# GLOBAL STATUS OF CCS 2019: TARGETING CLIMATE CHANGE

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# GLOBAL STATUS OF CCS 2019

## TARGETING CLIMATE CHANGE

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# WHY DO WE NEED CCS?

**VITAL:** CCS is vital to reduce emissions to net-zero by mid-century and achieve global climate change targets.

**VERSATILE:** CCS is versatile in its application and can contribute to meeting climate targets through three different ways: mitigating emissions, removing CO2 from atmosphere and clean hydrogen production.

**PROVEN:** CCS technologies have been in operation since the 1970s. The current capture capacity in operation is around 40 Mtpa and  over 260 Mt of anthropogenic $CO_2$ has been captured and stored to date.

**ENABLER:** CCS is a conduit to a new clean energy economy (eg, clean hydrogen, chemicals, fertiliser production).

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# GLOBAL STATUS OF CCS - 2019

- 51 large-scale CCS facilities globally: 19 in operation, 4 under construction, and 28 in various stages of development.
- These 51 facilities can capture and store close to 100 Mtpa of $CO_2$.
- New project announcements include major innovation milestones:
  - CCS application on natural gas power
  - First large-scale direct air capture (DAC) plant.
- To date, more than 260 million tonnes of anthropogenic $CO_2$ has been safely captured and permanently stored globally.
- Estimated 2,000+ large-scale CCS facilities, capturing more than 2,000 Mtpa of $CO_2$, are needed to achieve global climate targets.

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# CCS FACILITIES AROUND THE WORLD

| | Early development | Advanced development | Construction | Operating | Total |
|---|---|---|---|---|---|
| **North America** | 3 | 6 | 2 | 12 | 23 |
| **China** | 5 | - | 2 | 1 | 8 |
| **Europe** | 8 | 2 | - | 2 | 12 |
| **Gulf Cooperation Council** | - | 1 | - | 2 | 3 |
| **Rest of World*** | 2 | 1 | 0 | 2 | 5 |
| **Total** | 18 | 10 | 4 | 19 | **51** |

* Includes facilities in Australia, Brazil and South Korea

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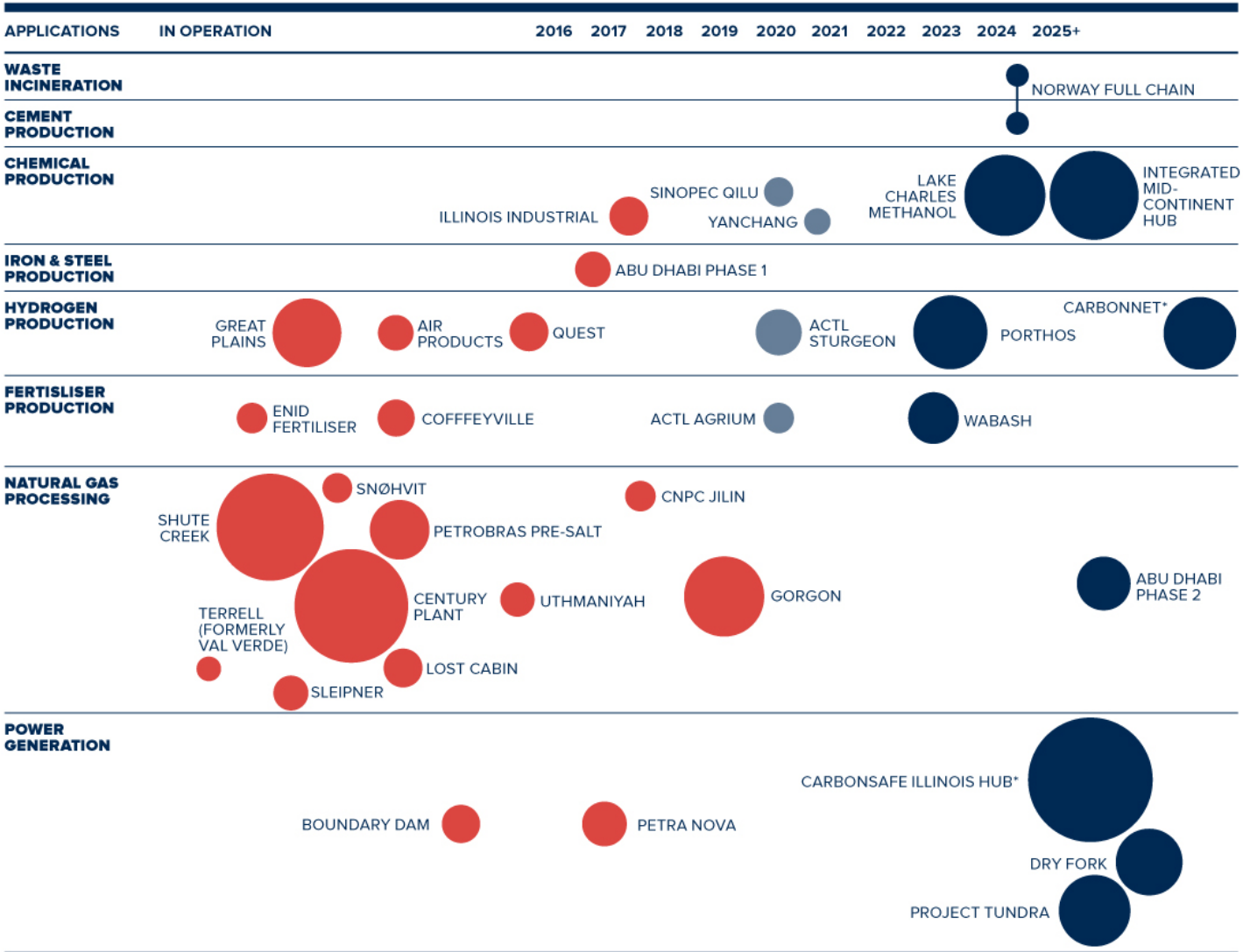
# CCS HAS DIVERSE APPLICATIONS ACROSS INDUSTRIES

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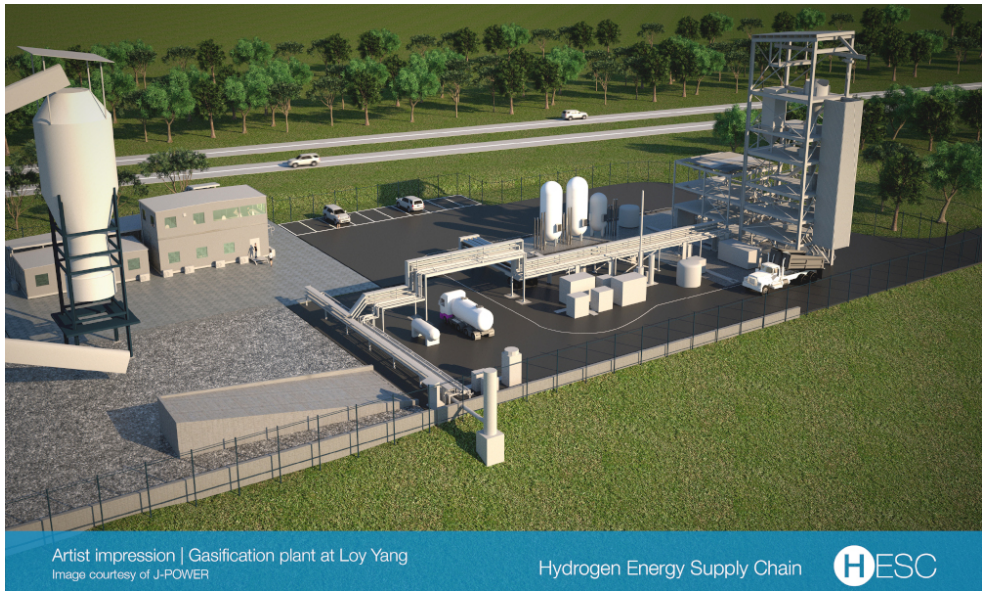
# TOMAKOMAI CCS DEMONSTRATION PLANT

- With ongoing support from METI, Japan CCS Co. Ltd's Tomakomai CCS facility, remains Asia's first full-cycle CCS hydrogen plant.
- In 2019, it reached a capture milestone of 300,000 tonnes of $CO_2$, and continued intensive monitoring.

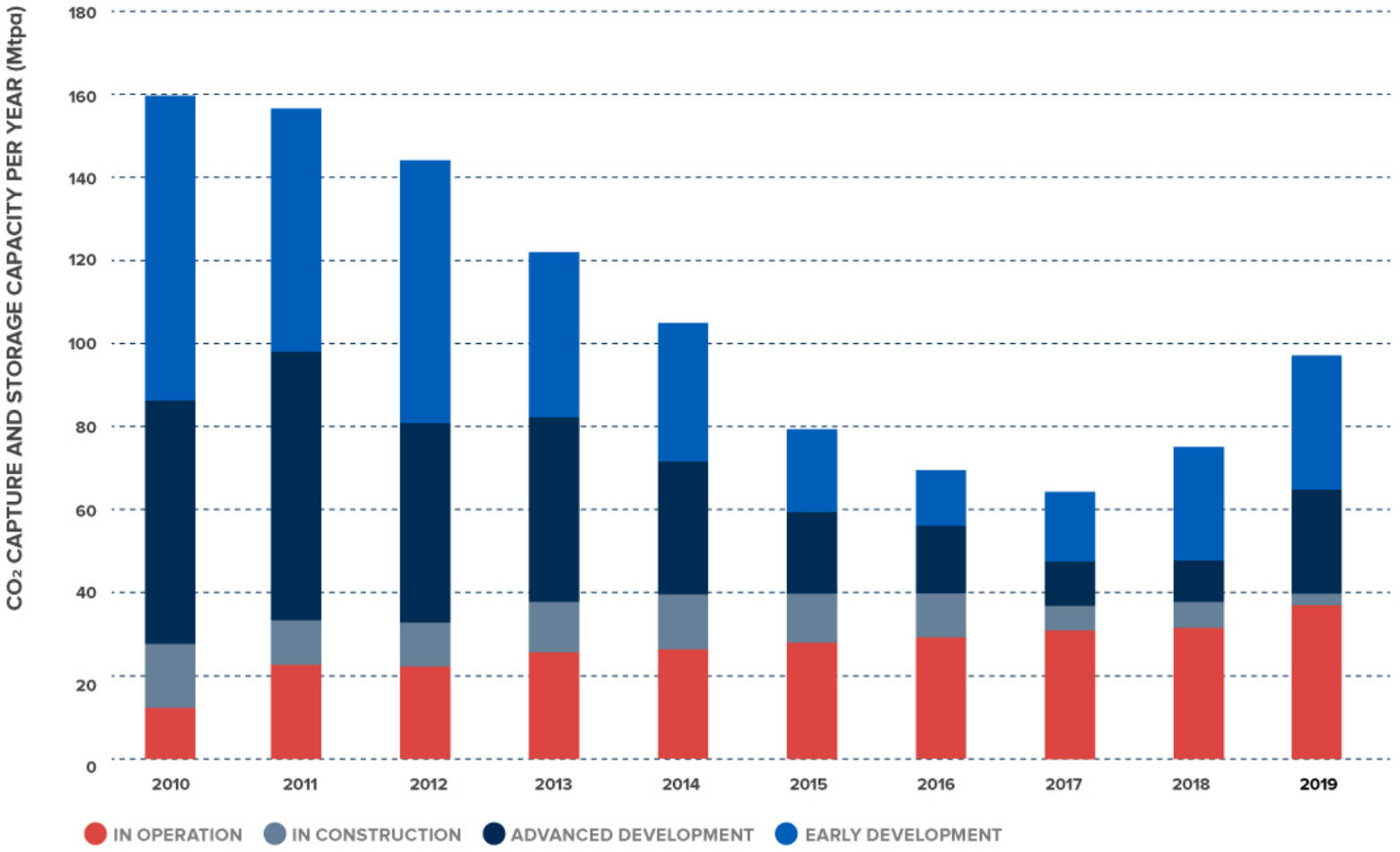

- Safe and secure operation achieved in the vicinity of a large city, and in spite of major earthquakes and disasters.
- World-class, comprehensive community engagement activities undertaken throughout the duration of the project.

# HYDROGEN ENERGY SUPPLY CHAIN (HESC) PROJECT

- Construction of the gasifier commenced in November 2019 and first hydrogen production is expected by 2021.
- If this pilot is successful, an investment decision to construct a commercial scale clean hydrogen production facility with CCS in the Latrobe Valley, to supply Japan could be made in the mid 2020s.



# CCS PIPELINE IS REPLENISHING, BUT NOT FAST ENOUGH

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# KEY CCS DEVELOPMENTS IN 2019

- “Next wave” facilities based around CCS hubs and clusters
- New project announcements in gas power generation and DAC
- Policy confidence is improving. CCS-specific policies introduced on national and sub-national levels
- Cross-border transport of CO2 now possible through provisional application of the amendment of Article 6 of London Protocol
- CCS is entering the sustainable finance discussions

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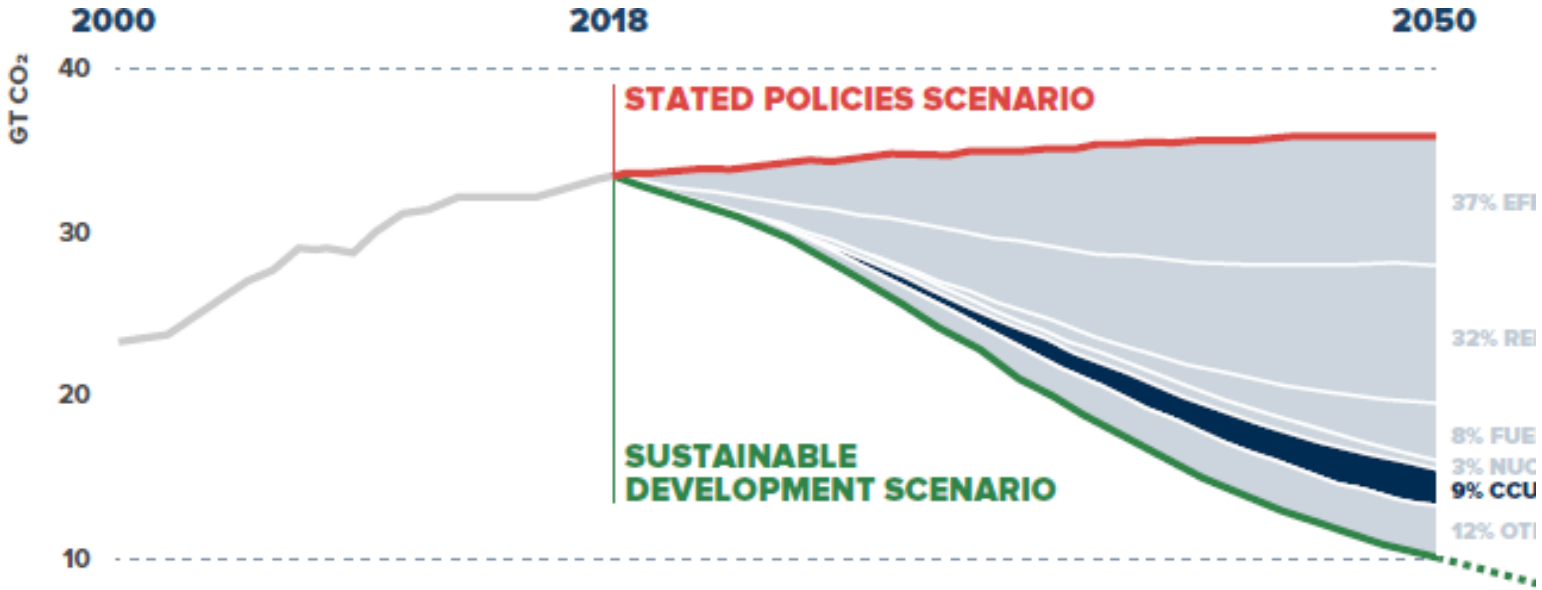
# CCS IS A VITAL ELEMENT OF A LOW-CARBON ENERGY FUTURE




EMISSIONS REDUCTIONS IN THE IEA'S SUSTAINABLE DEVELOPMENT SCENARIO (SDS)

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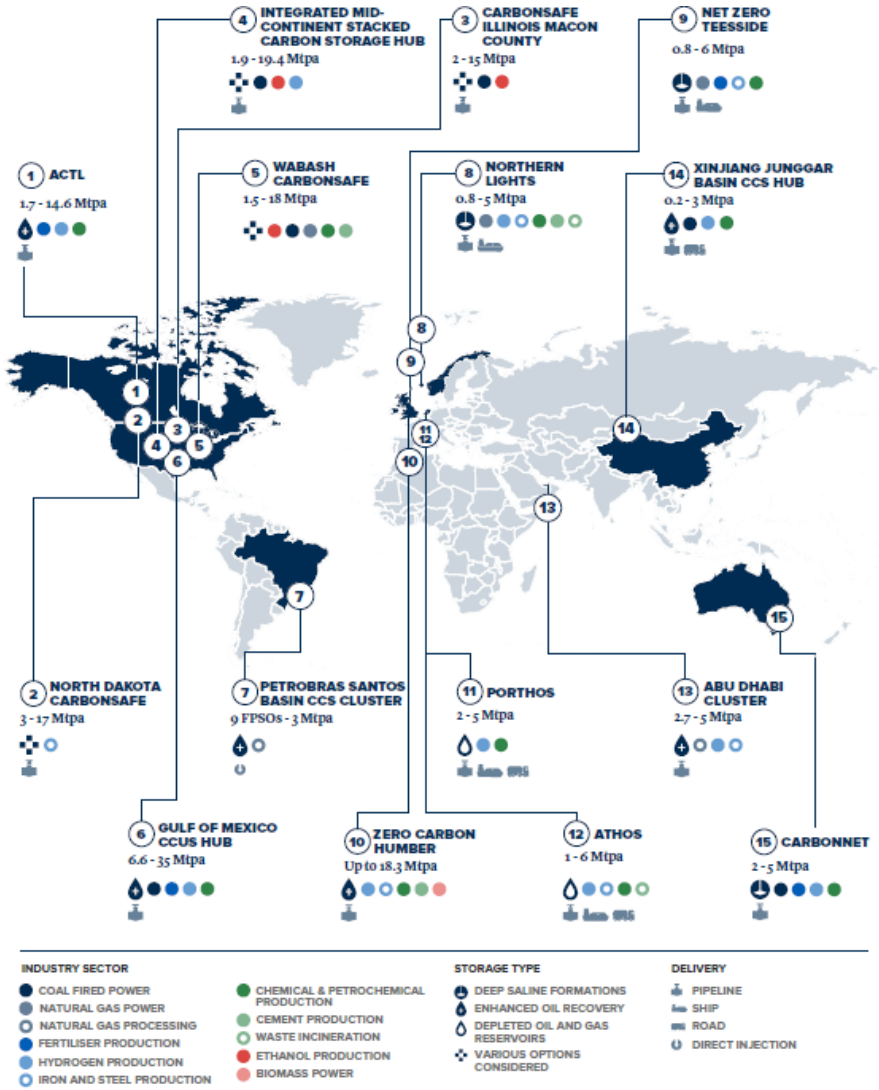
# NEXT WAVE OF CCS: HUBS & CLUSTERS




- Multiple industrial point sources of CO2 connected to a CO2 transport and storage network.
- Access to large geological storage resources with the capacity to store CO2 from industrial sources for decades.
- Economies of scale deliver lower unit-costs for CO2 storage.
- Synergies between multiple CO2 sources and the storage operator reduce cross chain risks and support commercial viability.

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# CCS BRINGS SIGNIFICANT ECONOMIC BENEFITS

- **CREATES JOBS**

Supports high paying jobs, supports employment retention and creates new employment opportunities.

- **REDUCES OPERATIONAL COSTS**

Reduces total system costs of electricity supply by providing reliable, dispatchable generation capacity when fitted to flexible fossil fuel power plants

- **EXTENDS LIFE OF EXISTING INFRASTRUCTURE**

Utilizes existing infrastructure that would otherwise be decommissioned, helping to defer shut-down costs

- **UNLOCKS GROWTH**

Provides knowledge spill overs that can support innovation-based economic growth

# SUPPORTIVE POLICY IS URGENTLY NEEDED

- **PLACING A VALUE ON EMISSION REDUCTIONS**
  - A range of options, including carbon taxes, emissions trading and tax credits or payments linked to delivered emission reductions
- **MOBILISING EARLY INVESTMENT**
  - Public-Private partnerships particularly important in early stages of deployment to reduce perceived risks and attract bank financing
- **ADDRESSING HARD TO REDUCE RISKS**
  - Robust policy frameworks needed to reduce cross-chain, and long-term liability risks

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# URGENT ACTION IS REQUIRED TO ACHIEVE CLIMATE CHANGE TARGETS

# CARBON CAPTURE & STORAGE IS VITAL

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