

CARBON CAPTURE, UTILIZATION & STORAGE
ACCELERATING CCUS TOGETHER
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL

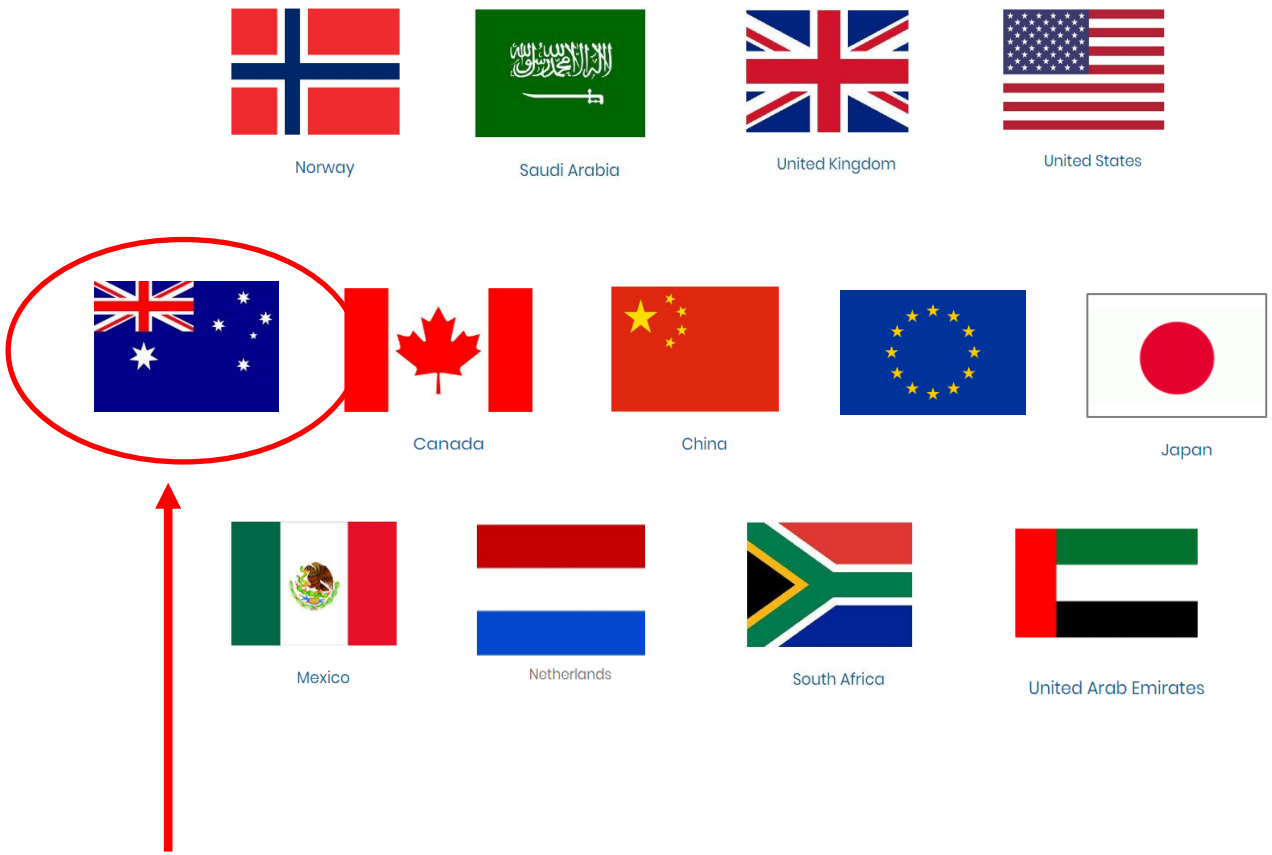
# Clean Energy Ministerial CCUS Initiative Update

*CSLF Technical Group meeting | 8 December 2021*

*Juho Lipponen, CEM CCUS Initiative Coordinator*

CLEAN ENERGY MINISTERIAL
Advancing Clean Energy Together

# Clean Energy Ministerial CCUS Initiative




**NEW:**

**Australia joined the Initiative in September.**

## Members and Partners:

**Thirteen Members:**

- **Lead countries**: Norway, Saudi Arabia, United Kingdom, United States
- **Participating CEM members**: Australia, Canada, China, Japan, Mexico, Netherlands, South Africa and United Arab Emirates; in addition, the European Commission is an observer

**Links to further countries:** Bahrain, Denmark, Germany, India, Indonesia, Ireland, Malaysia, Nigeria, Singapore 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)

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# CCUS Initiative Annual Meeting

## Day-1, Monday 6 December

| | |
|---|---|
| 12:30 | 1. Opening and welcome |
| 12:35 | 2. Global CCUS policy round table |
| | 2.1. Overview of COP-26 results |
| | 2.2. Policy Round Table |
| | ***~14:00 5-minute break*** |
| 15:20 | 3. CEM Secretariat update |
| 15:30 | End of Day-1 |
| *15:35* | *Informal networking* |

## Day-2, Tuesday 7 December

| | |
|---|---|
| 12:30 | 4. CSLF Policy Group meeting |
| 12:45 | 5. Global CO2 storage assessment work |
| 13:15 | 6. Role of Paris Agreement Article 6 |
| 13:45 | 7. Collaboration with industry |
| 14:30 | 8. Work towards CEM-13 |
| 15:15 | 9. Open space for information |
| 15:25 | 10. Summary of actions |
| 15:30 | End of meeting |
| *15:35* | *Informal networking* |

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# Meeting participants: record attendance

## CEM CCUS MEMBER COUNTRIES

**Australia**: Jocelyn Taylor, Lucy Haller, Jen Deng Lee

**Canada**: Claude Gauvin, Tyler Chapman, Kathryn Gagnon, Dan-Tam Nguyen

**China**: Xuejing Zhang, Dongyang Zhang, Mingwei Shi, Xian Zhang

**European Commission**: Chris Bolesta

**Japan**: Hiroki Goto, Ryozo Tanaka, Hiroto Yoshikawa, Yoshihiro Sawada, Jiro Tanaka, Takashi Kawabata

**Mexico**:

**Netherlands**: Tom Mikunda

**Norway**: Stig Svenningsen, Henriette Nesheim

**Saudi Arabia**: Hamoud Otaibi

**South Africa**: David Khoza, Taufeeq Dhansay, Thabo Mosia

**UAE**: Nawal Alhanaee, Naser Alhammadi, Maryam Alshamsi, Yusif Alhanaee, Dina Almannaee

**United Kingdom**: Matt Taylor

**United States**: Jennifer Wilcox, Adam Wong, Stephanie Hutson, Noah Thompson

## INVITED COUNTRIES

**Brazil**: Ana Pinto, Viviana Coelho, Irineu Barreto, Igor Teixeira

**Denmark**: Jasmin Sharzad

**Germany**: Almut Fischer

**India**: Neelima Alam

**Indonesia**: Saleh Abdurrahman, Putu Suardana, Bambang Eka Satria, Jauhar Fuadi, Rachmat Sule, Brioletty Letty, Senda Kanam, Fahrur Rozi Firmansyah, Wanda Ali Akbar, Dadan Saputra, Usman Pasarai, Kosario Kautsar, Jery Christian

**Israel**: Michael Gardosh, Eran Brokovich, Sarit Klibanski, Shahar Dolev

**Malaysia**: Noriani Yati Mohamad

**Nigeria**: Victor Osu

**Russia**: Denis Deryushkin, Alexey Tsikin

**Singapore**: Benedict Chia, Ho Hiang Kwee, Joseph Tay

**Sweden**: Svante Söderholm

## ORGANISATIONS, INDUSTRY, FINANCE

**CEM Secretariat**: Ellina Levina, Samuel Price

**IEA**: Samantha McCulloch

**IEAGHG**: Tim Dixon, Keith Burnard

**CSLF TG**: Åse Slagtern, Lars Ingolf Eide

**GCCSI**: Jarad Daniels

**USGS**: Peter Warwick, Sean Brennan

**UNIDO / CEM Industry Deep Decarbonisation Initiative**: Rana Ghoneim

**OGCI**: Bjorn Otto Sverdrup, Martin Towns, Julien Perez, Nirvasen Moonsamy

**GCCA**: Claude Lorea

**World Bank**: Natalia Kulichenko-Lotz, Brendan Beck

**ADB**: Darshak Mehta, Jinmiao Xu

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# Global CCUS policy round table

**CEM CCUS Initiative Members:**

1. Australia (~12:45)
2. Japan (12:51)
3. China (12:57)
4. UAE (13:03)
5. Saudi Arabia (13:09)
6. South Africa (13:15)
7. European Union (13:21)
8. Norway (13:27)
9. Netherlands (13:33)
10. UK (13:39)
11. ~~Mexico (13:45)~~
12. US (14:51)
13. Canada (14:57)

*** 5-minute break at 14:05 ***

**Invited guests:**

14. Indonesia (14:10)
15. ~~Malaysia (14:16)~~
16. Singapore (14:22)
17. India (14:28)
18. Russia (14:34)
19. Nigeria (14:40)
20. Germany (14:46)
21. Denmark (14:52)
22. Sweden (14:58)
23. Brazil (15:04)
24. United States Geological Survey (15:10)

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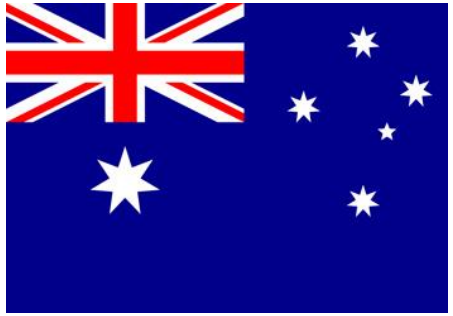
# Australia



Key climate policy targets

- Long-Term Emissions Reduction Plan to achieve net zero by 2050 using a technology led approach.

Current government strategy for CCUS

- Technology Investment Roadmap and annual Low Emissions Technology Statements (where CCS is a priority technology and CCU is an emerging technology).
  - Economic stretch goal of under $20 per tonne for $CO_2$ compression, hub transport and storage through innovation and co-location.

Deployment policies and programmes in place

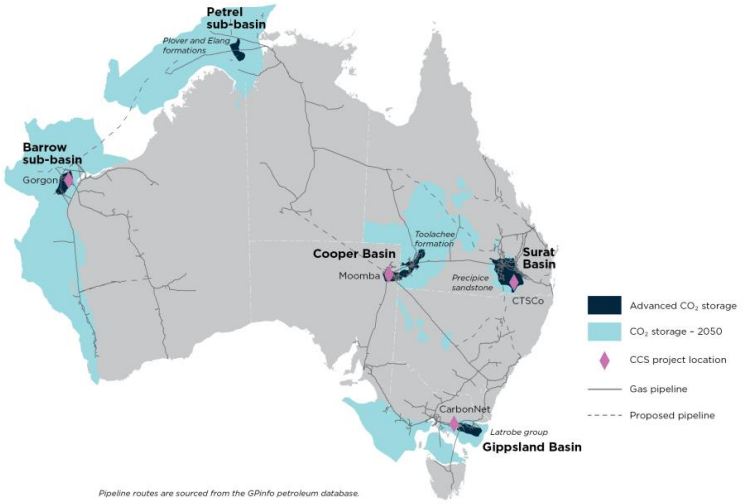
- $50 million CCUS Development Fund
- $250 million CCUS Hubs and Technology Program
  - $150 million technology stream and
  - $100 million for hub development
- $464 million Clean Hydrogen Hub Industrial Program
  - An additional $150 million has recently been announced for a further two locations under the program.
- Other government initiatives include:
  - CCS added to the Emissions Reduction Fund.
  - CCS added to the Australian Renewable Energy Agency remit.
  - 2021 Offshore Greenhouse Gas Acreage Release which aims to encourage investment in CCS.

Priorities going forward

- Develop a National CCUS Technology Emissions Abatement Strategy to improve policy frameworks and help coordinate the deployment of CCS hubs. Strategy is expected to be published in 2022.
- Establish a $1 billion Low Emissions Technology Commercialisation Fund to support early stage companies to develop new technologies, with $500 million from the Clean Energy Finance Corporation.
- Mapping of $CO_2$ storage capacity in Australia.

**LARGE-SCALE CCUS PROJECTS**

- **Current:** Gorgon $CO_2$ Injection Project (Chevron Australia): over 5 Mt of $CO_2$ equivalent stored since August 2019. Once fully operational, the system will capture up to 4 Mt of CO2 annually and reduce greenhouse gas emissions by more than 100 Mt over the project life.
- **Future:** Moomba CCS Hub Project (Santos): Moomba CCS Hub Project (Santos and Beach Energy): Santos has announced it has made a final investment decision to develop a CCS plant in the onshore Cooper basin in South Australia. Expected be operational in 2024 and store 1.7 Mtpa of $CO_2$.

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# Indonesia

## Key climate policy targets

- **NZE 2060**
- **NDC 29% GHGs reduction by 2030**
  - **Target reduction from energy and transportation sector 314 (CM1) or 446 (CM2, with international support) from around 1,100 million tons p.a. emitted nowadays**
  - **2021 outlook of total $CO_2$ emission from upstream oil and gas around 20 million tons p.a.**
  - **2030 net zero routine flaring policy for upstream oil and gas activities**

## Current government strategy for CCS-CCUS

- **Establishing CoE on CCS-CCUS involving research institutions**
- **Strengthening cooperation to deploy CCS-CCUS project**

## Deployment policies and programmes in place

- **Carbon pricing system, cap and trade, cap and tax scheme in place through issuance Act No. 7 Year of 2021 regarding Harmonized Taxation, include carbon tax and Presidential Regulation Number 98 of 2021regarding carbon pricing.**
- **CCS-CCUS from upstream oil and gas already accommodated on current PSCs contract scheme**

## Priorities going forward:

- **Preparing Ministerial regulation for CCS-CCUS development**
- **Include CCS-CCUS into revision of oil and gas act legislation program**
- **Considering multi point sources for CCS-CCUS (power plant, industrial) to integrate with upstream oil and gas which have nature sink**
- **Establishing cooperation with international institutions and multinational companies on carbon pricing implementation for CCS-CCUS**

## APPROVED PLAN CCS-CCUS PROJECTS

- BP Tangguh CCUS Project,
  $CO_2$ reduction targeted 33 MT by 2045 (or 25 MT by PSC expiry in 2035).
  Incremental production 0.5tscf by 2045 or ca 0.3tscf prior to PSC expiry in 2035 (POD Ubadari and Vorwata EGR CCUS already approved).

## POTENTIAL FUTURE CCS-CCUS PROJECTS

- PT Pertamina EP Gundih CCUS-EGR/EOR Project (2024/2025),
  $CO_2$ reduction targeted 0.29 MTPA for 10 years,
  Incremental gas production 36 BSCF and 325 MB condensates
- PT Pertamina EP Sukowati CCUS-EOR Project (2030),
  $CO_2$ reduction targeted 0.60 MTPA for 25 years,
  Incremental production potential: ± 50.6 MMSTB
- Repsol Sakakemang CCS Project,
  $CO_2$ injection targeted 2.2 MTPA or total 25 MT along production lifetime,
  target reservoir to be injected under other PSC.
  Production proposal around 450mmscfd.
- Inpex Abadi CCS Project,
  $CO_2$ injection targeted 5.6 MTPA or total 140 MT for 25 years.
  Production proposal around 150mmscfd and 41kbpd condensates since 2027.

MT = million tons; MTPA = million tons per annum

USGS
science for a changing world

# *Global Carbon Dioxide Storage Resource Assessments*

***CEM CCUS Initiative Annual Members' Meeting***
***6-7 December 2021***

Sean T. Brennan and Peter D. Warwick

U.S. Department of the Interior
U.S. Geological Survey

# Key Developments in the Clean Energy Ministerial since CEM 12

Ellina Levina, Partnerships Manager

December 6-7, 2021

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# CEM Workstreams

## POWER

- 21 Century Power Partnership
- Power System Flexibility
- Nuclear Innovation
- Flexible Nuclear
- International Smart Grid Action Network
- Regional and Global Energy Interconnection

## TRANSPORT

- Electric Vehicles
- EV30@30
- Global Commercial Vehicles Drive to Zero

## INDUSTRY

- Carbon Capture, Utilization, and Storage
- *(NEW)* Industrial Deep Decarbonisation
- *(NEW)* Green Public Procurement campaign (IDDI)

## BUILDINGS

- Super-efficient Appliance and Equipment Deployment (SEAD)

## CROSS-SECTORAL

- Hydrogen Initiative
- Global Ports Hydrogen Coalition
- Biofuture Platform
- *(NEW)* Biofuture Campaign

## ENABLING ENVIRONMENT

- *(NEW)* Empowering People
- Clean Energy Education and Empowerment
- Equal by 30
- Long-Term Energy Scenarios
- Investment and Finance
- Clean Energy Solutions Center

Carbon Sequestration leadership forum

www.cslforum.org

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# DRAFT AGENDA

## CSLF Policy Group Virtual Meeting

## Hosted by the CEM CCUS Initiative

**Tuesday, 07 December 2021**

*Meeting platform (Zoom) opens at 12:15pm CET*

*Meeting starts at 12:30pm CET and ends at 12:45pm CET*

1. **Meeting Welcome and Meeting Protocols** *(5 minutes)*
   *Adam Wong, United States*

2. **Election of Policy Group Officers** *(5 minutes)*
   *Stephanie Hutson, CSLF Secretariat (presiding)*

3. **Closing Statement / Adjourn** *(5 minutes)*
   *Stephanie Hutson, CSLF Secretariat*

# Election of Policy Group Officers

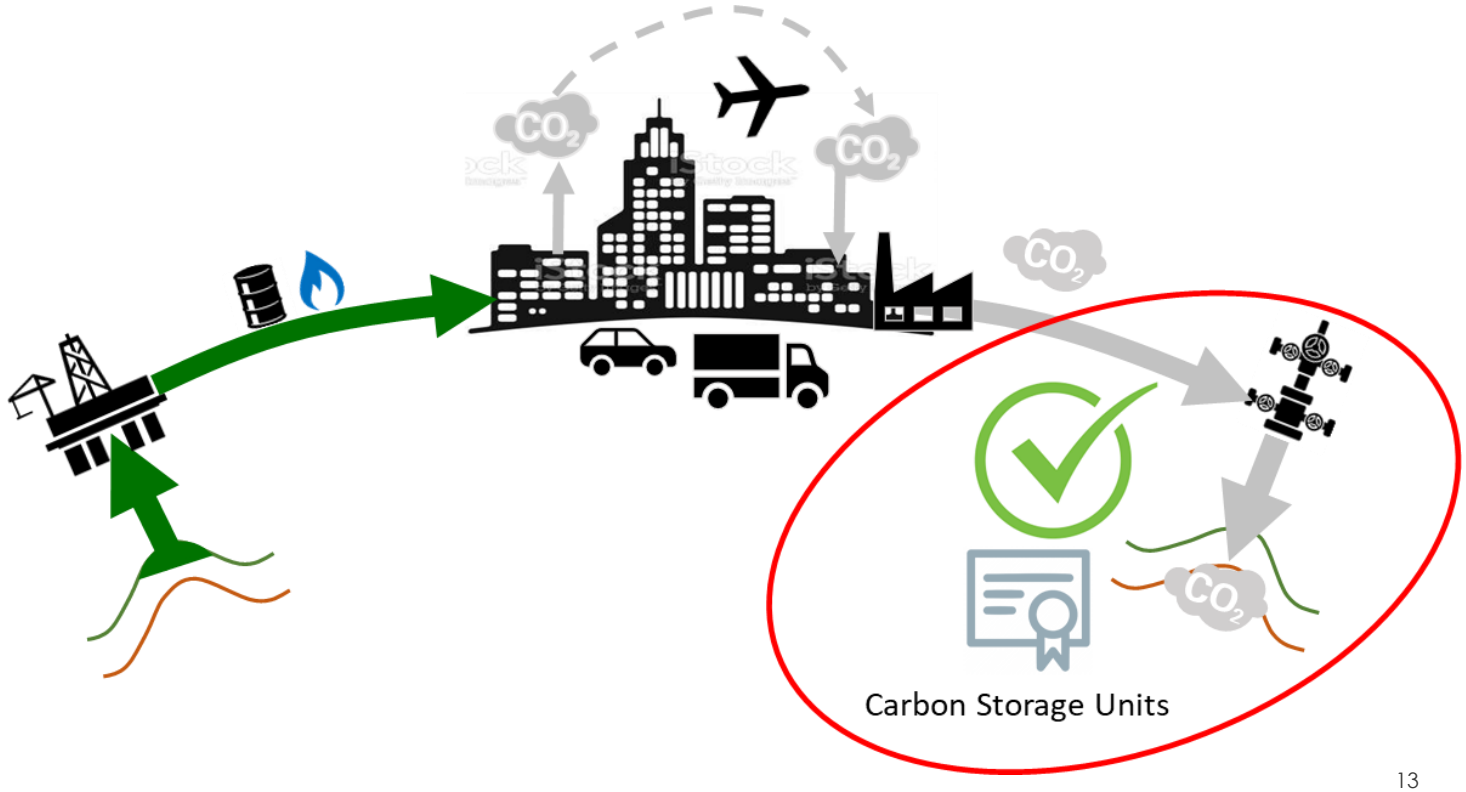
- On September 29, the CSLF Secretariat sent a call to all CSLF members for nominations
- On October 17, Australia nominated the existing countries, Chair (United States) and Vice Chairs (China, Saudi Arabia, United Kingdom), to continue serving as Policy Group Officers

# Carbon Storage Units - A new asset class

Asset classes for emissions and removals are well established. A corresponding asset class is needed for the carbon accounting frame of production and storage.

**Carbon Storage Units** (CSUs) would provide stakeholders with a trustworthy record of permanent storage.

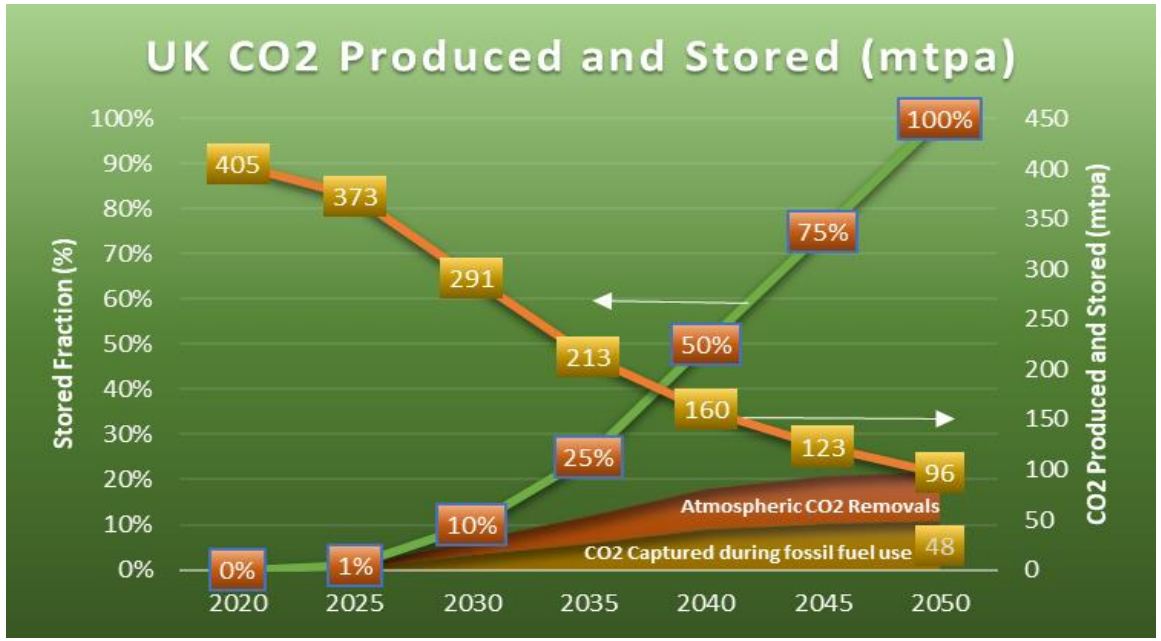
CSUs would be issued under clearly defined protocols, either by independent inspectors, or by accredited storers who would be audited regularly. CSUs can satisfy the needs of both compliance and voluntary markets.

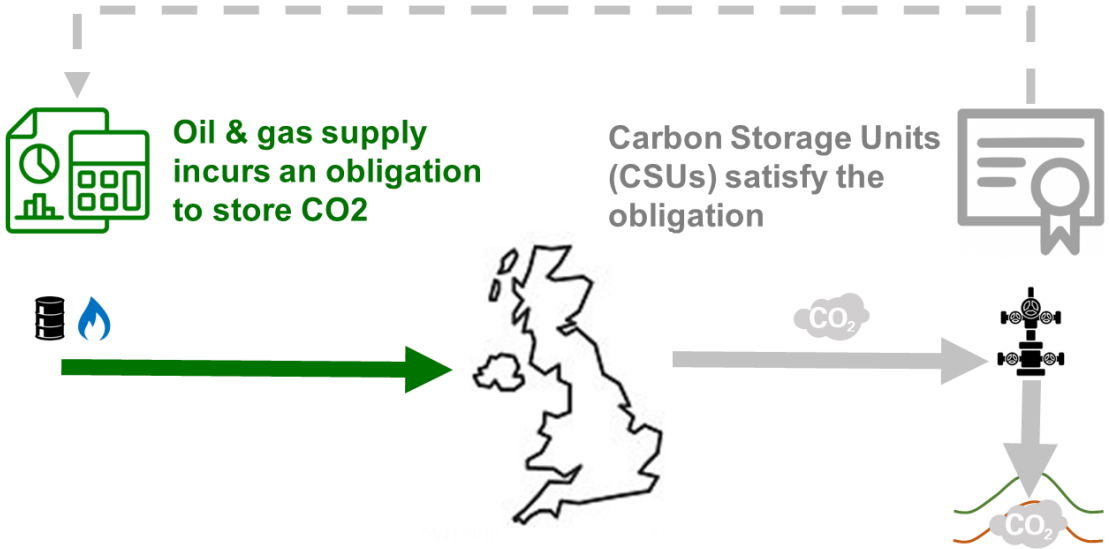


# Carbon Storage Obligation - Mobilising demand

A region, country or bloc wishing to reach net zero could introduce a Carbon Storage Obligation (CSO).

This would mandate that suppliers of fossil carbon into the jurisdiction's markets geologically store a defined fraction of the carbon they supply, with this fraction increasing over time. Here's an illustration for the UK.




Once the fraction reaches 100% (by 2050 for example), the net emissions to atmosphere from fossil carbon use within the jurisdiction would be zero. And provided fossil carbon use did not grow over the same period, emissions would progressively fall from the point at which the CSO is introduced until net zero is reached.

OIL AND GAS CLIMATE INITIATIVE

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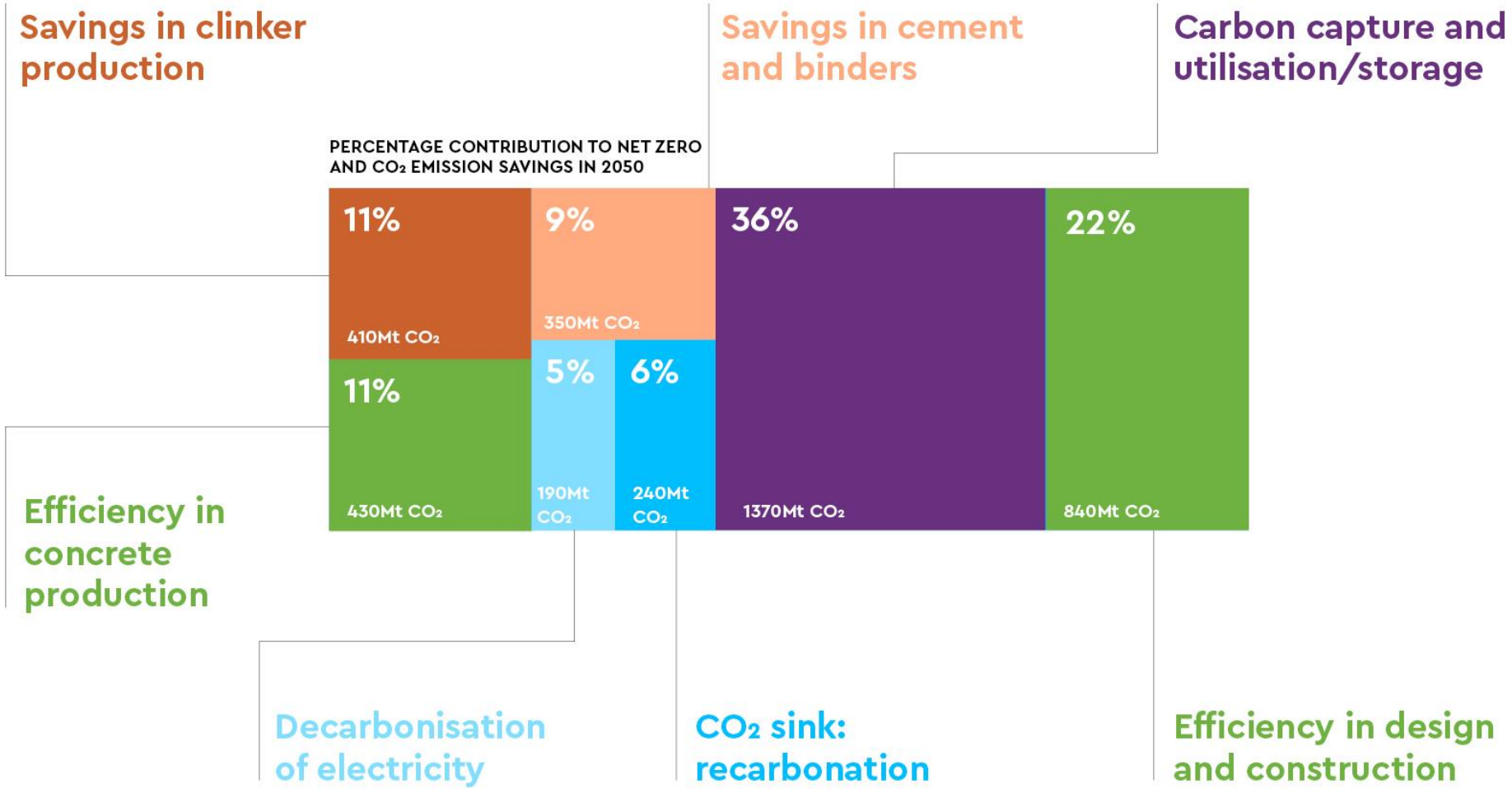
# CEM CCUS – OGCI Collaboration

**7 December 2021**

# Next steps: potential collaboration

| | |
|---|---|
| **Hubs accelerator**<br><br>Continue and enhance work on strategic hubs in key regions, on appropriate level (country or region), with particular emphasis on industrial sectors such as cement and blue $H_2$. Also foster work on planning of infrastructure network creation in all relevant regions. | **Activity / deliverables**<br><br>Q1 2022 Identify priority countries<br>Q1-Q4 Organise country meetings for industry, government and the finance sector to create coalitions of stakeholders working towards CCUS deployment. |
| **Policy and finance**<br><br>Dialogue on incentive policy to deploy CCUS, on market creation for low-carbon products and on Paris Agreement Article 6 mechanisms. | Q1-Q4 2022 Series of industry – government – finance sector meetings to inform policy approaches for both infrastructure and capture project development. |
| **DACs and BECCS**<br><br>Specific attention on accelerating and facilitating engineered carbon dioxide removals, such as DACs and BECCS. | Q1-Q2 Dialogue meetings on the role of DACs and BECCS in government and industry strategies. |

## ACTIONS TO A NET ZERO FUTURE



# Example of specific policy asks – for discussion

- Use appropriate carbon pricing mechanisms to create a level playing field on carbon costs and avoid carbon leakage through adequate carbon pricing mechanisms.
- Integrate CCUS in **public financing mechanisms** that covers in particular the CapEx and early OpEx abatement costs at least during the depreciation period.
- Provide fair recognition of all carbon removal measures, both where the $CO_2$ is ultimately stored or used in products, either by acknowledging them as part of regional/national emission trading systems or by developing tailored accounting rules. Include negative emission savings through the use of CCS combined with biomass fuels in the accounting rules.
- Provide **transport infrastructure and storage infrastructure** to move captured carbon to places where it can be used or stored. In particular, speed up the permitting processes to allow for the construction of carbon storage facilities.
- Establish public-private partnerships to speed-up CCUS developments, including shared investment in $CO_2$ transport and storage networks.
- **Support R&D** including for new uses in other sectors of $CO_2$ captured by the cement industry.
- Enable the integration of $CO_2$ performance in public procurement, building standards and construction codes alongside traditional criteria (e.g. technical performance) to create the demand for carbon-neutral products.

(**Bold** text by JL for CSLF TG meeting 8 December)

# Towards CEM-13: four suggested themes

## SIGNIFICANT GLOBAL CCUS FUND

- Investigate the opportunity to replenish existing CCS/CCUS funds
- Investigate the opportunity for donors in a large new fund
- Liaise with key development banks to discuss how such a fund would best be organised
- Collaboration: ADB and WB, other banks

## $CO_2$ STORAGE RESOURCE ASSESSMENTS

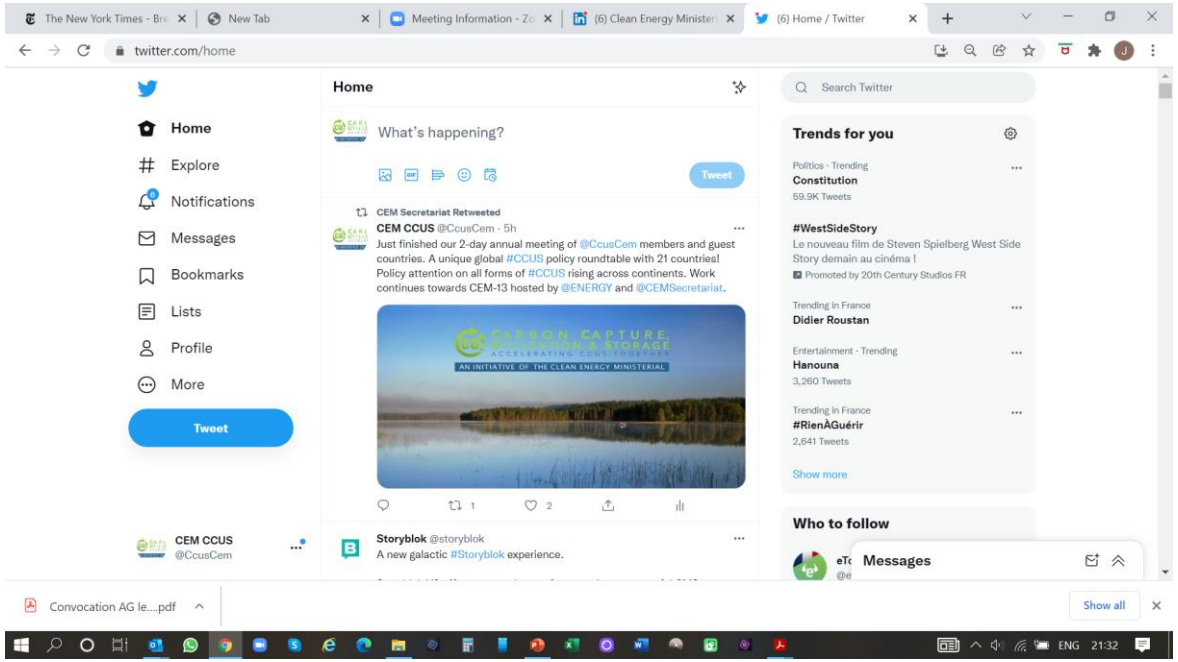
- Encourage CEM geological survey organisations to provide expertise
- Provide a platform to initiate collaboration between CEM CCUS members and organisations in developing countries
- Collaboration: USGS and various other geological survey organisations, ADB and WB

## DAC and BECCS

- Organise a working group to look into key strategic questions around direct air capture and BECCS, conditional on a member being willing to lead such a group
- Map national policy approaches, current and future
- Establish links with the relevant industry and invite them to join the working group as necessary
- Collaboration: Industry (Carbon Engineering, Climeworks etc.), Biofuture Platform Initiative, Hydrogen Initiative

## INDUSTRY COLLABORATION TO DRIVE CCUS IN CEMENT

- Collaborate with GCCA to jointly map out and review the key issue areas relevant for cement
- Work to create specific frameworks to facilitate CCUS in the cement sector, including as regards public procurement policies
- Organise a series of regional workstreams on strategic hubs
- Join the public procurement campaign organized by CEM IDDI
- Collaboration: GCCA, OGCI, CEM Industrial Deep Decarbonisation Initiative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Just finished our 2-day annual meeting of @CcusCem members and guest countries. A unique global #CCUS policy roundtable with 21 countries! Policy attention on all forms of #CCUS rising across continents. Work continues towards CEM-13 hosted by @ENERGY and @CEMSecretariat.
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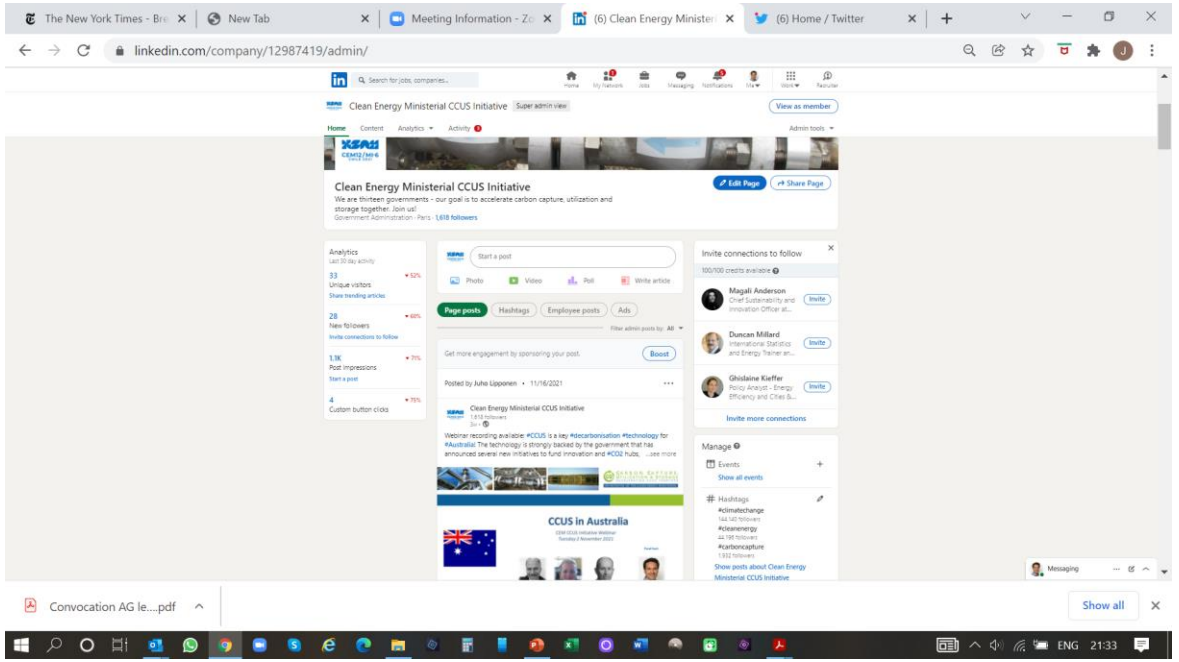
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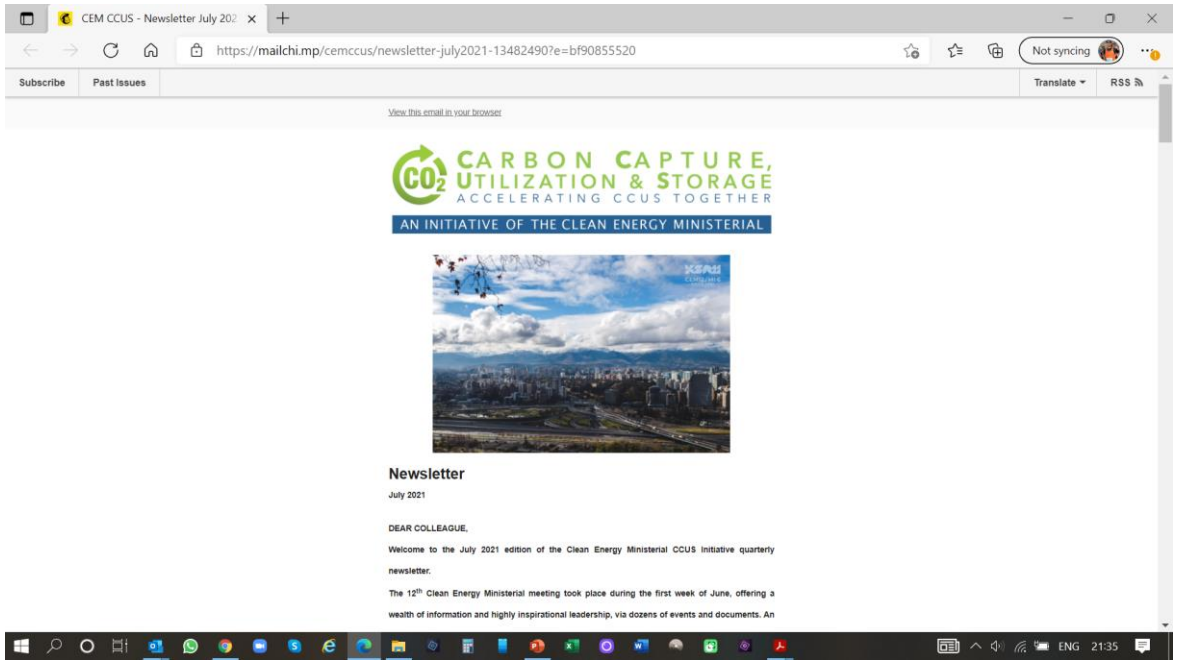
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Newsletter
July 2021
DEAR COLLEAGUE,
Welcome to the July 2021 edition of the Clean Energy Ministerial CCUS Initiative quarterly newsletter.
The 12th Clean Energy Ministerial meeting took place during the first week of June, offering a wealth of information and highly inspirational leadership, via dozens of events and documents. An
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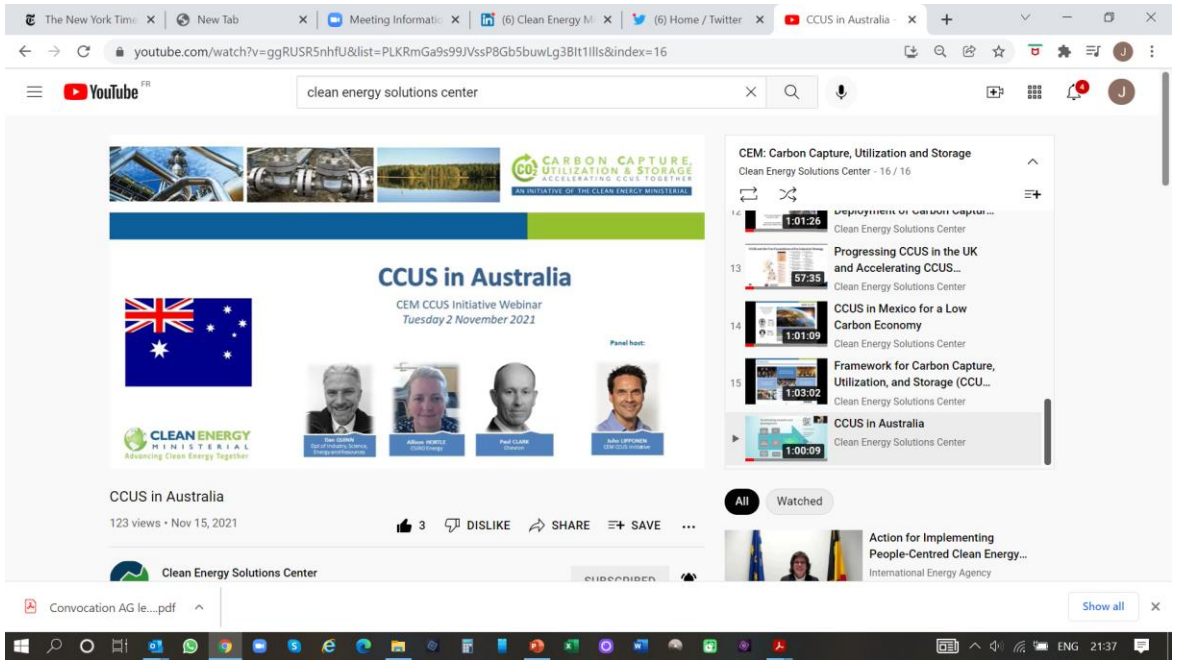
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