



AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

Clean Energy Ministerial CCUS Initiative - update

CSLF Technical Group meeting | Tuesday 13 June 2023



Agenda 13 June 2023

- 1. Clean Energy Ministerial overview
- 2. 14th Clean Energy Ministerial meeting, Goa, India, 19-22 July
- 3. CEM CCUS Initiative: main activities
- 4. Discussion & questions



INDIA 2023 Advancing clean energy together

19 - 22 July, Goa, India





CEM'S 29 MEMBERS





HOW DOES THE CEM WORK?

The CEM builds **Global Action Coalitions** to achieve clean energy goals and advance their transitions. The CEM operates through **three key pillars:**

- **CEM Ministerial:** An annual meeting of its ministers, partners and community.
- **CEM Work Programme:** A combination of international campaigns and initiatives spanning the clean energy spectrum.
- CEM Secretariat: a small, flexible team that serves the ministerial, all workstreams and members.

CEM MINISTERIAL



CEM WORKSTREAMS



POWER

- 21st Century Power Partnership
- Nuclear Innovation
- International Smart Grid Action Network
- Regional & Global
 Interconnection
- Transforming Solar
- RISE³



TRANSPORT

- Electric Vehicles Initiative
- EV30@30 Campaign
- Commercial Vehicles Drive to Zero Campaign
- Clean Energy
 Marine Hubs



INDUSTRY

- Carbon Capture, Utilization, & Storage
- Industrial Deep Decarbonisation
- Green Public Procurement Campaign



BUILDINGS

 Super-Efficient Appliance & Equipment Deployment



CROSS-SECTORAL

- Hydrogen Initiative
- Biofuture Platform
- Biofuture Campaign



ENABLING ENVIRONMENT

- Empowering People
- Equality In Energy
 Transitions
- Equal by 30 Campaign
- Long-Term Energy
 Scenarios
- Investment & Finance
- Clean Energy Solutions
 Center

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https://www.cem-mi-india.org



ADVANCING CLEAN ENERGY TOGETHER

19 - 22 July, Goa, India











CEM 14 Ministerial in Goa

- Official Website: <u>https://www.cem-mi-india.org/</u>
- Date: 19-22 July 2023 (on margins of G20 Energy Transition Ministerial Meeting (ETMM) & Energy Transition Working Group (ETWG)
- Venue: Grand Hyatt Goa, P.O. Goa University, Bambolim, Goa 403 206, India
- Host: Government of India
- Theme of G20 Presidency: "One Earth, One Family, One Future" ("Vasudhaiva Kutumbakam")
- Theme of CEM14/MI8: "Advancing Clean Energy Together"
- Logo and Website launch event: <u>https://www.youtube.com/watch?v=hTNOS3VjGds</u>
- *Registration:* (will soon be available via the official website)
- Key Features:





CEM14 in Goa – Emerging workstream deliverables

POWER

- Battery storage announce new workstream idea
- Solar policy paper on resilient supply chains
- 21CPP-release of action plans for rapid power sector decarbonization; new signatories
- Solutions Centre policy brief on key crosssector challenges to clean energy policies
- ISGAN announce Awards on use of Al in Smart Grids

INDUSTRY

- CCUS updated 2023 report on key financing principles for CCUS; CCUS deployment report; support for Carbon Management Challenge launch at COP28
- IDDI/GPP new commitments, new progress and technical outcomes report
- CCUS, IDDI and GCCA next steps on industrial decarbonization of cement using CCUS

TRANSPORT

- Clean Energy Marine Hubs Launch of new initiative
- EVI report from transport ministers to energy ministers; Charging infrastructure roadmap
- DriveToZero vehicle display/demonstration; new commitments to the Global MoU

CLEANFUELS

- Hydrogen *launch* of new Hydrogen Trade Forum; CEM-MI Collaboration on H2 corridors and ports
- Biofuture Platform India announces the Global Biofuels Alliance; Presenting key messages for policy makers, including for G20 discussions

ENABLING ENVIRONMENT

- LTES new report on investment tools; also seeking new members
- Equality Initiative target of 30 new Ambassadors announced
- Equalby30 new toolkit, 5-year anniversary, seeking new signatories
- Empowering People new toolkit; new funding, announcement of new partners

BUILDINGS

- SEAD additional signatories for Call to Action on Product Efficiency; support for Cooling Campaign for COP28
- EMLA announce winners of Energy Management Leadership Awards

CEM-14: overall schedule

	TUE 18 JUL	WED 19 JUL	THU 20 JUL	FRI 21 JUL	SAT 22 JUL
am	CEM CCUS - OGCI India workshop (tentative)	CEM / MI side-events	CEM / MI side-events	CEM 14 – MI-8 Ministerial + side-events	G20 Energy Ministerial + side-events
pm	<i>CCUS Initiative Annual meeting (tentative)</i>	CEM / MI side-events	CEM / MI side-events	CEM 14 – MI-8 Ministerial + side-events	G20 Energy Ministerial + side-events



Three CCUS side-events – exact timings TBC

1.DECARBONISING CEMENT WITH CCUS

[DATE, TIME]

- Panel discussion, 90 minutes
- Proposal by: CEM CCUS, CEM IDDI, GCCA
- Concept: This panel discussion will bring together ministers and CEOs to discuss how carbon capture can be accelerated in the cement sector, where it is a vital decarbonization lever.
- Expected / potential speakers:
 - Jennifer Granholm, Secretary of Energy, US
 - V.K. Saraswat, Member of NITI Aayog, India
 - Graham Stuart, Minister for Energy Security and Net Zero, United Kingdom
 - Hadi Knani, Carbon Management Director, Ministry of Energy, Saudi Arabia
 - Thomas Guillot, CEO of GCCA**
 - Magali Anderson, Chief Sustainability and Innovation Officer, Holcim*
 - Cathy Shepherd, Global Head of Clean Energy Transition, Citi Bank*



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2. FINANCING CCUS

[DATE, TIME]

- Round table, 90 minutes
- Proposal by: CEM CCUS, GCCSI
- Concept: This roundtable session will bring together several representatives of the finance sector, governments and industry, to discuss challenges and ways forward in risk-sharing to accelerate CCUS financing, as well as the role for development finance institutions.
- "20 + 20"
- Expected / potential speakers:
 - Cathy Shepherd, MD, Citi *
 - Lionel Martinez, MD, ING*
 - Yukimi Shimura, MUFG Bank*
 - Raghav Handa, HSBC **
 - Priyantha Wijayatunga, Asian Development Bank*
 - Natalia Kulichenko-Lotz, World Bank**
 - Jacek Podkanski, European Investment Bank*
 - 3-4 industry representatives: OGCI**, GCCA...
 - 3-4 CEM CCUS Initiative government representatives
 - Andrei Marcu, ERCST**

Document update:

"Key Financing Principles for CCUS"



3. CARBON MANAGEMENT CHALLENGE [DATE, TIME]

- Round table, 90 minutes
- Proposal by: US, NOR, KSA, CEM CCUS
- Concept: At this event, this Carbon Management Challenge concept is presented. At the roundtable discussion, key elements of the challenge, such as quantitative goals, associated policy frameworks and ways to support the challenge, will be discussed.
- "20 + 20"
- Expected / potential speakers: HoDs from:
 - US
 - NOR
 - CA
 - UAE
- KSA
- JP
- UK
- All interested CEM Member countries
- IEAGHG
- IEA
- CATF
- GCCSI
- etc.



Pre-CEM meetings, Tuesday 18 July

AM: INDIA WORKSHOP WITH OGCI

- Presentation by OGCI on their work on India Roadmap, followed by discussion
- Event targeted for Indian industry and some representatives of gov.

PM: INITIATIVE ANNUAL MEETING

- Discussion with India government
- Joint session with partners: OCGI, GCCA, CEM IDDI and H2
- Discussion on COP-28
- Other relevant topics and administrative issues as needed



CCUS events at GCEAF in Pittsburgh, 22-23 Sept 22

Financing CCUS – Thursday 22 September, 12:30 – 1:30, Room 411 Co-organisers: CEM CCUS Initiative and Global CCS Institute Panelists: Citi, Credit Suisse, New Energy Risk, Energy Futures Finance Forum

Accelerating CCUS in developing countries – Thursday 22 September, 12:30 – 1:30, Room 303 Co-organisers: Clean Air Task Force, IEAGHG, Global CCS Institute, CEM CCUS Initiative Panelists: GCCSI, World Bank, SKK Migas (Indonesia), Nigeria Ministry of Science and Technology, IEAGHG, Clean Air Task Force

Accelerating technology-based carbon dioxide removals – Friday 23 September, 10:15 – 11:15, Room 413 Co-organisers: DAC Coalition, IRENA, IEAGHG, CEM CCUS Initiative Panelists: Carbon Engineering, IRENA, Climeworks, Negative Emissions Platform, Stripe

Collaborating to scale up CCUS for the cement sector – Friday 23 September, 11:30 – 12:30, Room 407 Co-organisers: GCCA, CEM Industry Deep Decarbonisation Initiative, CEM CCUS Initiative Panelists: Global Cement and Concrete Association, Lehigh Hanson Cement, OGCI, UNIDO, US Department of Energy, Norwegian Ministry of Petroleum and Energy



Full schedule

available at

https://gceaf.org



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Clean Energy Ministerial CCUS Initiative

Fourteen Member Countries:

United States Saudi Arabia United Kingdom Norway

Lead countries

Participating CEM Members

China

Nigeria



Australia

Mexico



Canada

Netherlands







United Arab Emirates



South Africa

Other countries and Partners:

Links to further countries: Denmark, Finland, Germany, India, Indonesia, Singapore, Sweden etc.

Industry: Oil and Gas Climate Initiative, Global Cement and Concrete Association, worldsteel

Financial institutions: Multilateral Development Banks, private banks, investment firms

Organizations: Carbon Sequestration Leadership Forum (CSLF), International Energy Agency (IEA), IEA Greenhouse Gas R&D Programme (IEAGHG), Mission Innovation (MI), Global CCS Institute (GCCSI)

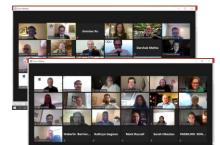


Three key areas of activities

1. WORKING WITH INDUSTRY TO ACCELERATE PROJECT DEPLOYMENT



Working with Oil and Gas Climate Initiative to accelerate strategic CCUS hubs and infrastructure.



2. LINKING WITH THE FINANCE SECTOR

"Finance Sector Lead Group for CCUS"

- Informal group of banks interested in CCUS: development banks, commercial banks etc.
- Platform to discuss CCUS as investment opportunity and to link with industry
- Opportunity to give advice to governments and ministers

3. DISSEMINATING BEST PRACTICE

Sharing country developments in monthly meetings.

Sharing best practice in regional workshops

and events.



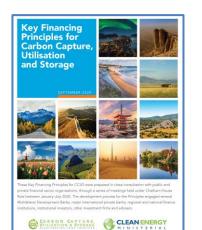
Giobal Cement and Concret Association

Working with Global Cement and Concrete Association to materially accelerate CCUS in the cement sector.





"Key Financing Principles for CCUS" drafted in collaboration with the finance group.



Sharing best practice in webinars.



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Accelerating CCUS in the cement sector: Collaboration with GCCA

Workshop 7 March on incentive policy mechanisms

- CCUS key for cement sectors; 10 projects by 2030
- Active CCUS project development by the sector: >100
- Cost of CCUS for cement: +100% / +40% / +2-6%
- Government support required for OPEX and CAPEX; no one single preferred mechanism
- Carbon pricing/markets: predictability and upward trend
- Green public procurement can be a key driver; definitions must be clarified ("green" / "low-carbon" / "clean" etc.)

Next workshop 29 June

Infrastructure and hubs as enablers for CCUS for cement

20 March 2023





WORKSHOP SUMMARY

CEM CCUS – GCCA internal virtual workshop on "Incentive policy solutions to accelerate CCUS in the cement sector"

Tuesday 7 March 2023, 13:00 - 15:00 CET

On Tuesday 7 March 2023, members of Clean Energy Ministerial CCUS Initiative (CEM CCUS) and the Global Cement and Concrete Association (GCCA) gathered at the first internal workshop under the collaboration agreement between the two organisations. The meeting was held virtually.

The objective of the workshop was to discuss current incentive policy approaches and share best practice in CCUS policy, to enable rapid acceleration of carbon capture projects in the cement sector. The workshop focused on large-scale deployment incentive frameworks, to accelerate CCUS in cement on industrial scale, as a significant CO₂ reduction mechanism. Policies and programmes for R&D or pilot-scale projects were not discussed in this meeting. Later workshops will cover other vital issues such as CO₂ transport and storage infrastructure and hubs, financing etc.

1. Opening and introduction

- Henriette Nesheim, Assistant Director-General in the Ministry of Petroleum and Energy in Norway, one of the four CEM CCUS Initiative co-leads, gave a brief welcome on behalf of the Initiative. The CEM CCUS Initiative was established in 2018 as a government-led platform to accelerate CCUS deployment.
- Henriette recalled that the cement sector has a particularly challenging decarbonisation
 pathway, in which many technology levers play a role. In this collaboration, we concentrate
 on CCUS, on its strategic, large-scale deployment level, and we take the need to deploy CCUS
 in the cement sector as given.
- CEO Thomas Guillot gave a welcome on behalf of GCCA, a global cement industry association that represents 80% of cement manufacturers outside China. In October 2021 the GCCA published its net-zero roadmap, in which CCUS is an important lever for the cement sector decarbonisation.
- In its roadmap, the cement industry committed to having ten industrial-scale CCUS projects by 2030. There has been great acceleration in project development by industry over the past two years. Today the cement industry has already identified over 100 CCUS projects under development globally.
- Beyond 2030, the industry's CCUS deployment pathway is challenging: roughly one largescale (1.3-1.5Mtpa) project is needed every week between 2030 and 2050. This requires for the right framework conditions to be created now.
- It is now time to work in partnership. At the CEM meetings in Pittsburgh in September 2022 we launched the CEM CCUS – GCCA collaboration declaration. Under the collaboration we will jointly accelerate CCUS in the cement sector globally, to reach GCCA's goal of ten industrial-scale projects, and hopefully many more, during this decade. Under the declaration, the two groups will:

Work with the finance sector

FINANCE SECTOR LEAD GROUP FOR CCUS

- Informal group of banks interested in CCUS open to all interested banks!
- Platform to **discuss** CCUS as investment opportunity
- Opportunity to give **advice** to governments and ministers
- Opportunity to take part in work to identify investment opportunities with industry
- Banks who have been involved:

World Bank & IFC	Soci
Asian Development Bank	Citi
Islamic Development Bank	ING
EIB	Banl
EBRD	ABN
Apicorp	Crec
Japan Bank for Int'l Cooperation	HSB
CIIB	Mits
Franklin Templeton	Sum
Legal and General	JP N
Aviva Investors	Roya
Zero-Carbon Partners	SEB
KPMG	Link

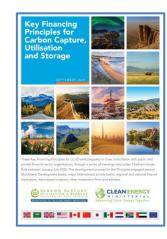
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KEY FINANCING PRINCIPLES FOR CCUS

- Ten high-level principles
- **Objective**: to support the establishment of a business case for CCUS and to facilitate financing
- Target groups: governments, industry and the financing sector who each have a unique and essential role to play
- Global coverage: both developed and developing countries, taking into account differences in countries' circumstances



DOCUMENT AVAILABLE AT: https://www.cleanenergyministerial.org/initiatives

FINANCE SECTOR MEETING 20 APRIL

- IFC: work to advance CCUS in Nigeria and Timor Leste
- ING: financial advice for projects in NL and UK

IFC DEPLOYS A BROAD ARRAY OF TOOLS TO CREATE MARKETS.

INVESTMENT	BLENDED FINANCE	ADVISORY / UPSTREAM	MOBILIZATION	
Financial products tailored to client needs	De-risking investments to catalyze impact at scale	Innovative solutions using IFC's expertise and tools	Mobilizing and managin capital for investment	
Loans Equity Trade and Commodity Finance Derivatives and Structured Finance	 Loans Guarantees Performance-based Incentives 	Help Create New Markets Unlock Investment Opportunities Strengthen Clients' Performance and Impact Improve Environmental, Social, and Corporate Governance	Syndications IFC Asset Management Company	
Portfolio exposure as of June 2022: \$63 billion	-\$5 billion under management \$1 of concessional resources from partners mobilizes \$6 of IFC/ other party financing	\$1.4 billion in advisory programming in last five years 51% committed in IDA countries	\$26 billion syndicated in last five years \$10.1 billion under management at IFC AMC	

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😂 tata gasume 💼	 Porthos is a joint venture between Port of Rottheadam, Gazunie and ERN, the 	 Project involved on- & offshore elements. Contracts between emitters (CO2 volumes, quality, etc.) and project company staned. 	 a bankability study for Porthos. ING advised the sponsors or all project related aspect including but not limited to
Nacial Asian Naciona Maria Nachana N	Speasars) who between them how extensive invoked on the local situation, gas infrastructure development and expertise in sub-undrog gas reserveins and enforce infrastructure. Controls is the lengest planned CS project considered of storaling: importance for the Dutch government's energy transition glans.	Project: Company agrical The Duck poverment allocated C BUR 2 billion of SIGH- subadies ETS price of HLR 400cm. Porthon is on schedule to store on annual amount of 2.5 mt of CO2 from 2024.	financing structures and options and levy Projec Agreements On INGs first mandale we acted as sole Financial Advise to the spansaes in relation to the overall Project. On INGS second mandate we acted as sole Financial Advise to the Put of Rottendam in to the Put of Rottendam in
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	Current, government strategy for CCUS	
	 National 14th Five-year Plan 	
	 Opinions of the Central Committee of the CPC and the State Council on Carbon Dicode Peaking and Carbon Neutrality in Full and Faithful Implementing of the Ne Development Philosophy 	*
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	 Large-scale integrated demonstration and pipeline system 	- Darka Presi
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frade Exchange (CCETE) officially launched omoting CCUS demo projects	POTINITIAL RUTURE (PROJECTS
sectors	Hualking Group ZhengNingPower Plant Post Combustion CCUS Project Connext Plant CCUS (Huilan, Sinuc)
US incentive policy	 Steel Part COUS (Because 1935)

	rent povernment strategy for CCUS	
•	EU financial support to CCUS research, innovation and demonstration	POTENTIAL FUTURE PROJECTS
Dep	ployment policies and programmes in place	CO2 transportation projects inclu
•	Innovation Fund, TEN-E and Connecting Europe Facility, Horizon 2020 and Horizon Europe, Recovery – NextGenerationEU, Sustainable carbon cycles communication	Interest*: • CO2 TransParts, part of PORTs (Norway), 4THO5 (Netherlands project (France), EU CC5 (mines)
Prk	orities going forward;	CCS and CCU projects supported his
Foster the deployment of large scale, Innovative projects Propose certification of carbon removals (2022)	 Kainss at C, Port of Annuerg – Cl ethylene solds productise (beig at a CHP plant (Sweden), R1 – Cl (Prance), 958RC - Green hydrogy 	
•	Publish strategic CCUS Vision Paper (2023)	- C29: Catton29usiness-Dayfuel
	Assess CO2 infrastructure investment needs and CO2 infrastructure regulatory needs	(Germany), ANRAY: Dep fuel in a mineral conge hub in anthone production from memorialis hud battainable Avaition Fuel from R Crystap CO2 capture in created

and a second second second	 Reduce Japan's GHG emissions by 40% in FY2030 ft
in the 3° list of "Projects of Convelor	Current government strategy for COUS -intervedee duriney on un upcoming CCS long-term to + improve a business environment toward, the star
Nethenlands), Harthern Sgitts project anna project (Nethenlands), Dartagnan schor (Poland) Mitteration (Indi	Improve a countries eminiment country for sur- The Bih Strategic Energy Plan (approved by the Call Continue to incorporate CCUS into society Introduce CCS by 2030 premised on its comm Dealowment policies and organizations in place
phore hove hydrogen, anononia and BECCS Stockholm. Bis energy CO2 capture phore at converts plent, reuse & storage d but hydrogerewith CCS (Fridand)	Enhance JOGMEC's functions through an amendment Insectment and debt guarantee services for CC R&Ds on safety evaluation technologies and CO2 o
capture and a ce for methanic (production is production (Bulgenia), Coda Terminal CO2 thrmatise) (Coland), ARK Methanal And Capture (See Add), WyGSian: and CCD (See Add), GOAL COMMET nd), CaRCC CO2 capture in line production	 Investigation of potential CO2 storage sites <u>Priorities using Serverd</u>; Lausch two working groups in preparation for their growning CC3 business and discussing current out the entire CC3 value chain as well as ideal support.
i	 Support CCS deployment in Asia through Asia CCUI
	 Establish liquefied CO2 ship transportation technol

Current strategy for CCUS	 Integrated utilisation
 CCUS identified as a key enabler of the just Transition in SA as part of 2050 developmental goals. 	Finans program
 A pilot project is initiated, targeted finalization in the 2028/24/financial year. 	 Basaltis inj omitters ar
15	1
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	1.1

South Africa

Saudi Arabia Term the Research Instructive COS - Control Copies of Aritiga Unitarians series COS where Char, this installer - Share Copies and Instructive - Angular Construct Institutions - Tabla Status - Tabla Status	CLERING LARGE SALE COLS PROJECTS
Determent solicies and anaranes in aligne • Ministry of Energy established Division Carlson Romany, Bistoland Program (CCARP) to supporting importantion accordingen and Carlson management with a straining Constitution from government section, research restrates and individual chargeon to worker CCAR.	Soud Ansmou Uthreariyet and Heavyet NOL facilities to Resear CO ₂ as (DR (DI MCCO2/yes) United, a SABIC atfliate, to Resear CO2 as Cremisch (E.S. MCCO2/yes)
Institute neutrinosticates Conton Management una of the finance ansatzle the (Erstein Essentre sentence program and fission advections are therein a strategies in the strategies and advections and advections and approved in the Conton advection and advections and advections and advection advections and estimates that advections are contourned estimations and estimate the advection and instantistics agreement estimations. A strategies and estimate the advection in these Coll granting to Coll instantes	Instruments survive Protects In Organism instruments traps (all in transpires 48 Mijas of CO, by 2018) all extended thereing the lateral discretion instrume (DSI) that (by Contrel 2018) Damp Sequences 2021. State Arannes, through the in-Advise investment groups and Arannes Namas. In Amark Control Colliver & Resperantion Coll (2014) (postforder and proteinal partmentarity. The consortiums are avoiring to finalize the freededing on the coll on the Colliver.

Our	rent government strategy for CCUS	
•	Cost-effective development of CCUS projects	
	Facilitate large-scale storage opportunities at NCS	CURRENT LANGE SCALL
	Focus on decarbonization of industry and low carbon H2	 Skipner (1 mill.)
	Establish open access CD2 infrastructure	 Srehvit (0.8 mill
	Share knowledge and experience	PROJECTS UNDER DEVI
Dep	oloyment policies and programmes in place	 The full chain CC
	CO2 tax and the European Trading Scheme	 Capture at incineratio
	Ratified the amendment to the London Protocol and deposited a	 The North
	declaration on provisional application	
	Financial support for the Longship project	Northern Light
Erk	orities going forward:	 Develop additi
	Establish a business case for CO2-storage	 2 new explorat
	Establish bilateral agreements with relevant countries as foreseen under the LP	North Sea and
	New acreage for CO2 storage	

N	igeria	
Key	climate policy targets	
	Revised NDC update 20% unconditional and 47% conditional targets by 2080.	
	Net Zero target (Energy Transition) by 2060.	
1	Long-Term Emissions Reduction Plan to achieve 50% by 2050 using a climate technology led approach.	CURRENT LARGE-SCALE CCUS PF
Car	rent government strategy for CCUS	N/A
•	identify near-term needs and opportunities for CCUS development and deployment that are consistent with Nigeria's net zero emission target by 2060	
	Creating an enabling environment through identifying dorage resources; matching enhance pairty sources and industrial clasters whit CO2 storage, developing legal and regulating frameworks, performing techno ecocornic seasonments; regularging with stakeholsen; supporting capacity development; and ultimately plotting and demonstration of CO26 is industrial settings.	POTENTIAL RUTURE PROJECTS
	National CCUS Centre of Excellence	CCUS gas development -blue hydroge
Dep	loyment policies and programmes in place	 carbon dioxide removal
	Energy Transition Plan	
	Cirrate technology Need Assessment.	
	Cirrate Change Bill	
Prix	rities going forward:	
	Industrial CO2 CCU5 Diagnostic and Scoping Study	
	Legal and Regulatory Assessment & frameworks	
	Institutional cases/tv-development	

United States	
Key climate policy targets; New climate goals: 50% emissions reduction by 2030, 100% clean electricity by 2035, and net-zero carbon emissions by 2050	
Current advertment strategy for CCUS New goals on justice and equity and community ergagement	United States
Deployment policies and programmes in place	 Air Products/Port Arthur Project: Bmillion metric tanses of CO, captured (Jane 2022)
 Inflation Reduction Act: Reduce greenhouse gas emissions by about 1 gigaton in 2030, or a billion metric tons 	 Illinois/CCSProject: 2.7 million metric sonnex of CO₂ injected (June 2022) Over 35 active CCUS projects in the U.S.
 Includes enhancements to 45Q tax credit (e.g., credit value increases, direct pay, extension of commence construction window, lower capture threshold) 	 December of applications — prove, etherol, inducted projects, and bin;
CHIPS and Science Act: \$1 billion for carbon dioxide removal RD&D (\$67 billion total for DOE)	POTENTIAL FUTURE PROJECTS
 Bipartisan Infrastructure Law: \$12 billion for carbon management approaches 	 Many projects announced since the 450 tax credit values were increased
 Enhanced 45Q tax credits, loan programs, and state policies/mechanisms 	Analysis are in various stages of
 Regional initiative to Accelerate CCUS Deployment, Carbon Storage Assurance Facility Enterprise (CarbonSAFE), CCUS Demonstrations, and FEED Studies 	development, ranging from early planning stages to those ready for construction
Priorities going forward;	
Point-source carbon capture, hydrogen, carbon dioxide removal, industrial decarbonization	

CCUS country overview -The Netherlands

idnesday 21 September 2022

	Jnited Kingdom	
		 Ball-1-defaul
	contactive and unangebre CO.5	Server Track 1 climber
	The LBC has potential to more more than 20 killion increase of andors density (CO ₄) is the continential shaft which is one of the harpest potential diverge equation is foreign.	B Disciplation
	The UK is converted to progressing COILs part of the 1908 for Zees Sensing, with expension of "Unit or "isotophare and more 20-bit MRCOX per year by 2000.	1 500
h	physical and an appropriate and a second	Sec Em
	Indiated the "Character Sequencing" presence, first Track 1 character answered as Myller and ECC (Det. 22), property shortlyted by Track 1 (preferred within Plane 2 anneurometer (Aug 22).	[manal] 2
	Published the CCUS investor Readings (Apr 72), summarizing the government and velocity's work an CCUS, custining apportantian to drive investment for COS.	LINE SHOW
	Being with the COSE (CC), Namer, Stempart and Non-upp and Exploring Control to the provided the to provide these are long to true upp of a second or model, as well as called a stable humanities of exploration of the constraines (spectrum) is always.	500
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	The UP's (2007ers) Carbon Carbon and Nor age 20225 Front various frond with all provide CDN e-ar- locations (2017ed) and a second se	+ 12-
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h	inclusion forward	The state state and share
	We have consolited to accounting out improve Task 2 characteristics of a difference in T2 protection Task 3 therein and contracting theorem and a characteristic data at ACT, CDA SCH12 and	mind a star and the second relation winds are a fee in which as overall is descripting (2020)

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 If Haitsnelly One-mind Cambridge – NBC on 2020 anth Dirind Auk University (AA) presence as accuracy-wide aminan-minimum and accuracy and accuracy project dirich and a constraint on the 310 ACCEC in 2030. The memory atime on minimum 23 MAY 2020. Accuracy the WHX accuracy (2010) CO20. 	CURRENT LARGE SCALE COLS PR
 2012-194E is an exact to a dominics serviced 37% internally Determined Costribution(NDC). 	 A Revealab Plant: which is the
 Hydrogeniandenhip stating (2021) 	project, that captures 800,00
Convergencement using the COM	for DOR.
¹ Hoad a USB Webby due length sights the fourse series as will as indexey to andrate fouring and diplogreement/USPproject.	
 Inspeccie 860. 	
 2021- Optimp the National Energy Strange 2020 is partnering with Khalifu University 2023 and the International Encendibility-optimp/2021/01 	POTENTIAL FUTURE PROJECTS ADNOC expansion of CCUS init
 2022 National Hydrogen Drang, which will include the COEFCCS halo Contriguend to Sepublished have 2023. 	 Shahgas plant, which has
 2011-HydrogenRegulatory/Internet-Allenging 	million torvnes of CO2 pe
Dealegenerate him and an quantum instant	 Habshan-Bab gas plant, i the capture of LB million
 XEMADE Annuances Comprehensive 2020 Suminability Goals and COUR expension capacity of SIRPS in the next 10 years. 	 The equivalent of a forestarea
Provides going forward	
Development/COSPulicy	
Control on a support to control of COUNT beliance.	

Arab Emirates	
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ranger interne to 640. The country property for the 644 statement and a 21046, tot in 2004. The country Phile 2008, where we dow 2007 screen in 2004 PADC, 2028.	CURRENT LARGE SCALE COUS PROJECTS
a han a sheriri in seria a d P ^{an} ini a she Oneserina (Caraciha interNPC)	
fra staffmar (2011)	 Al Reyadah Plant: which is the largest carbon capture steel project, that captures 800,000 tonnes of CO2 that is injected
ng fer CDB	for DOR.
inhiby the length synthes the finance some as well as indexety to another biancing and Aproprise.	
In National Energy Strategy 2018 is partnerfile with Khallis University 2018 and the International	POTENTIAL FUTURE PROJECTS
Agency (MCM)	 ADNOC expansion of CCUS initiatives
A spectrosognakich will include the CCEUCCS halo contripued to he published here 2003	 Shahgas plant, which has the potential to capture 2.3
age a stray framework (or going)	million torvies of CO2 per year
an ago ann mar tha fina a	 Habshan-Bab gas plant, which has the potential to enable the capture of LB million tones of CO2 peryear
a Compartensise 2000 Suminability Goals and COUS expension requerys of SIRMs in the next Till yours.	 The equivalent of a forestarea that is twice the size of the UAE.
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men in place	A STATE OF THE OWNER
ort huge and complex technology leaps, sive industries, loss term 2018-2040, 70	Puture and angoing projects
	Mankhaim Europ full scale Inte-CC3 facility about 800 000 torvies p.s.
we relative, long term 7038-0040, 70 neof 10 million Cytear to bio CCS. Inverse auctions first auction 2023.	Standhalm Cange Mal scale line CC3 facility about 500 200 toxines p.a. Several hashifty studies on 50×2C3 – first stag to pertoperate in autous, mainly CHF and VHS

Fi	inland		
100 C	y climate policy targets and .CUS-related deployment Climate neutrality by 2015 The Sustanable Growth Programme for Finland allocated EUR 150		
1	million to hydrogen and carbon capture and utilisation projects.	- 6	Indial COJ Innevetiana
•	E-fuels will be included in the transport fuel distribution obligation from the beginning of 2023.		Folland currently hosts an active business duster and investment, pertifying of carbon capture and utilisation projects (e.g.e.fuels production). Was opportunities for long-term storage and
•	Government has initiated a strategic research project for carbon use		permanent storage (CCS) are being studied by the companies
Da	and removes rrent Climate and Energy Strategy (2022) includes CCUS		Investment pipeline is a reard 20 projects corresponding investments of approximately 1 billion cores. Many investments include hydrogen production.
•	The development and use of carbon capture and utilization (CCS/CCU) technologies and solutions will be accelerated.		 A Environment of this air theory of thing a plant to produce proteins out of this air theory of thing (10) in the air
	E-fuels will amount to 3 per cent of all transport fuels by 2030.		An other start up is developing CCU solution to be installed
•	The legislative framework for CCS/CCU regulation at the EU level will be promoted.		to WWC systems in buildings
•	CCS/CCU techniques to reduce CO2 emissions caused by waste incineration will be piloted.		-11-
1	Legislative framework for carbon disaide removal solutions, will be assessed.		2 1 2

Climate Law: 65 Ny 2030, Climate Institutistly by 2045 and regative entition form 2059 Control Lawrence Limate Limit (Limit) (Limit) Controls Agreement: We entiteworked the need thin for technical negative emissions and all develops lang form strategy for develop with the approximately 5 percent of unworked/mile strates/agreemings.	Studies, Small ac Funding for Mio.0 Study by Ca
Coalition Agreement: We acknowledge the need also for technical negative emissions and will develop a long-term strategy for dealing with the	Mio.6) Study by Ca
'We acknowledge the need also for technical negative emissions and will develop a long-term strategy for dealing with the	
	Industry in t including To Heidelberg (
Deployment policies and programmes in place	Cement Indi
 On State(Länder)-level North Rhine-Westphalia released new Carbon Management Strategy in Oct. 2021 	 Carbon2Che from steel p Mio in R&D
Priorities going forward: • Evaluating current legal framework in Germany till the end of 2022	 HyScale100 CO2/a for M

	Indonesia
sole anisch and fater Jean sole anäisch r CDR H80(1) Research networks, 21 apflansCO2: Network of the Chemical the center of General-CUV/CS torst, Under eit coment Lisling: 2.100.0001 CO224.	Instrume to information According to the second s
	Consider procession strategy for CT3.CC05 • Brownbridg research institutions as canter of Expands as OCM-OCM6 • Strangthuming comparison in dealiny CC5-CC05 project
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0 (Holicim Cement Plant capture 1 Milo t Methanol from green hydrogen)	Fination andrea formante

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A full set of country slides available here:

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G20 CCUS seminar, Bengaluru Sunday 5 February

- Key takeaways
 - India clearly stepping up their CCUS knowledge and work
 - Identified CCUS as one of six key technologies under its G20 agenda
 - CCUS to play a pivotal role in India's decarbonization
 - Recognition that technology is not the key issue
- Panel discussion: points for G20 consideration
 - Define strategic role for CCUS in G20 countries
 - Enhance knowledge-sharing
 - Create solid policy frameworks that drive business case
 - Facilitate financing
 - Give due consideration for CO2 utilization
 - Establish storage atlas
- <u>https://www.youtube.com/watch?v=MbhPoXy3i-0</u>







CEM CCUS: activities, events etc.

Events:

- 15 November 2022: ADB event on CCUS, Dhaka, Bangladesh. Initiative Coordinator presented the CEM CCUS activities and developments from various member countries.
- 15 December: webinar on "CCUS Policy for India", after the publication of a key report commissioned by NITI Aayog and drafted by Dastur Energy. The webinar recording is available here: <u>https://www.youtube.com/watch?v=ke4chsEzR74</u>
- 18 January: CCUS event at World Future Energy Summit, Abu Dhabi. Together with GCCSI, CATF and KAPSARC, the Initiative co-hosted a CCUS seminar in the sidelines of the 2023 WFES.
- 16 February: High-Level CCUS dialogue, Riyadh. Several CEM CCUS members, other countries, organisations and industries came together at this event to discuss how to best de-risk CCUS investment. More information is available at: <u>https://www.ief.org/events/2nd-ief-high-level-roundtable-on-carbon-management-technologies</u>.
- 4 May: Webinar "CCUS in Denmark, Sweden and Finland". At this webinar, representatives from energy ministries of three Nordic countries outlined their strategies and activities in CCUS. View recording here: <u>https://www.youtube.com/playlist?list=PLKRmGa9s99JVssP8Gb5buwLg3Blt1llls</u>



Check out our latest newsletter



AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL



Newsletter

March 2023

DEAR COLLEAGUE,

Welcome to the March 2023 edition of the Clean Energy Ministerial CCUS Initiative newsletter. The first quarter of the year has certainly been very active with several key meetings and gatherings, allowing us to build momentum towards the fourteenth Clean Energy Ministerial meeting, hosted by India in July. India is linking its G20 Presidency energy agenda with the CEM, which is a very practical approach allowing important synergies between the two ministerial-level processes. We helped organise a key CCUS event in conjunction with the G20 Energy Transition Working Group in Bengaluru - more below!

The CEM CCUS Initiative has continued its work to serve as a platform for governments, industry and the finance sector to share experience and best practice, both amongst themselves and towards the wider public.

We thank you for your interest in our work and invite you to get in touch if you are interested in knowing more about our activity. Our contact details are at the end of this newsletter.

G20 CCUS WORKSHOP IN BENGALURU, INDIA





India holds the <u>G20 Presidency</u> and also hosts the Clean Energy Ministerial meeting this year. It is highly commendable that India has sought to combine the CEM and the G20 energy agendas as much as possible. CCUS was selected as one of six key technology areas by India, and earlier in the year the CEM CCUS Initiative was invited to help organise a CCUS event in conjunction of the first G20 Energy Transition Working Group meeting held in Bengaluru, India. India's Ministry of Power, as well as the country's largest power group NTPC Limited hosted a <u>half-day CCUS seminar</u> on Sunday 5 February.

While the seminar explained and discussed many aspects of carbon capture fully applicable globally, the main emphasis of the talks was on how India itself could rapidly start scaling up carbon capture, from small pilots to megatonne-projects. India is really stepping up its CCUS agenda, moving from highly technical R&D discussions into the <u>strategy and deployment space</u>. Both the G20 and CEM processed can provide a great help, by encouraging countries to set ambitious goals and by facilitating countries and industries to share experience. Building a common understanding on what role CCUS can play and how to enable it is vital.

The final panel discussion outlined six key points for consideration by India and the G20 community: 1) Define a strategic role for CCUS, 2) Maximise knowledge-sharing in order to avoid "reinventing the wheel", 3) Actively seek solutions for CCUS project financing, 4) Collaborate to establish CO₂ storage mapping and infrastructure, 5) Investigate the role that CO₂ utilisation can play and 6) Establish policy frameworks conducive for carbon capture investment.

The Clean Energy Ministerial and the G20 energy ministers' meetings will be held back to back on 21-22 July in Goa, and the CEM CCUS Initiative is working towards ensuring that the above points, and CCUS more widely, are firmly on the ministerial agenda.

CCUS VITAL FOR THE GLOBAL CEMENT INDUSTRY



On Tuesday 7 March 2023, members of Clean Energy Ministerial CCUS Initiative and the <u>Global</u> <u>Cement and Concrete Association</u> (GCCA) gathered at the first internal workshop under the <u>collaboration agreement</u> between the two organisations.

The objective of the workshop was to discuss current incentive policy approaches and share best practice in CCUS policy, to enable rapid acceleration of carbon capture projects in the cement sector. The workshop focused on large-scale deployment incentive frameworks, to accelerate CCUS in cement on industrial scale, as a significant CO₂ reduction mechanism. Policies discussed included direct government financial support, carbon markets and green public procurement. Later workshops will cover other vital issues such as CO₂ transport and storage infrastructure and hubs, as well as financing. The two groups will report on their collaboration at the upcoming CEM-14 and other relevant forums.

SIGN UP FOR OUR NEWSLETTER: https://mailchi.mp/cemccus/1fw2h94qa9



Webinar "Japan's CCS Roadmap" → NEW DATE Wed 28 June



18:00 – 19:00 Japan Standard Time

Presentation by:

Norihiko Saeki Director for CCS Policy Ministry of Economy, Trade and Industry Japan

https://us02web.zoom.us/webinar/register/WN_rYtPnOEGQqSrSK_uSNBt7A





Questions?

Discussion



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