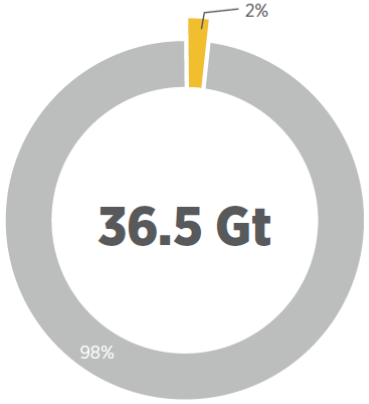
Chemicals and petrochemicals share of total energy and process-related CO_2 emissions in 2050 Planned Energy Scenario (Gt).



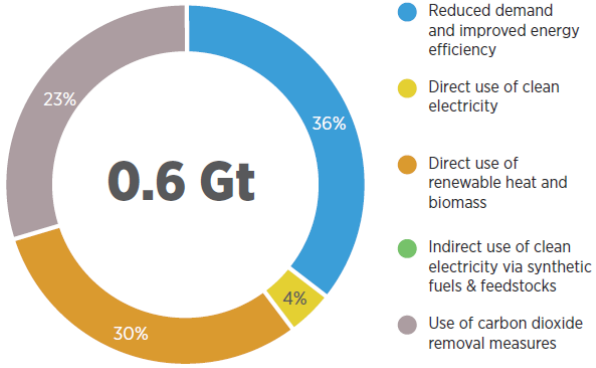
Estimated role of key CO_2 emission reduction measures to reduce chemicals and petrochemicals Planned Energy Scenario emissions to zero



Aluminium share of total energy and process-related CO_2 emissions in 2050 Planned Energy Scenario (Gt).



Estimated role of key CO_2 emission reduction measures to reduce aluminium Planned Energy Scenario emissions to zero.



3 options compatible with reaching zero emissions

Using biomass for feedstocks and renewables for energy

- Source all heat and electricity inputs from renewables.
- Use biomass for chemical feedstocks – replacing primary petrochemicals with bio-based chemicals or replacing fossil fuel-derived polymers (particularly plastics) with alternatives produced from biomass.

Using synthetic hydrocarbons for feedstocks and renewables for energy

- Source all heat and electricity inputs from renewables.
- Use synthetic hydrocarbons – produced from green hydrogen and clean CO2 sources – for chemical feedstocks.

Capturing and storing process and waste emissions, and using renewables for energy

- Apply CCUS to existing production processes.
- Source all heat and electricity inputs from renewables.
- Apply measures for the permanent storage of the carbon in products – *e.g.*, a highly efficient circular economy, the long-term storage of waste products or CCUS applied to end-of-life combustion.

1 option compatible with reaching zero emissions

Renewable power and inert anodes

- Source all heat and electricity inputs from renewables.
- Develop and adopt use of inert anodes.

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Reaching zero with renewables: ten priorities for action

Building a shared vision

1. Pursue a renewables- based with an end goal of zero emissions.

- Requires linked sectoral strategies at the local, national and international levels
- Plans built on the five technology pillars.

2. Develop a shared vision and strategy and co-develop practical roadmaps.

- Must be supported by all key actors
- So co-develop with broad engagement nationally and internationally to build consensus.
- International and inter-governmental bodies can assist.

Providing the enabling conditions

3. Build confidence and knowledge among decision makers.

- Decision makers need to better understand the risks.
- Many more demonstration and lighthouse projects are needed.
- Those who can must lead, showing what is possible.

4. Plan and deploy enabling infra-structure early on.

- New approaches will require substantial new infrastructure.
- Investment needs to come ahead of the demand.
- Requires carefully co-ordinated planning & targeted incentives.

Creating viable business models

5. Foster early demand for green products and services.

- Creating early sources of demand for green fuels, materials, products and services will help scale of production and reduce costs.
- Use public procurement, corporate sourcing, regulated minimum percent requirements, etc.

6. Develop tailored approaches to ensure access to finance.

- Sectors have specific needs i.e., high CAPEX, long payback periods, etc.
- So tailored financial instruments along the whole innovation cycle are needed.
- Co-operation between public and private financial institutions can help.

Working across boundaries

7. Collaborate across borders.

- A global challenge, and the solutions needed are complex and expensive.
- Countries working alone will not be able to explore all options in the necessary depth.
- Countries can share the burden.

8. Think globally, utilise national strengths.

- Relocating industrial production to access low-cost renewable energy could reduce costs and create new trade opportunities.
- Countries with large or expanding production should be supported in getting on the right (zero-carbon-compatible) track early on.

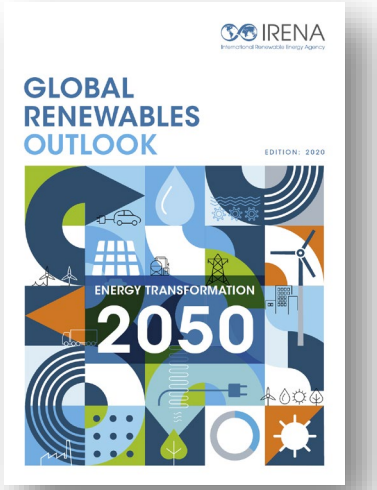
9. Establish pathways for evolving regulation & international standards.

- Regulations and standards are both enablers and barriers for change
- Requires careful planning to ensure that they shift at the same pace as the technological changes.

Innovating

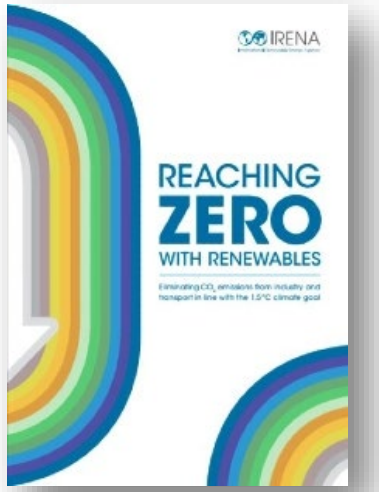
10. Support RD&D and systemic innovation.

- Large gaps in capability and large cost differences still remain.
- Increased investment in RD&D is needed across a range of technologies to reduce costs, improve performance and broaden applicability.
- Innovation support needs to be systemic.



Thanks for your attention!

pdurrant@irena.org



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Panel I: Solutions to decarbonise the iron & steel sector

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Panel I: Solutions to decarbonise the iron & steel sector

Faustine Delasalle

Director

Energy Transitions Commission (ETC)

There are a range of decarbonisation options for primary steel production with differing levels of technological maturity

Conventional options	Decarbonisation technologies		
	Applied at industrial-scale sites	Technology to be applied in pilot sites	Earlier stage research phase
• BF-BOF with coal as fuel and feedstock • DRI-EAF with natural gas as feedstock • Mixed options (e.g. liquid iron in EAF or DRI in BF or BOF)	• BF-BOF with charcoal as fuel and feedstock (small furnaces) • DRI-EAF with biogas as feedstock	• DRI-EAF with hydrogen as feedstock • Conventional BF-BOF with CCS on all exhaust gases • HIsarna-BOF and CCS on all exhaust gases • BF-BOF with top-gas recycling, coke oven gas rerouting, and CCS on all exhaust gases	• BF-BOF with hydrogen as feedstock • Electrolysis for iron ore reduction

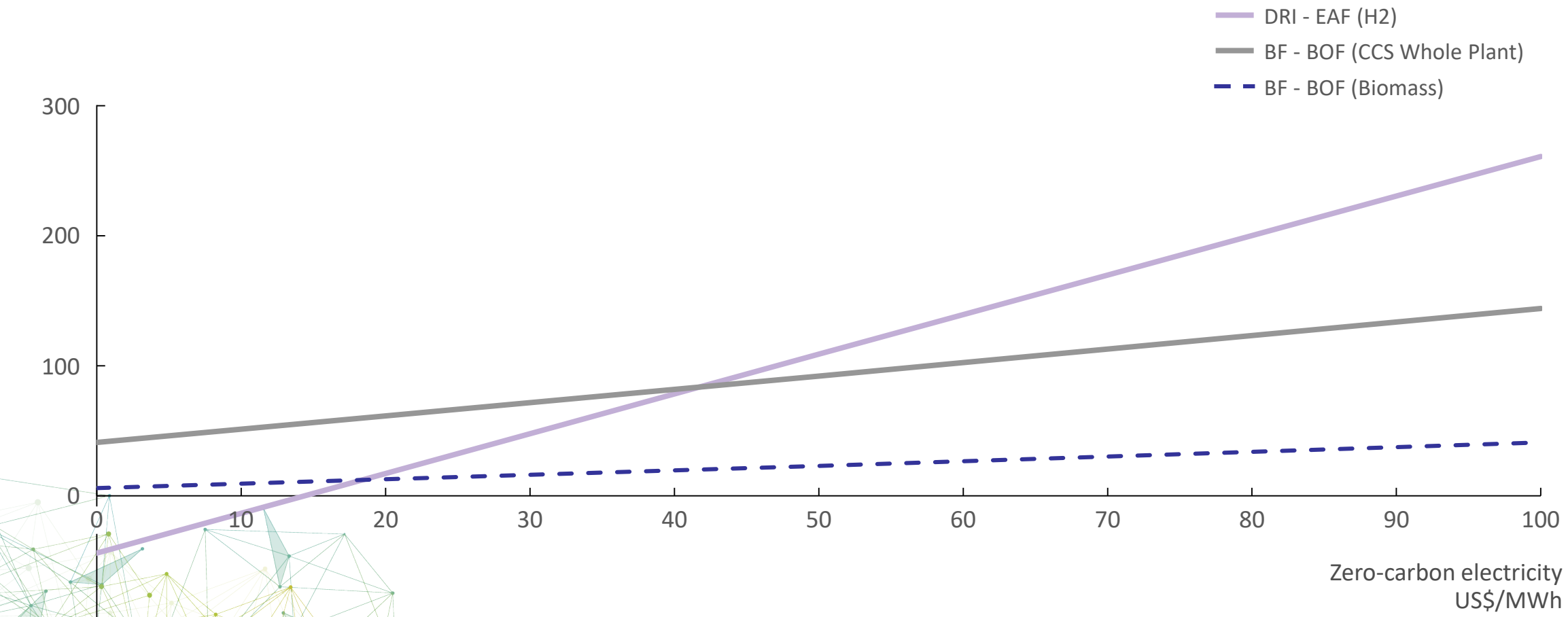
Most competitive technology will vary based on location-specific and site-specific characteristics.
➔ ***Technology neutral policy approaches are essential.***

Source: ETC (2019)

No silver bullet:
The most cost-competitive decarbonisation option will vary by region & by site

Decarbonisation cost in steel production – greenfield

US$/tonne CO_2



Source: McKinsey (2018)

The cost differential between high-CO2 and low-CO2 steel is the main barrier to decarbonisation, in a sector facing international competition

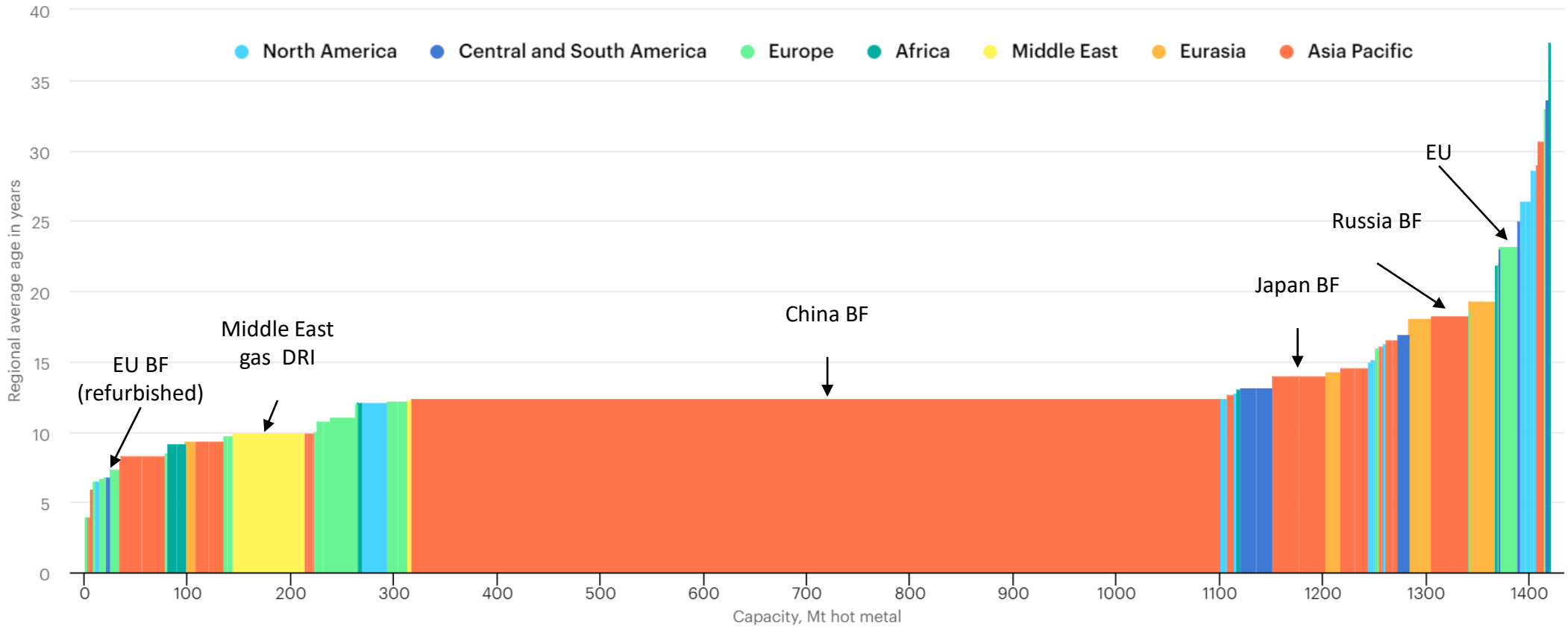
EUA January 2020: ↑EUR25/t
EUA March 2020: ↓ EUR17/t
EUA Sept 2020: ↑EUR28/t

Source: ETC (2018)

Outside of China, nearly half of primary steel capacity will reach the end of its investment cycle in the next 10-15 years

Age profile of global production capacity for steel sector (blast furnace and DRI furnaces)

Regional average age versus capacity, Mt



Source: IEA (2020)

Panel I: Solutions to decarbonise the iron & steel sector

Moderator

Faustine Delasalle

Director

Energy Transitions Commission (ETC)

Panellists

Åsa Ekdahl

Head, Environment and Climate Change

World Steel Association

Andreas Regnell

Chairman of the Board

Hybrit

Yoon-Gih Ahn

Senior Vice President

Management Consulting Center,
POSRI (POSCO Research Institute)

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Digital Break

Coming up next: Panel II - Solutions to decarbonise the cement and lime sector

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Panel II: Solutions to decarbonise the cement and lime sector

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Panel II: Solutions to decarbonise the cement and lime sector

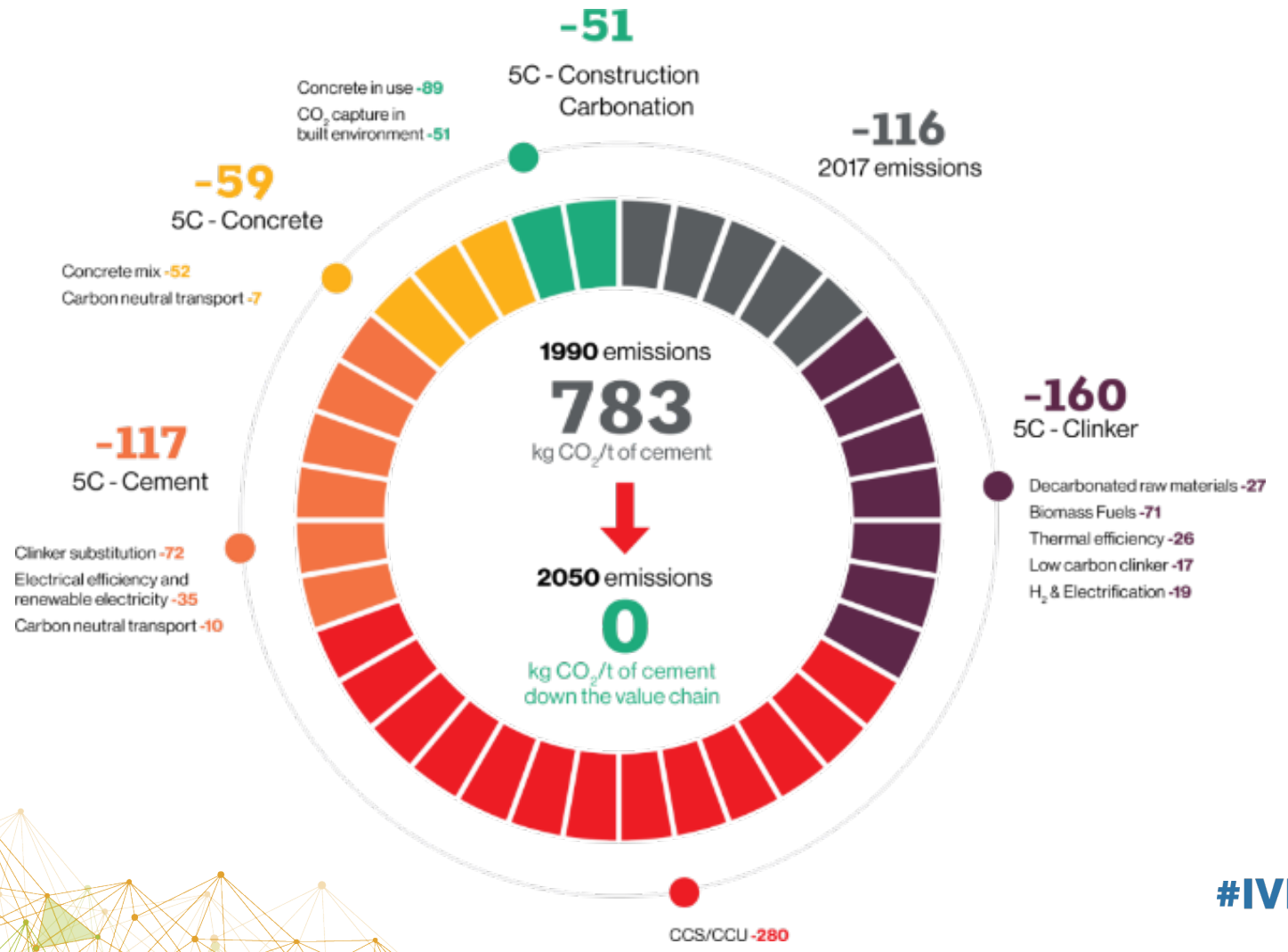
Jim Rushworth

Industrial Policy Director
CEMBUREAU

Panel II: Solutions to decarbonise the cement and lime sector

CEMBUREAU 2050 roadmap

CO_2 reduction along the cement value chain (5Cs: clinker, cement, concrete, construction, re-carbonation)



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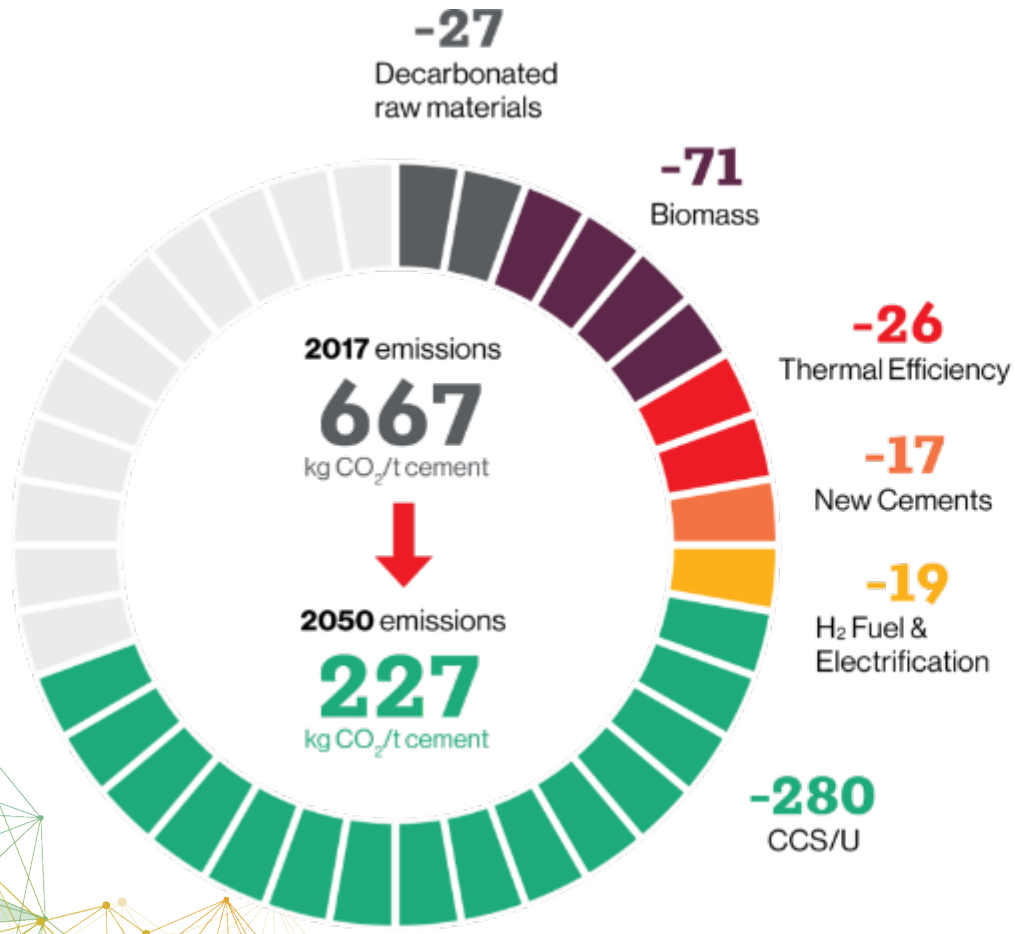
Opportunities to Achieve CO_2 Reductions for Clinker



- Access to alternative decarbonated raw materials, Zero landfill, improved waste sorting, better implementation of waste legislation.
- Access to biomass waste, Zero landfill, improved waste sorting, better implementation of waste legislation
- Investment in kiln upgrades and waste heat recovery
- Access to funding for research, take-up of low carbon products effcient revision of standards
- Access to H_2 and sufficient renewable electricity
- Access to public funding for innovation, CO_2 pipeline infrastructure, Access to Renewable Electricity, High CO_2 price, Ability to pass on CO_2 costs

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Panel II: Solutions to decarbonise the cement and lime sector

CEMBUREAU
The European Cement Association

Main Policy Requests

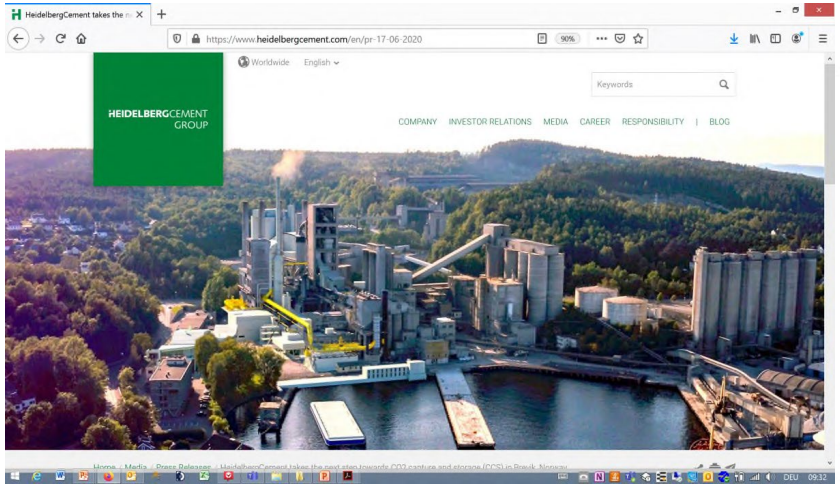
Carbon Capture, Use and Storage (CCUS) will account for **42% of the CO_2 emissions reduction** in the sector. The EU should urgently look at developing a **pan-European CO_2 transportation and storage network,** provide continued **funding to demonstrators** and **support the business case** of the technology through State Aid.

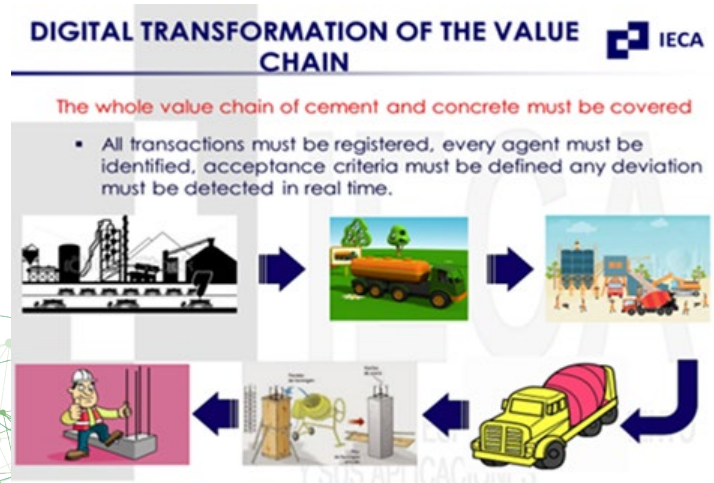
The replacement of fossil fuels by non-recyclable and biomass waste, and the use of alternative raw materials, will deliver another **15% of the emissions reduction in the cement industry.** Policies should support this circular approach by **facilitating waste shipment** between EU countries, and **discouraging both landfill and exports** of waste outside of the EU.

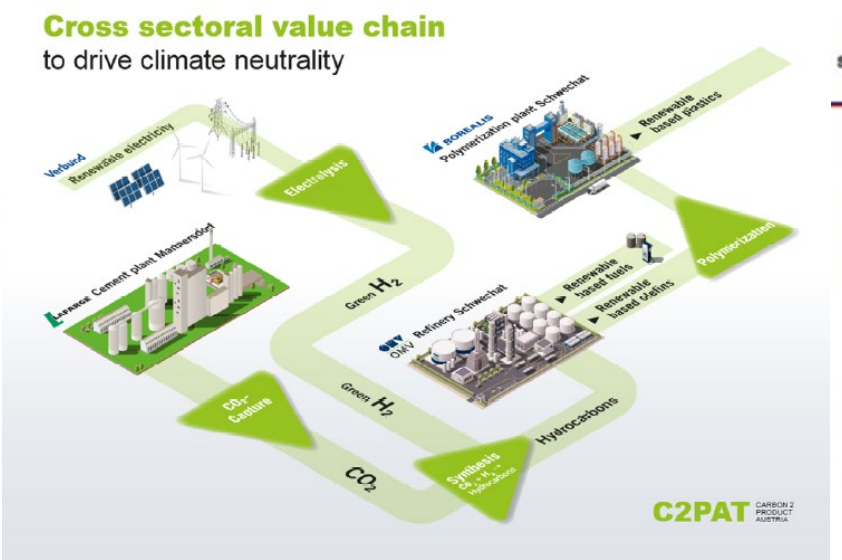
Bringing low carbon-cements products to the market will deliver an additional **13% emissions reduction.** Upcoming policies should aim to reduce European building's CO_2 footprint, be based on a **life-cycle approach,** and **incentivise the market uptake** of low-carbon products.

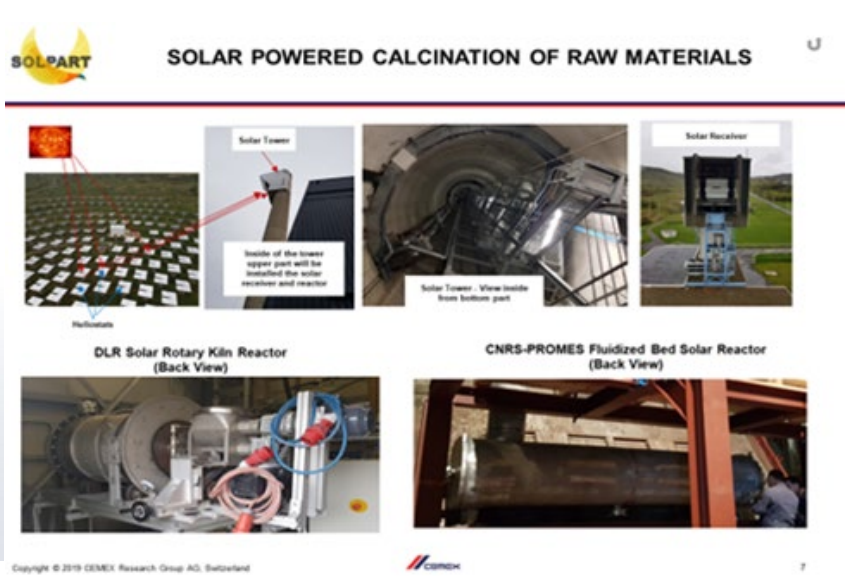
A level playing field on carbon, regulatory certainty as well as an ambitious industrial transformation agenda, will be **pivotal to deliver the investments needed** to achieve carbon neutrality.

Panel II: Solutions to decarbonise the cement and lime sector









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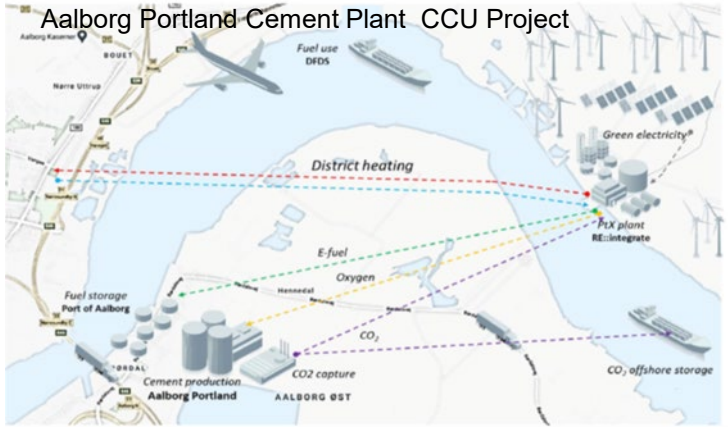
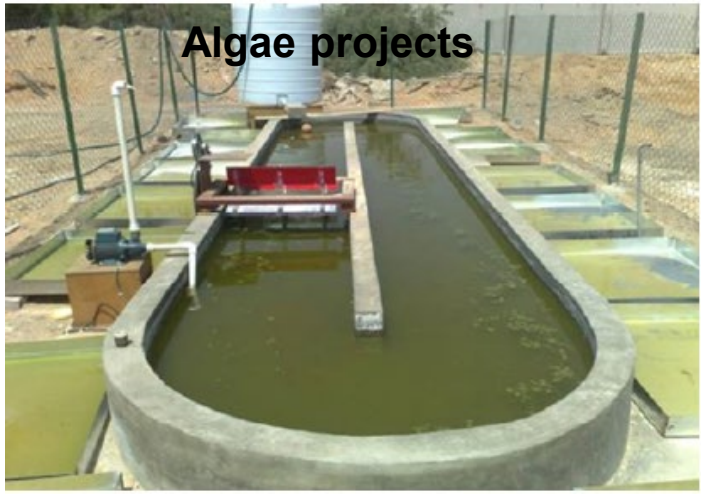
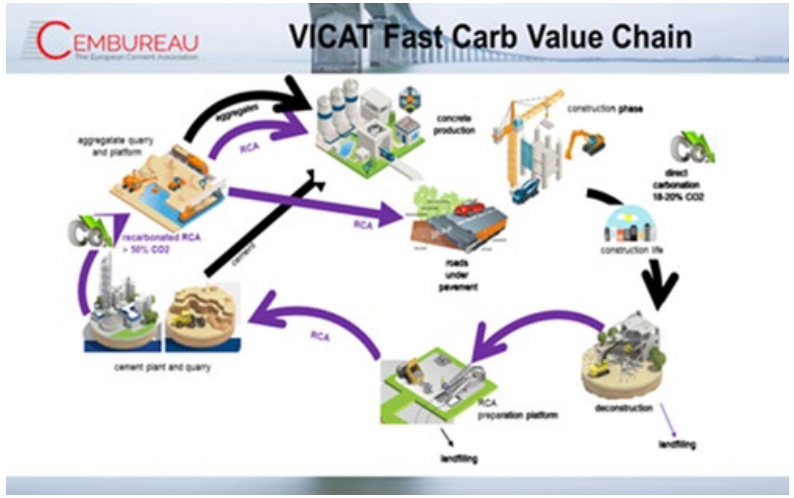
Aalborg Portland Cement Plant CCU Project



Algae projects





Limestone Calcined Clay Cement LC3

FUTURECEM

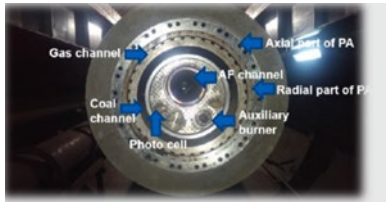
Limestone-calcined clay technology

Solidia Technologies

Cement and concrete cured using CO_2

EU MSCA-ETN REDMUD

Alternative Raw Materials
Bauxite residues

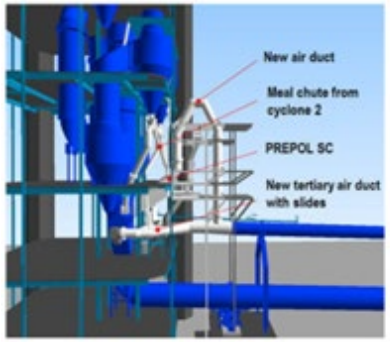


C3 carbon concrete composite

Carbon reinforced concrete

ECO BINDER

Belite-Ye'elimite-Ferrite (BYF)
class of low-CO_2 binders



Novel hydraulically active
calcium hydrosilicates

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Jim Rushworth

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CEMBUREAU

Panellists

Rob van der Meer

Director EU Public Affairs

Heidelberg Cement

Kiran Ananth

Principal Counsellor

Confederation of Indian Industry - Godrej Green Business Centre

Davide Zampini

Head of Global R&D

Cemex

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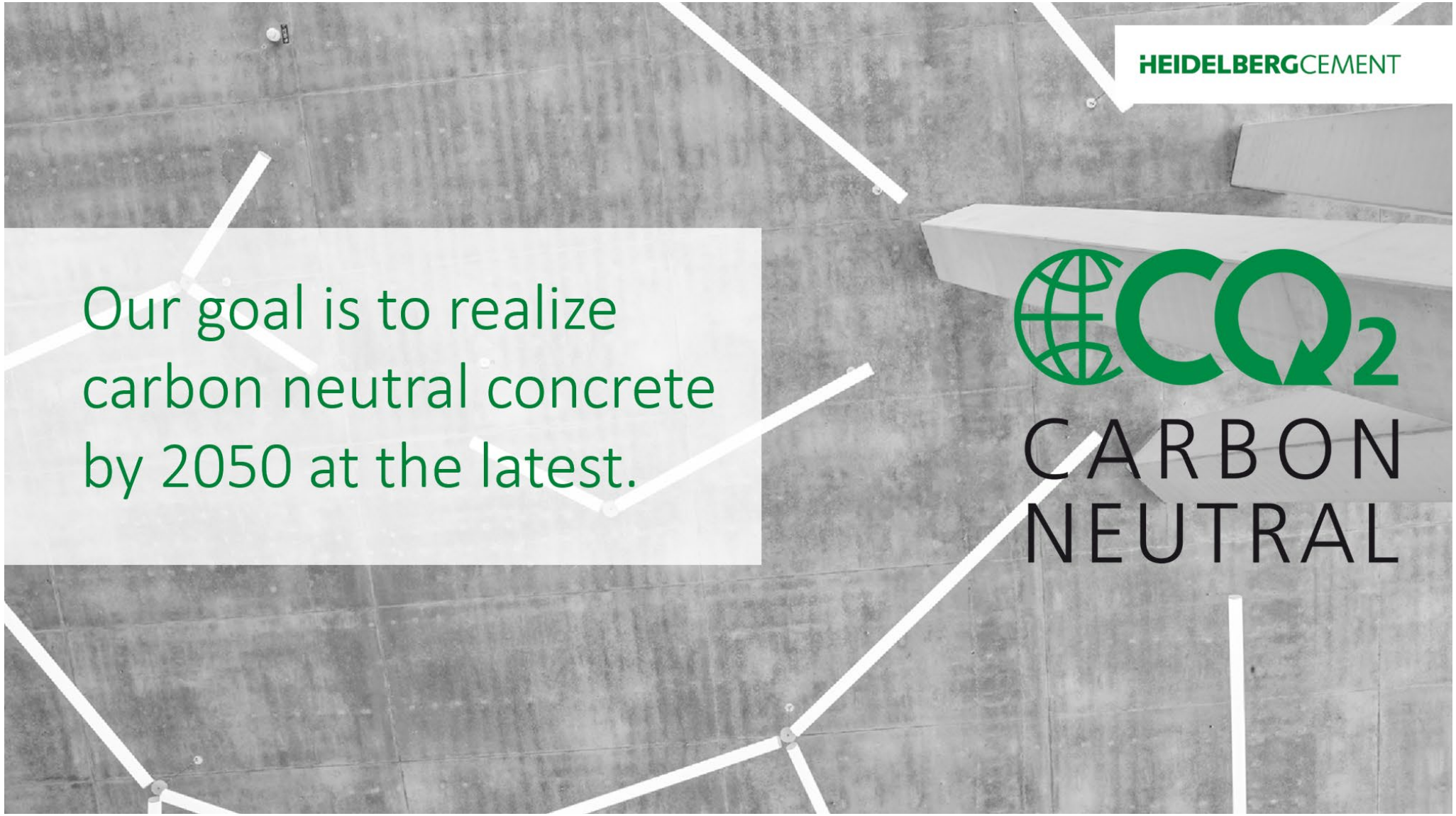
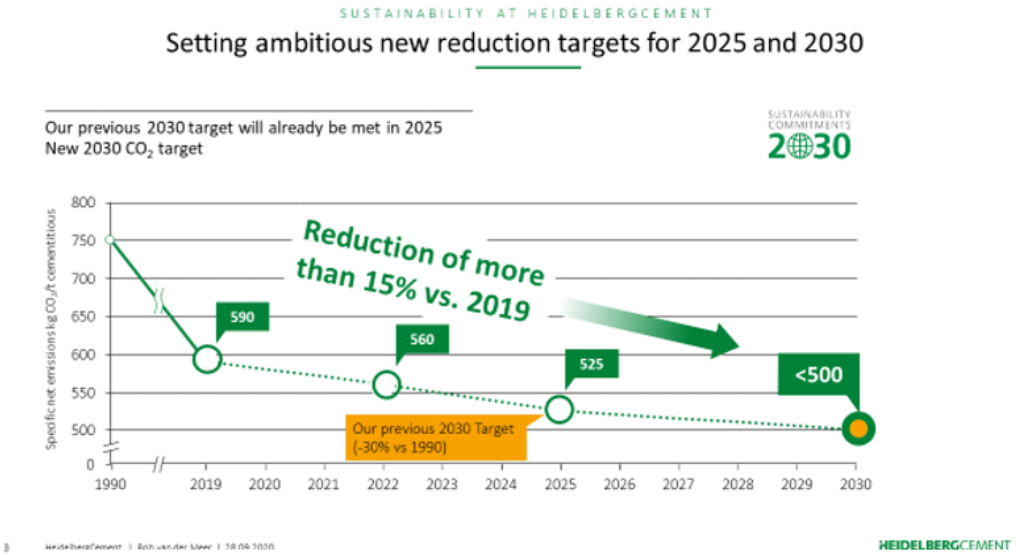


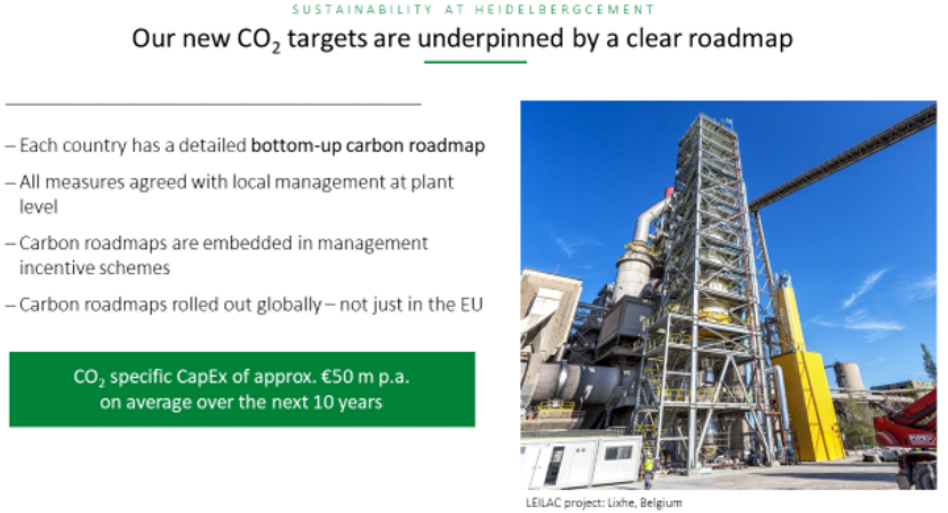
Panel II: Solutions to decarbonise the cement and lime sector

Climate Change at the heart of HeidelbergCement

1. Improved and strengthened reduction targets for 2030
    1. 30% reduction of net specific emissions in 2025
    2. 500 kg/CO2 ton cementitious for 2030
    3. Carbon neutrality in concrete for 2050

2. Global targets, with differentiated approach for every single plant / country:
   HeidelbergCement Roadmap
    1. Each country has a detailed bottom-up carbon roadmap
    2. All measures agreed with local management at plant level
    3. Carbon roadmaps are embedded in management incentive schemes
    4. Carbon roadmaps rolled out globally – not just in the EU





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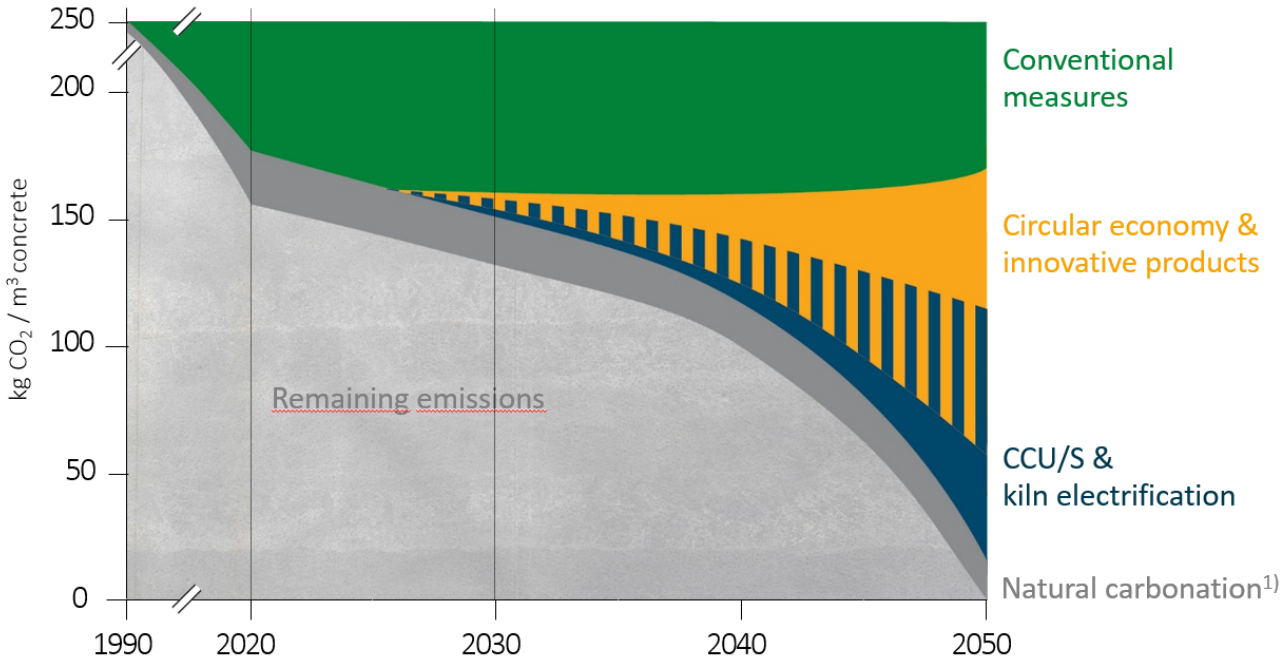
SUSTAINABILITY AT HEIDELBERGCEMENT

Carbon neutrality by 2050 requires a variety of localized approaches

Our approach to carbon neutrality



1) Natural carbonation is the absorption of CO_2 from the atmosphere during the lifetime of a concrete construction

Circular economy & innovative products

- Recycled materials (recycled aggregates, recycled concrete paste as raw material)
- Alternative cementitious materials (e.g. calcined clay, carbonated recycled concrete paste)
- Low carbon clinker types (example: Ternocem, CSA)
- Low carbon cement types (example: MultiComponentCement – CEMII/C-M)

CCU/S & kiln electrification

- Carbon Capture & Usage (high protein animal feed, manufacture of fuels, carbonates and chemicals)
- Carbon Capture & Storage (amine scrubbing, Oxyfuel technology, LEILAC)
- Hydrogen & kiln electrification projects

HEIDELBERGCEMENT

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Panel II: Solutions to decarbonise the cement and lime sector

LEADING THE WAY TO CARBON NEUTRALITY

CCU/S – driving innovative projects and technologies with significant potential

TRL 8

Post combustion (Amine)

Early Stage: 4 research projects in Europe
Pre-industrial: Edmonton, Canada
Industrial/commercial scale:
Brevik, Norway

TRL 5

Oxyfuel

Early Stage: Preparatory research work done together with ECRA/UMONS
Pre-industrial: CI4C, Germany

TRL 6

Direct Separation (LEILAC)

Pilot: LEILAC-1, Belgium
Pre-industrial: LEILAC-2, Germany

TRL 8

Micro-algae

Early Stage: 3 research projects executed in Sweden, Turkey & France
Pre-industrial: Safi, Morocco

TRL 7 to 8

Hydrogen

Pre-industrial: Carbon neutral H_2 based fuel, pilot at Ribblesdale, UK
Industrial/commercial scale:
H_2/O_2 HydrOxy combustion, France

TRL 3

Kiln electrification

Early Stage: Feasibility studies CEMZERO, Sweden, ELSE, Norway, and LEILAC-2, Germany

TRL - Technology Readiness Level (scale from 1-10, 1 being very early stage and 10 being industrial scale)

Panel II: Solutions to decarbonise the cement and lime sector

Kiran Ananth

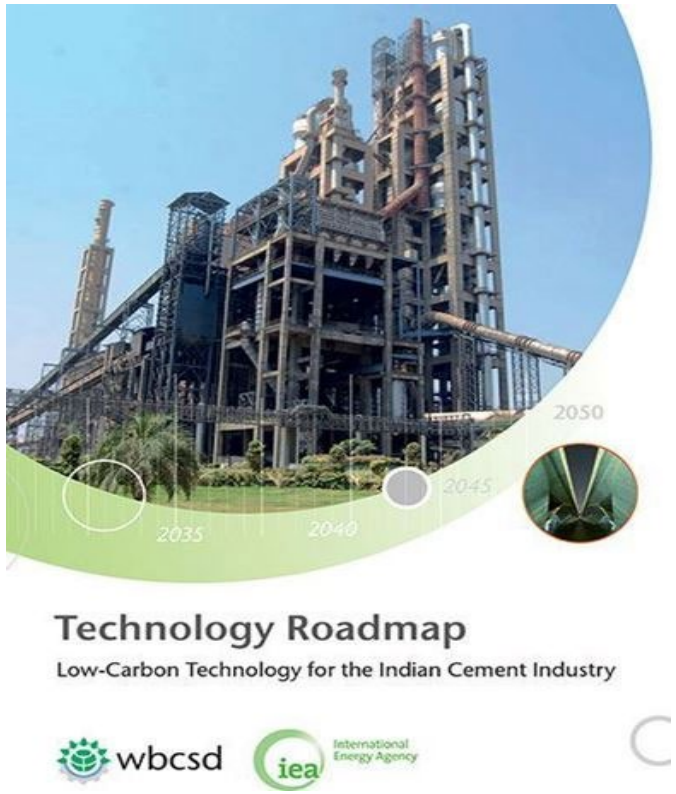
Principal Counsellor

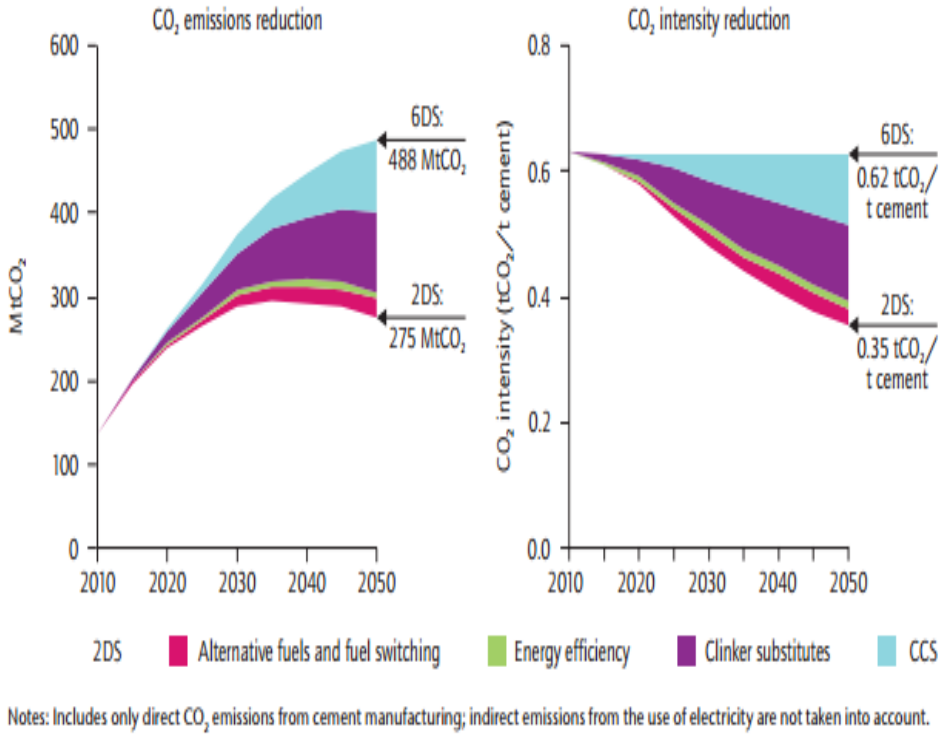
Confederation of Indian Industry - Godrej Green Business Centre

Confederation of Indian Industry
125 Years: 1895-2020

Decarbonizing cement & lime sector

Low Carbon Technology Roadmap (LCTR) for Indian Cement Industry

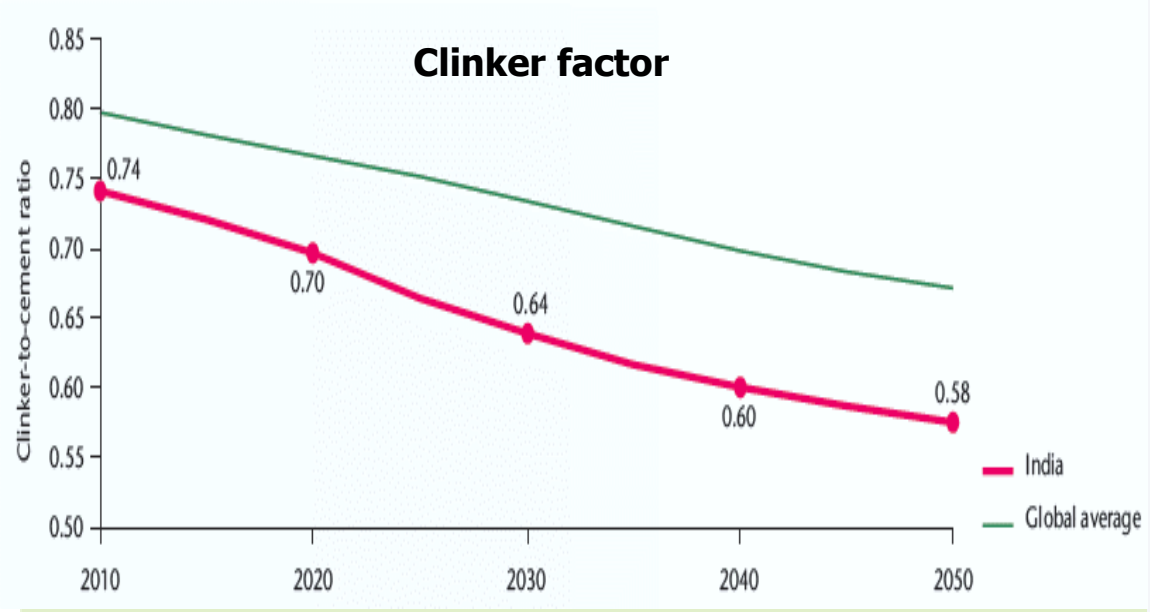


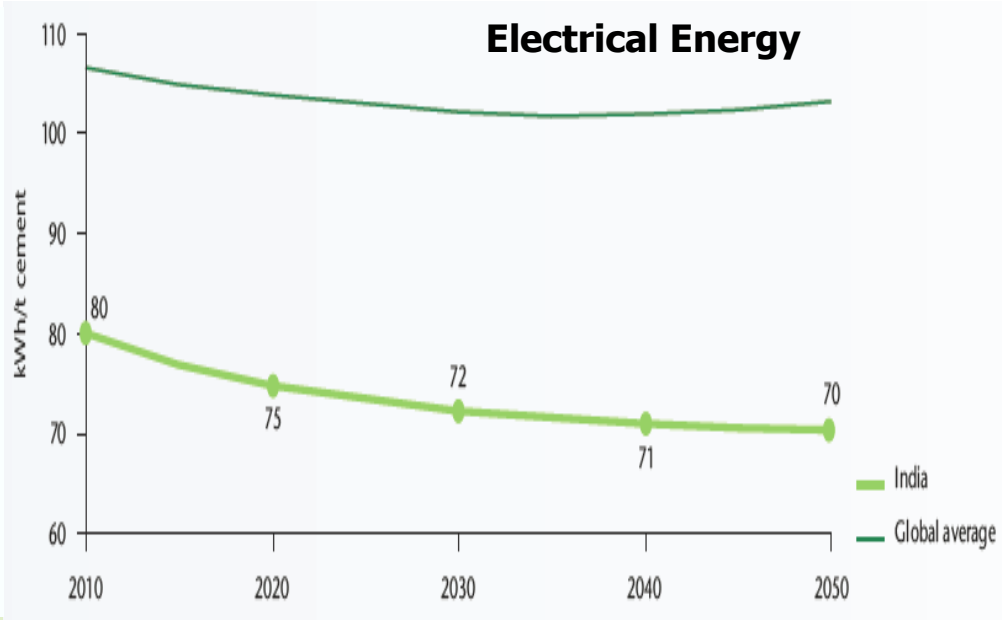


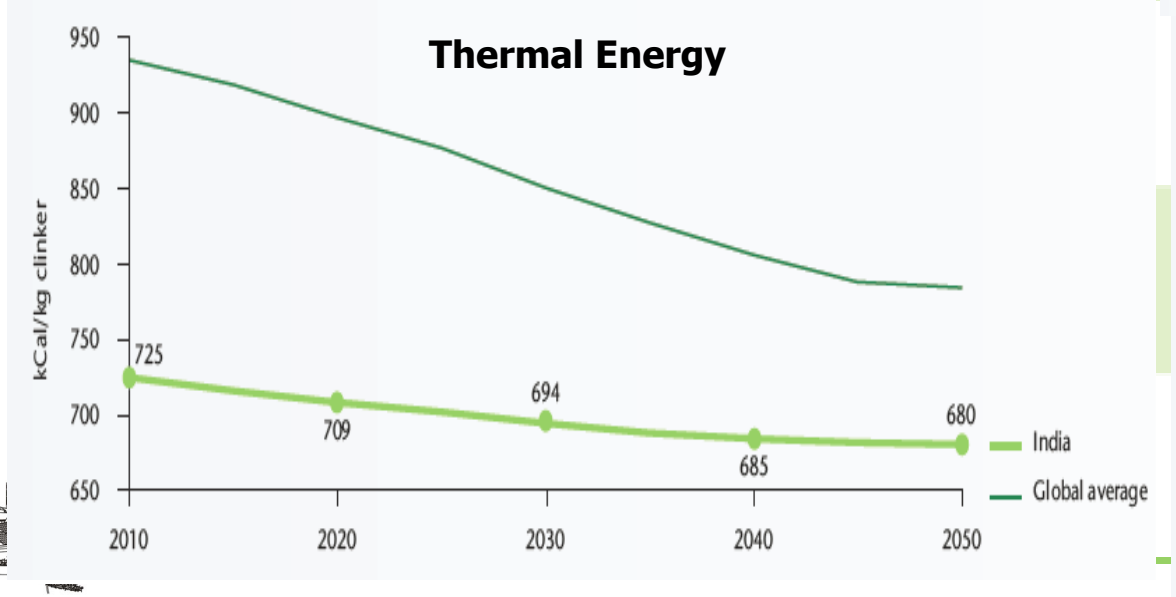
45% reduction in
GHG intensity by 2050 of 2010 Levels

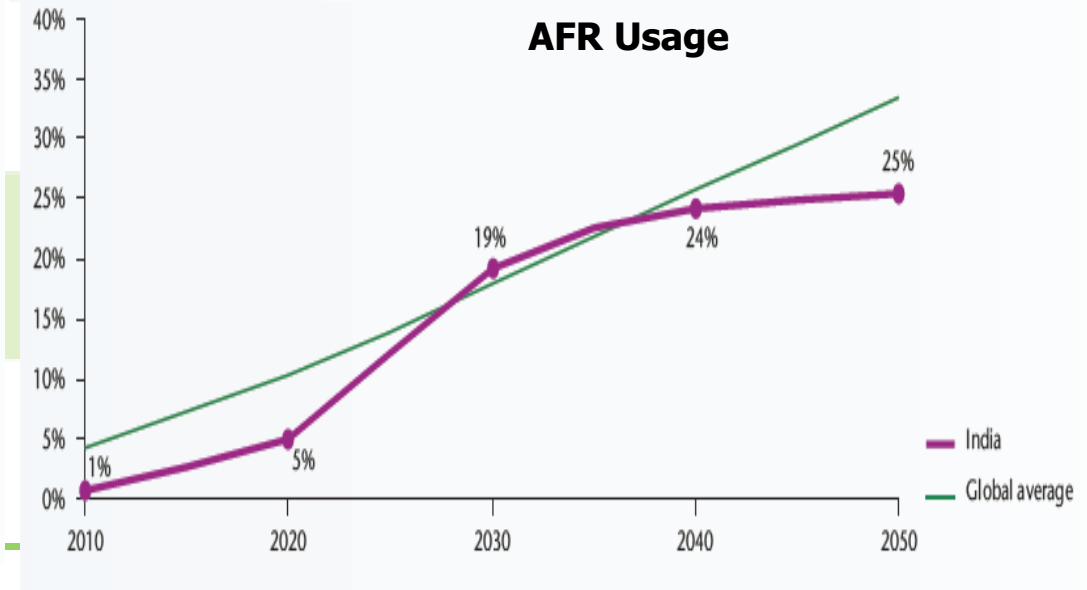
FIRST OF ITS KIND VOLUNTARY INITIATVE BY A SECTOR IN ANY COUNTRY GLOBALLY

Key indicator and levers of emission reduction







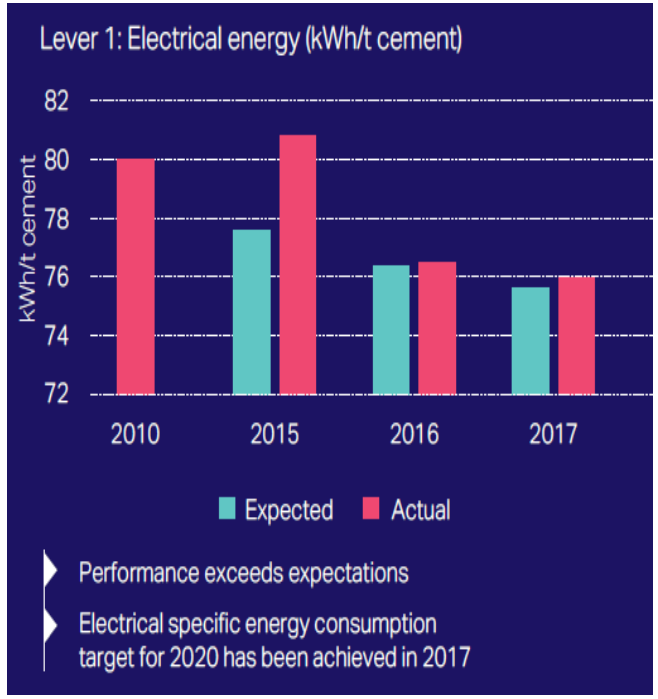


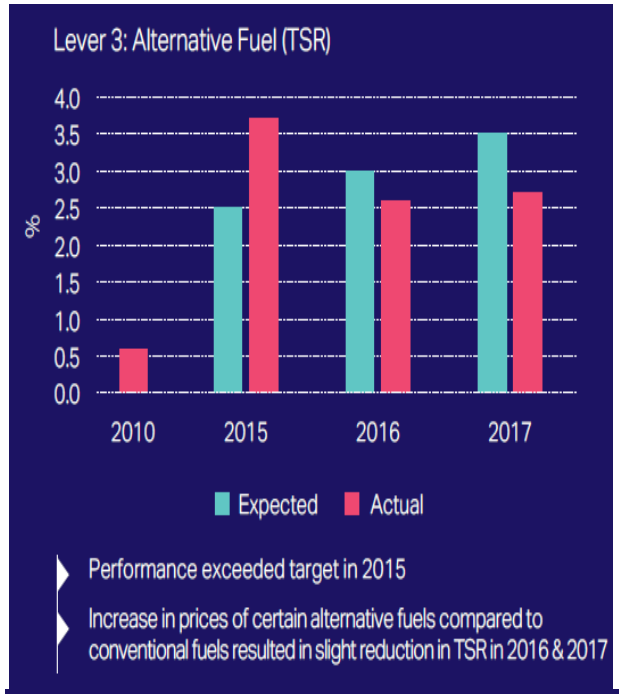
Cement Sector – Decarbonization Strategies

Energy Efficiency	Resource Efficiency	Renewable Energy	Carbon Capture & Storage	Product demand & Efficiency (Downstream)
Thermal Efficiency	Alternative Fuel	Solar/Wind	Carbon Capture, Storage & Reuse	Low Carbon Concrete
Electrical Efficiency	Alternative Material			Circular Economy
	Clinker Substitution			
	Blended Cement			

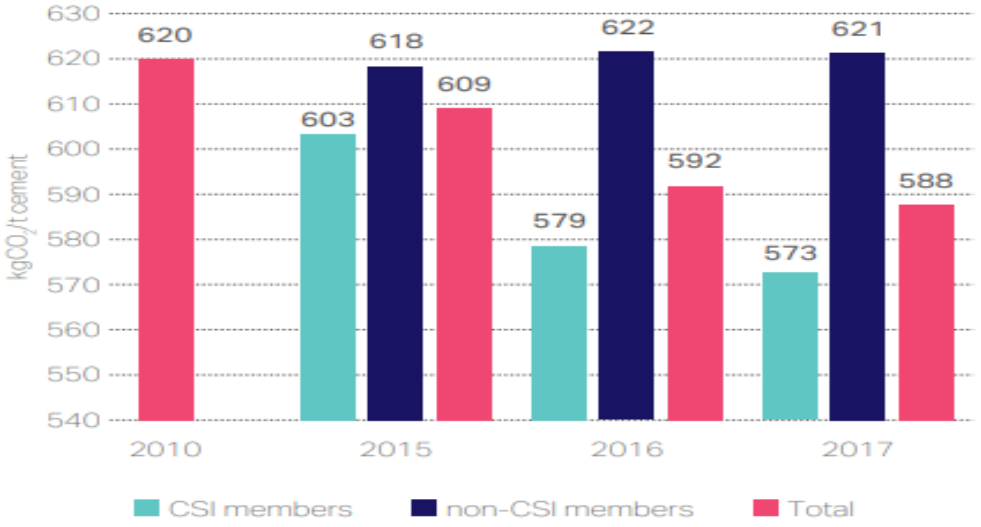
LCTR status update - Snapshot of progress in 7 years (2010 to 2017)

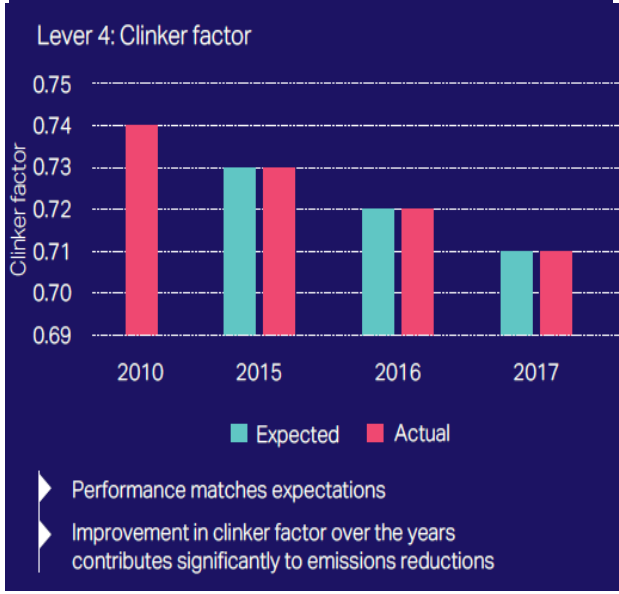
- Data collected covers 75% of India's cement production
- 5-fold increase in alternative fuel consumption (1.5 million Ton used)
- Global best in energy efficiency
- Sector achieved targets for 2020 in 2017
- WHR installed capacity 344 MW in 2017



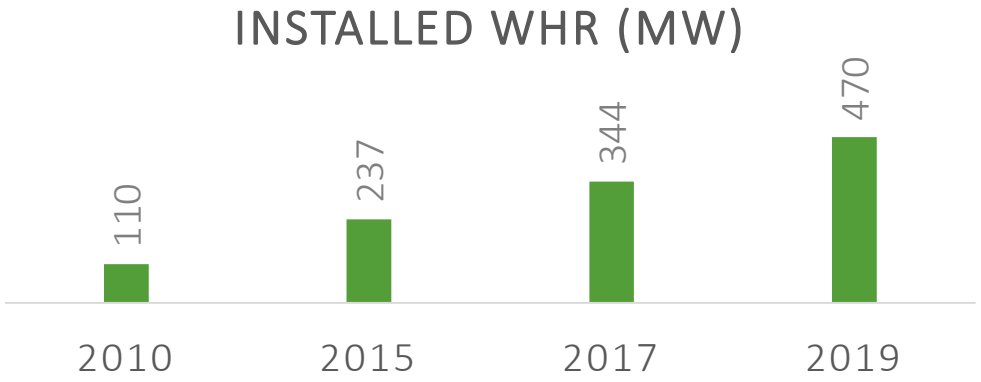


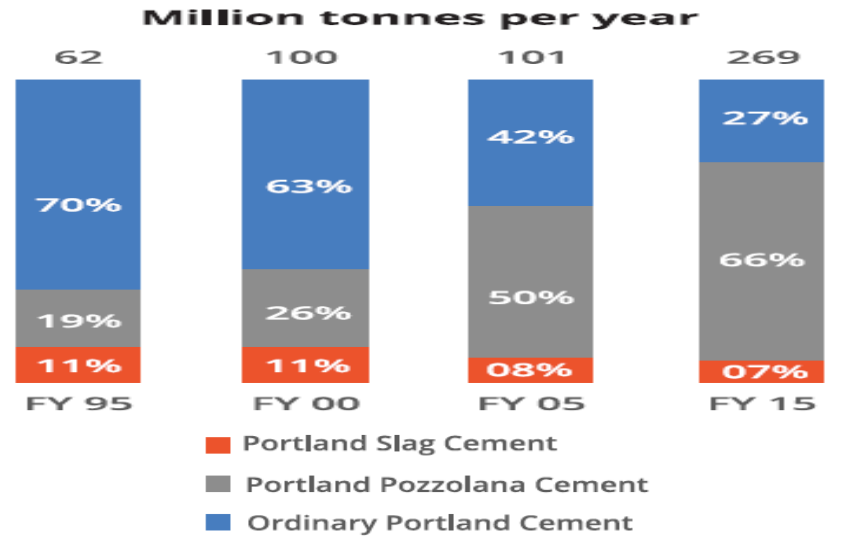
GHG Intensity reduction of 5% in 2017 as compared to 2010 baseline (on path to achieve target)

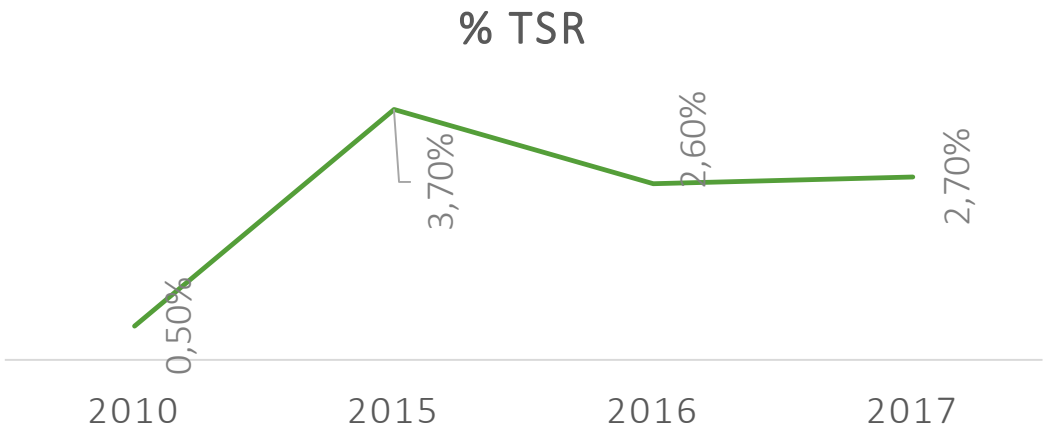


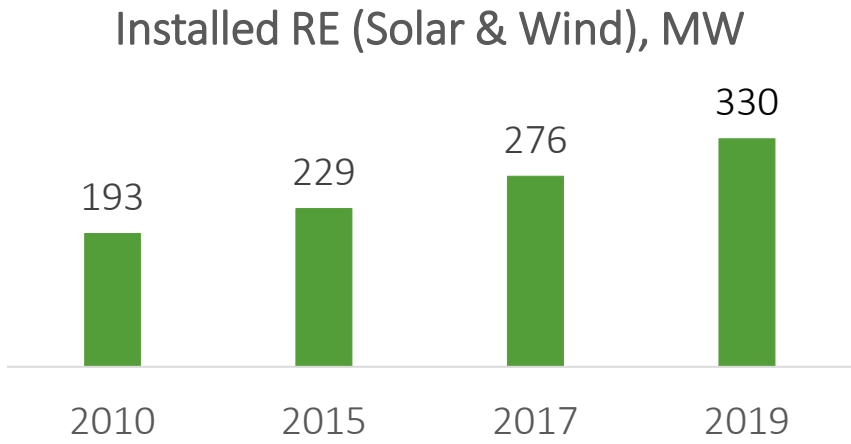


Indian Cement Sector –EE Status









Barriers – Policy, Technical and Financial

- Energy efficiency
  - New plants have achieved global best numbers
  - For old plants, higher investment needed for installation/retrofits, layout constraints
- Clinker factor
  - Need for modification of existing national standards and codes to increase additives
- Renewable energy
  - Higher investment
- AFR
  - Availability of alternate fuel and raw materials
  - Higher investment for waste pre-processing facilities
- CCUS
  - Higher investment, No regulatory drivers, Lack of business case

Contact:
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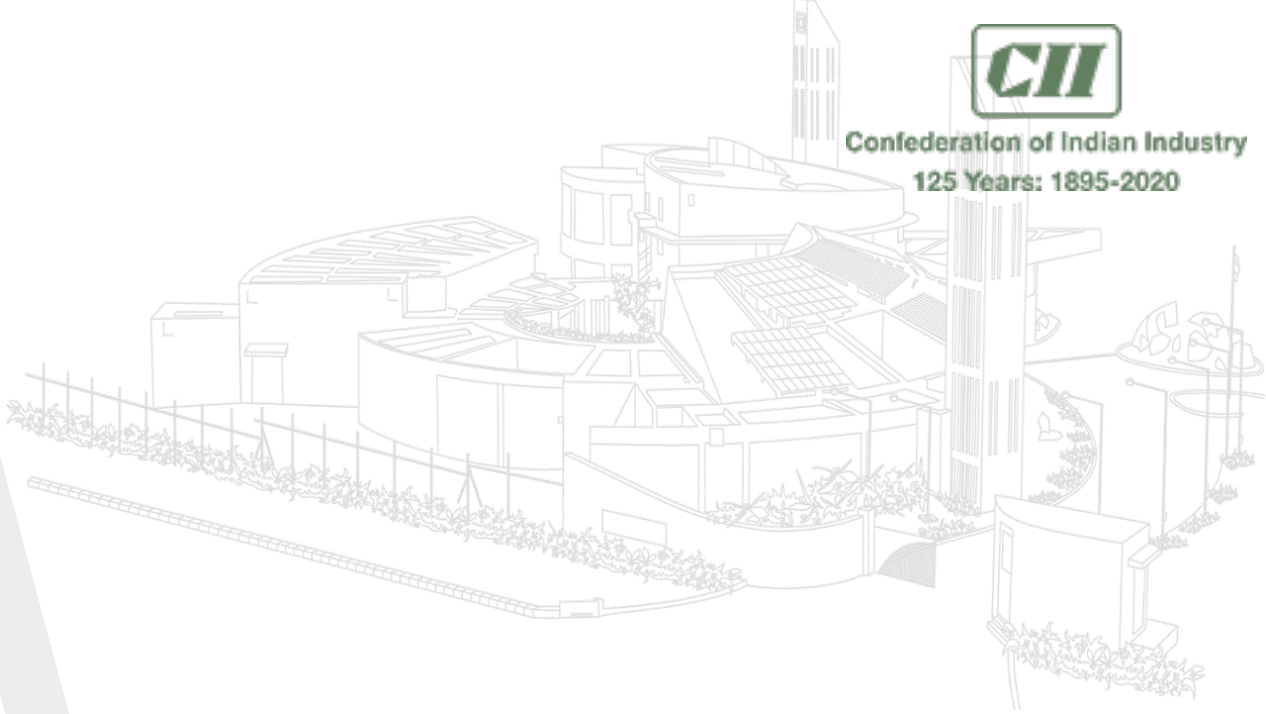
CII - Godrej Green Business Centre, India
kiran.ananth@cii.in



THANK YOU!

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Digital Break

Coming up next: Panel III - Solutions to decarbonise the chemical and petrochemical sector

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Panel III: Solutions to decarbonise the chemical and petrochemical sector

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Panel III: Solutions to decarbonise the chemical and petrochemical sector

Değer Saygın

Director

SHURA Energy

Panel III: Solutions to decarbonise the chemical and petrochemical sector

Moderator

Değer Saygın

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Babette Pettersen

VP Europe

Lanzatech

Eelco Dekker

Chief EU Representative

Methanol Institute

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IRENA INNOVATION WEEK 2020

Closing remarks

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International Renewable Energy Agency

Closing remarks

Dolf Gielen

Director

IRENA Innovation and Technology Centre

IRENA Innovation Week 2020: Programme

Day & Time	Session	Partners
Monday 5th October 09:30 – 11:30 CEST	**High-level opening session**	
Monday 5th October 17:00 – 20:00 CEST	**Session 2: Smart electrification of end-use sectors:** implications for the power system	EPRI ELECTRIC POWER RESEARCH INSTITUTE
Tuesday 6th October 08:00 – 11:00 CEST	**Session 3: Scaling up green hydrogen and green e-fuels production** to decarbonise industry & transport	Hydrogen Council
Tuesday 6th October 17:00 – 20:00 CEST	**Session 4: Growing the bio-economy:** solutions for the sustainable supply of biomass & biofuels	GBEP Global Bioenergy Partnership
Wed 7th October 08:00 – 11:00 CESR	**Session 5: Renewable solutions for industry transformation**	MISSION POSSIBLE PLATFORM
Wed 7th October 17:00 – 20:00 CEST	**Session 6: Transforming Transport:** Innovative renewable-based solutions in road freight, shipping & aviation	International Transport Forum
Thursday 8th October 10:00 – 12:30 CEST	**Session 7: IRENA Youth Talk:** Entrepreneurship and Innovation for the green energy agenda	Initiate! SDG7 YOUTH CONSTITUENCY YOUTH IN SUSTAINABLE ENERGY
Thursday 8th October 14:00 – 16:00 CEST	**Session 8: The Way Forward**	

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IRENA INNOVATION WEEK 2020

Thank you!

Coming up next

Session 6: Transforming Transport: innovative renewable-based solutions in road freight, shipping and aviation at 16:00 today (CEST)

Register at
https://innovationweek.irena.org/

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