



SCHOOL OF ENERGY RESOURCES

“Can The Paris Agreement Facilitate CCS/CCUS Projects?: Lessons Learned From the Kyoto Protocol & COP24”

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Presentation Overview

- ✓ Role of CCS/CCUS Under Low Carbon Pathways & Current Status
- ✓ CCC/CCUS Under the Kyoto Protocol
- ✓ CCS/CCUS Under the Paris Agreement
- ✓ A New Approach & Financing Mechanism for CCS/CCUS Under the Paris Agreement



Role of CCS/CCUS Under Low-Carbon Pathways & Current Status

43

43 large-scale facilities – 18 in commercial operation, 5 under construction and 20 in various stages of development.

- ✓ **CCS/CCUS are needed to meet various low-carbon goals/scenarios/pathways – indeed, through BECCS, the technology is needed for carbon dioxide removal (CDR)**
- ✓ **The number of projects is indicated; there is a non-trivial shortfall between what is needed and what is happening; of the 18, ~12 involve EOR**
- ✓ **Insufficient capital is being mobilized to build-out CCS/CCUS**
- ✓ **Government funding support peaked in about 2010**
- ✓ **Except for CO₂-EOR, other potential utilizations and \$45Q, a business model for storing CO₂ geologically remains lacking**

Sources: GCCSI (<https://www.globalccsinstitute.com/resources/global-status-report/>); KAPSARC; IEA



CCS/CCUS Under the Kyoto Protocol

- ✓ “Top-Down” Approach With Differentiated Responsibilities Among Countries
- ✓ Several Different Market-Type Mechanisms
 - *Clean Development Mechanism (CDM)*
 - *Joint Implementation (JI)*
- ✓ “Modalities and Procedures” Approved for CCS as CDM project activities (Dec. 2011)
 - *This was, and remains, a significant advance under international climate policy*
 - *But the Kyoto Protocol generally failed to mobilize capital for CCS/CCUS*
- ✓ Set to End Next Year

Sources: Decision 10/CMP.7 (available at <https://unfccc.int/resource/docs/2011/cmp7/eng/10a02.pdf#page=13>); <https://cdm.unfccc.int/about/ccs/index.html>



CCS/CCUS Under the Paris Agreement

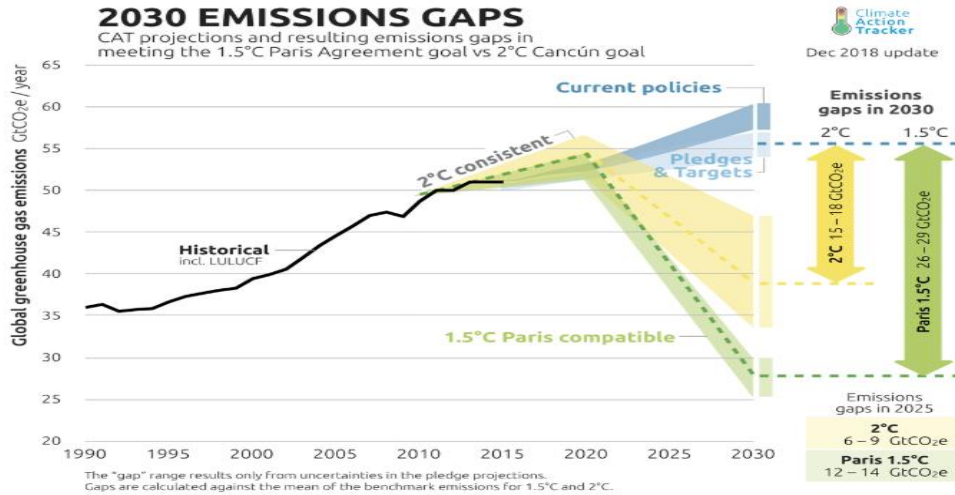
- ✓ **Already in force and taking effect post 2020, the Paris Agreement Will Guide this Century's Low-Carbon Energy Transition**
 - *Envisions peaking as soon as possible, then net GHG neutrality post 2050*
 - *Therefore, it is absolutely imperative that CCS/CCUS thrive under the Agreement*

- ✓ **Completely Different Approach from the Kyoto Protocol --**
 - *No more differentiated responsibilities*
 - *Bottom-up approach driven by “Nationally Determined Contributions” (NDCs)*
 - *NDCs to get more stringent with each 5-year cycle, with “stocktakes” in between*
 - *First official stocktake in 2023*
 - *Initial NDCs – known as “Intended Nationally Determined Contributions” (INDCs) – have already been submitted*

Sources: Reflections Note by SBSTA Chair (May 24, 2019) (https://unfccc.int/sites/default/files/resource/1_SBSTA%20reflections%20note%20.pdf); IPCC Special Report on Global Warming of 1.5C (2018) (<https://www.ipcc.ch/sr15/>)



What Can We Discern from the INDCs/NDCs?



Pledges inadequate to meet PA policy goals

Few references to CCS

Table 1. CCS in first NDCs and INDCs.

Countries with explicit reference to CCS technology	Bahrain	Malawi
	China	Norway
	Egypt	Saudi Arabia
	Iran	South Africa
	Iraq	United Arab Emirates
Countries listing CCS as a source sector category in their NDCs	European Union*	Mexico
	Japan	Montenegro
Countries not mentioning CCS but with potential interests	Australia ¹	Malaysia ³
	Brazil ^{1,2}	Russia ¹
	Canada ^{1,2}	Thailand ³
	Colombia ¹	Trinidad & Tobago ³
	Indonesia ³	United States ^{1,3}
	South Korea ¹	Vietnam ³

Notes: * 28 member state countries at time of writing. 1 = Member country of CSLF, IEA Greenhouse Gas R&D Programme or Global CCS Institute; 2 = Active CCS pilot, demonstrator or large-scale plant(s) in operation. 3 = Significant energy sector emissions and potential for low cost CCS from high purity sources.

Source: KAPSARC.

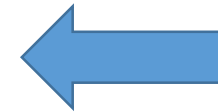
Sources: Reflections Note by SBSTA Chair (May 24, 2019) (https://unfccc.int/sites/default/files/resource/1_SBSTA%20reflections%20note%20.pdf); Climate Action Tracer (<https://climateactiontracker.org/>); KAPSARC



Some Key Market Mechanisms Under the Paris Agreement

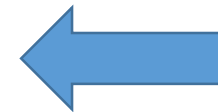
✓ Most of the Paris Agreement rulebook was approved at COP24 (Katowice, Poland), with the notable exception of Article 6 which is expected to be advanced at the next meeting of the Subsidiary Body for Scientific and Technological Advice (SBSTA-50; Bonn; June 17-27, 2019) and concluded at COP25 (Chile; December 2-13, 2019)

✓ Article 6.2: “Internationally transferred mitigation outcomes” (ITMOs)



Broad interpretation

✓ Article 6.4: Mechanism to support GHG mitigation and sustainable development



CDM Successor?

Sources: Reflections Note by SBSTA Chair (May 24, 2019)
(https://unfccc.int/sites/default/files/resource/1_SBSTA%20reflections%20note%20.pdf); Climate Action Tracer
(<https://climateactiontracer.org/>)



A New Approach & Financing Mechanism under the Paris Agreement

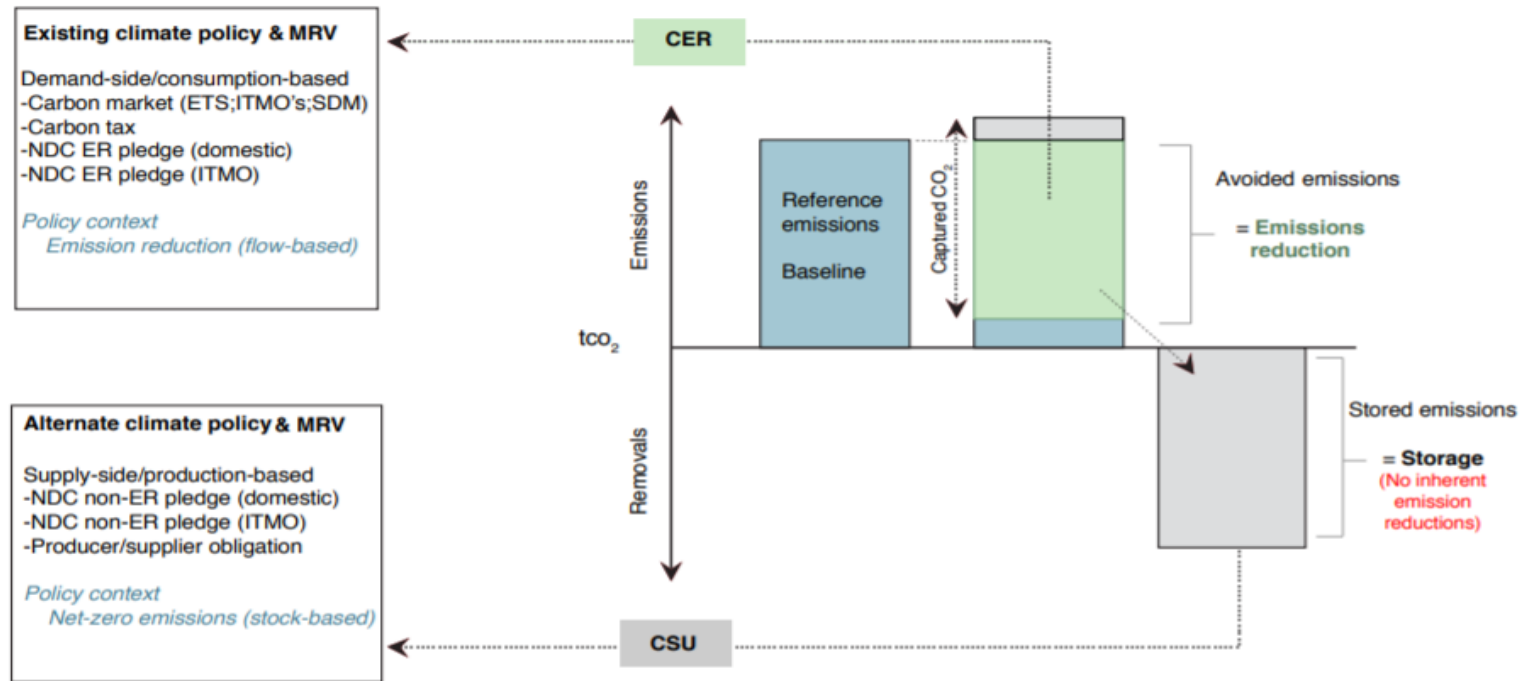
- ✓ New Approach: Carbon clubs as ITMO's under Article 6.2
 - *Solid basis to move forward: (1) urgent need for CCS/CCUS/BECCS; (2) Decision 10/CMP.7; (3) projects; (4) 2006 Guidelines for National GHG Inventories (CCS); & (5) new ISO standards for CCS/CCUS*
- ✓ New Financing Mechanism for CCS/CCUS: Carbon Storage Unit (CSU) = 1 verified ton of CO₂ securely stored in a geologic reservoir
- ✓ Carry forward, under Article 6.4, the CDM-esque program for CCS/CCUS as previously approved under the Kyoto Protocol

For an excellent paper on this, see Zakkour, P., Heidug, W. "A Mechanism for CCS in the Post-Paris Era: Piloting Results-Based Finance and Supply Side Policy Under Article 6" (KAPSARC, April 2019)

Sources: KAPSARC; IPCC Guidelines (<https://www.ipcc-nggip.iges.or.jp/public/2006gl/vol2.html>)



Possible CCS/CCUS Credit Flows under Paris Agreement



Key: CER = Carbon emission reduction; CSU = Carbon storage unit; ETS = Emissions trading scheme; ITMO = Internationally transferred mitigation outcome; SDM = Sustainable Development Mechanism under Article 6.4 of the Paris Agreement; MRV = Measurement, reporting and verification, ER = Emissions reduction.

Source: Zakkour, P., Heidug, W. "A Mechanism for CCS in the Post-Paris Era: Piloting Results-Based Finance and Supply Side Policy Under Article 6," p. 22, Fig. 1 (KAPSARC, April 2019)



“Carbon Storage Unit” Considerations

- ✓ Benefits:
 - *Arguably creates a business case for CO₂ geologic storage beyond EOR*
 - *Highlights the continued use of fossil fuels while addressing carbon considerations*
 - *Creates a runway for DAC, BECCS and other CDR technologies under the Paris Agreement*
 - *Consistent with the Paris Agreement’s post-2050 net GHG neutrality goals*
 - *Would supplement, not detract from, emission-based carbon finance*
- ✓ Significant capital will still be required for CCS/CCUS; a new carbon commodity alone is unlikely to get the job done
- ✓ Could raise double-counting concerns, but in reality no different than RECs, other attributes; could be addressed through careful and transparent accounting
- ✓ General bias in low-carbon policy towards emission-based rules and approaches, or carbon flows; what is being suggested here instead is focused on carbon stocks; and a carbon-stock approach may not be warmly welcomed by fossil fuel suppliers as it arguably shifts focus away from users of fossil fuels to their producers/suppliers
- ✓ The oil & gas industry may already be thinking this way –
 - *King Abdullah Petroleum Studies and Research Center (KAPSARC)*
 - *Recently announced collaboration between the Clean Energy Ministerial (CEM-10) and the Oil & Gas Climate Initiative on CCUS and financial institutions*

Source: <http://www.cleanenergyministerial.org/news-clean-energy-ministerial/clean-energy-ministerial-ccus-initiative-and-oil-gas-climate>



Q&A

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