THE CCUS HUB

# THE CCUS HUB PLAYBOOK

## A guide for regulators, industrial emitters and hub developers

# POLICIES & REGULATIONS

# 3. POLICIES & BUSINESS MODELS

## 3.1 Policies & regulations

### WHY SHOULD GOVERNMENTS SUPPORT CCUS HUBS?

CCUS is a cost-effective way to decarbonize heavy industry at scale – and a CCUS hub is designed to leverage the economies of scale for an entire region, while reducing costs by allocating risk management along the entire value chain.

> *Read about how the Dutch government calculated that supporting carbon capture was the cheapest way to meet its industrial decarbonization target.*

CCUS helps to enable a just transition, allowing existing industries to remain competitive, keep and create jobs and continue contributing to local economies while transitioning to a net-zero future. A CCUS hub can help industrial regions to keep existing industrial jobs and attract new ones.

> *Read about job creation in Net Zero Teesside and Northern Lights.*

CCUS hubs accelerate the commercial scale up of CCUS. By splitting the value chain between transport and storage operators and emitters and planning the development, CCUS hubs can involve partners with different risk approaches and also engage multiple emitters – including smaller players and industries that would not have considered CCUS as a solution on their own. As a result, policy support can enable faster decarbonization in the short and medium term, tailormade to the specifics of one or more CCUS hubs, and phase out that support over time as carbon price drive investments in CCUS and create a commercial industry.

> *Read about the Fortum waste-to-energy CCUS project that is a founding partner in Longship/ Northern Lights.*

Flexible power generation capacity that complements renewables can be an integrated part of a CCUS hub – providing reliable low-carbon power for businesses in the hub area.

> *Read about the UK government's contract for back-up electricity in Net Zero Teesside*

Hydrogen is set to play a big role in decarbonizing industry, heating and transport, and the cheapest way to make low-carbon hydrogen today is using natural gas with CCUS. Integrating low-carbon hydrogen production into a hub provides energy for multiple applications in the industrial region.

> *Read about hydrogen at the Humber Zero hub.*

CCUS hubs can also provide opportunities to remove carbon dioxide from the atmosphere at scale, through direct air capture with storage (DACS) and bioenergy with CCS (BECCS).

> *Read about how Norway is enabling industrial scale deployment of carbon removals through its Northern Lights project.*

## WHY DO CCUS HUBS NEED GOVERNMENT SUPPORT?

Today's market models make it more favourable for industrial companies to emit carbon dioxide (even where carbon has a cost) than to invest in carbon capture and have the carbon dioxide stored. As carbon prices rise, incentives develop and mandates kick in, CCUS will become cheaper than emitting.

The most advanced CCUS hubs today are supported by government-backed incentives and subsidies that tackle two main challenges:

- How to incentivise emitters to invest in capturing their carbon dioxide emissions so they can maintain competitiveness despite today's market models?
- How to incentivise potential carbon transport and storage operators to invest in infrastructure – providing a business case despite the lack of a sufficiently high and stable carbon price?

In addition, the incentives also need to address challenges throughout the CCUS value chain, like performance risk and counterparty risk.

Policy support is likely to match the dynamics of low-carbon energies such as offshore wind.Early-stage demonstration focuses on proving that a novel technology works in practice. Scale-up develops a few projects near or at full-scale, proving viability and deliverability. In these initial phases, governments are likely to offer some form of development funding, followed by upfront co-funding of capital costs, as well as revenue support.

> *See early CCUS projects such as Quest, Gorgon and Boundary Dam.*

At roll-out, the objectives are to establish a sustainable industry and to build capacity, via a funnel of projects, multiple developers, and a mature understanding of risks and contracting structures. As risks and costs fall, and the cost of private finance comes down, CCUS hub development could be driven by industry and supported by market-based mechanisms, that are based on giving a value to carbon. Government co-funding of costs could then be phased out as commerciality is reached.

Once established, a mature and stable industry can attract commercial finance on acceptable terms. CCUS hubs will be sustained by an explicit or implicit carbon price, supported by further reductions in the cost of technology applied, and by growing demand for decarbonised industrial products. In this phase, government action would be limited to addressing any remaining market failures and removal of regulatory barriers.

## WHAT KIND OF POLICY ENABLERS CAN SUPPORT CCUS HUBS?

Governments are using a range of different policy frameworks to help a CCUS industry get off the ground and scale rapidly. Government support is expected to decrease over time as the industry matures and sufficiently high carbon prices, mandates or market demand for low carbon products create business models.

The tools government are using in different combinations to support CCUS hubs include:

**Capital grants** for capture and transport and storage facilities including development support. Particularly relevant in early phases of CCUS hub development, these grant schemes can also include support for the operations phase, including minimal performance requirements. *> See Norway.*

**Feasibility study grants.** These are designed to help emitting companies in industries with tight profit margins to do due diligence on integrating CCUS into their processes. This is particularly important for companies that are pioneering the use of CCUS in their industry, such as waste-to-energy, glass and paper. *> See Fortum in Norway.*

**Government-steered model.** The government sets up a regulated publicly owned body responsible for delivering and operating the transport and storage infrastructure, with the option of privatisation as the CCUS market matures. *> See Porthos in the Netherlands*

**Tax incentives** for the capture, storage or utilization of carbon dioxide can take the form of production tax credits and investment tax credits.
*> See 45Q storage tax credit in the US.*

**Contracts for difference** top up carbon market prices where they are still too low to cover the cost of capture for emitters. The government sets a minimum price on stored carbon, paying the difference between the market price and this floor. This provides an incentive for the emitter to invest in capture plant, a clear demand signal to the operator and the prospect of decreasing subsidies to the government. *> See the Netherlands and the UK.*

**Regulated asset base.** Transport and storage operators receive a licence from the regulator, granting them the right to charge a regulated price to users in exchange for delivering and operating the transport and storage network. The charge is set by an independent regulator who considers allowable expenses, over a set period of time, to ensure costs are necessary and reasonable. For hub development, such schemes require an element of underwriting from the government to manage the counterparty risk. *> See the UK*

**Standards** that limit the permitted carbon intensity of fuels for transport or other products and create demand. *> See California's Low Carbon Fuel Standard and the European Commission's proposals for a Carbon Border Adjustment Mechanism.*

**Public procurement requirements** for low or zero-carbon industrial products to stimulate demand. For example, contractors on construction projects would have to include a certain percentage of low-carbon steel and cement. Being considered by some US states. *> See this overview*

**Hub alignment and competition.** The UK government has successfully accelerated the pace of progress and alignment among hubs by developing support policies step by step and making hub developers compete or align among themselves to get through the next "grant-gate". This is challenging for the hubs, but it has accelerated consolidation among the hubs and highlighted issues that need to be addressed.

**Emissions trading linkages** that recognize the role of tradeable CCUS credits, or develop a new transferable asset class such as a carbon storage unit (CSU) – a verified tonne of carbon dioxide or carbon securely stored in geological formations. Countries could pledge to buy these units as part of their NDCs; or fossil fuel companies could have a carbon storage obligation.

## WHAT ARE THE POLICY SUPPORT MODELS USED IN EARLY HUBS?

| CCUS hub | Policy support | |
|---|---|---|
| | **Transport and storage** | **Emitters** |
| **Northern Lights / Longship, Norway** | Phase 1<br><br>Regulated asset base: investment funding (80%) and operational cost funding (95% decreasing to 80%). Potentially additional EU funding. | Investment funding (80%) and operational cost funding (100% up to a certain level). |
| | Phase 2<br><br>None – fees from emitters (reflected in opex cost funding) | Capital grant and opex support from EU Innovation Fund, Connecting Europe Facility |
| **Net Zero Teesside, UK** | Regulated asset base: grants for pre-FEED work and FEED | One-off grants through CCS infrastructure fund for initial capture projects; contracts for difference on UK carbon price<br>Modified contract for difference on power price |
| **Porthos, The Netherlands** | Porthos run by three state-owned parties – EBN, Gasunie and Port of Rotterdam; €100 million capital grant from the EU Connecting Europe Facility. Fee from emitters. | Contract for difference on ETS carbon price, known as SDE++ |
| **China North-West, China**<br>*Under discussion, may include:* | Capital grant (as for other major Chinese infrastructure projects); storage tax credit to offset operating costs | Contract for difference on Chinese carbon market prices |
| **Ravenna, Italy**<br>*Under discussion, may include:* | Regulated asset base; possibly some form of capital grants | Contracts for difference on ETS carbon price |
| **Louisiana, US**<br>*Under discussion, may include:* | None – fees from emitters | 45Q storage tax credit; low-carbon fuel standards |

## DESIGNING EFFECTIVE POLICIES FOR CCUS HUBS

**Identify the potential and the value of CCUS**

- ✔ Map sources of carbon dioxide, with their concentration and purity – power, industry
- ✔ Map storage reservoirs, their type and capacities – saline aquifers, depleted oil & gas reservoirs
- ✔ Identify carbon transport options – pipelines, ships, barges, rail, trucks
- ✔ Quantify the socio-economic value of CCUS, including its potential for retaining and creating jobs

**Set up national CCUS strategy and targets**

- ✔ Articulate the role CCUS can play versus other levers to accelerate decarbonization in the national context
- ✔ Integrate CCUS into industrial, commercial and environmental policy
- ✔ Give relevant ministries the resources they need for implementation
- ✔ Develop a roadmap laying out targets for captured carbon dioxide
- ✔ Ensure a funnel of storage resource options are appraised in a timely manner to match the expected demand from captured carbon dioxide
- ✔ Design incentives to ensure industries meet those targets
- ✔ Provide support for storage maturation

**Provide clarity with regulations**

- ✔ Clarify issues around carbon dioxide transport, verification of capture and storage, the integrity of storage sites, monitoring, and long-term stewardship.
- ✔ Design permitting process to be streamlined across the numerous regulatory actors

**Assign roles and responsibilities**

- ✔ Assign roles and responsibilities to the appropriate authorities for developing policies, incentives, and regulatory frameworks
- ✔ Doing so transparently and predictably in the context of a roadmap reduces uncertainties and de-risks capital investments
- ✔ In many cases it will be beneficial to assign one party to take the lead role for a CCUS hub development

**Work on community acceptance**

- ✔ Collaborate with local governments, environmental organizations, trade unions, and other industries in the region

**LINKS**

- Global Hub Search
- $CO_2$ Storage Resource Catalogue

## DEVELOPING EFFECTIVE REGULATIONS FOR CCUS HUBS

Regulations relating to CCUS vary considerably by country. In order for CCUS hubs to scale, consistent regulations across geographies are necessary. Suggested guidelines for developing such regulations are as follows:

- Permit the adaptation of existing pipelines for carbon dioxide transport
- Enable new transport infrastructure such as pipelines, trucks, rail and shipping
- Streamline the process of awarding permits for capture, transport and storage
- Introduce standards for construction, operation and carbon dioxide injection
- Clarify storage liability: who is responsible at each stage of injection, monitoring and long-term stewardship; how risk is shared and eventually transferred to government.
- Introduce monitoring, reporting and verification protocols and processes for injected carbon dioxide to ensure safe, reliable and permanent storage
- Establish provisions for carbon dioxide leakage
- Provide legal certainty on pore-space ownership and how it relates to mineral rights
- Develop rules for joint development of carbon dioxide stores that span land under licence by different companies
- Enable trans-boundary (state and national) movement and storage of carbon dioxide including the delineation of associated risks and liabilities
- Ensure that emitters have access to carbon dioxide transport and storage infrastructure at reasonable rates
- Establish processes for stakeholder consultation

**READ MORE**

- What questions should policymakers ask themselves when developing policies and regulations for CCUS hubs?
- What are the policy lessons learned from the OGCI KickStarter hubs?