Regulatory Framework and Overall Structure

White Paper Presentation, 24th April

14:30-15:00 Arrival

15:00-15:05 Welcome by **Alexandra Sdoukou, Sec. Gen. of Energy & Mineral Resources**

15:05-15:15 Introduction to White Paper
Aristofanis Stefatos, CEO of HEREMA & Dimitris Papakanellou, Partner KPMG

15:15-15:25 CCS Landscape and Current Status
Efthimios Tartaras, Head of Geoscience and Advisor to CEO-HEREMA

15:25-15:35 CCS Legal Framework
Theodossis Tompras, Partner/Lawyer, KPMG

15:35-15:50 Revenue Models and Overall Structure
Ismail Ismail, Project Manager HEREMA, & Ioannis Mitsios, Project Manager KPMG

15:50-16:00 The Way Forward: "the Future of Carbon Capture & Storage in Greece" - Q&A
Aristofanis Stefatos, CEO of HEREMA & Dimitris Papakanellou, Partner KPMG

16:00- 16:30 Coffee and Refreshments

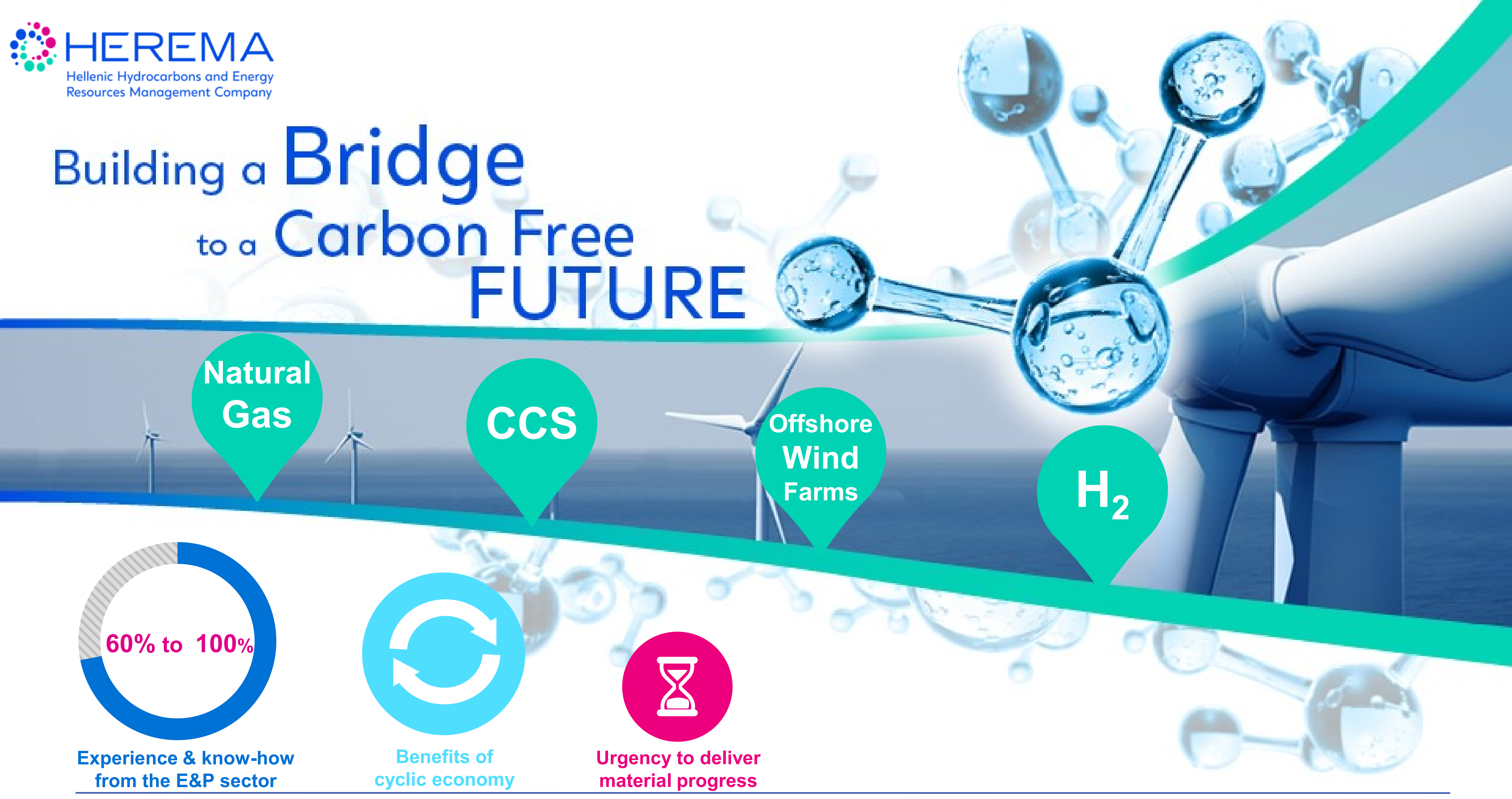
16:30 – 17:15 Closed Technical Discussion by invitation only

HEREMA
Hellenic Hydrocarbons and Energy Resources Management Company

Building a Bridge to a Carbon Free FUTURE

CARBON CAPTURE & STORAGE

Regulatory Framework & Overall Structure


HEREMA
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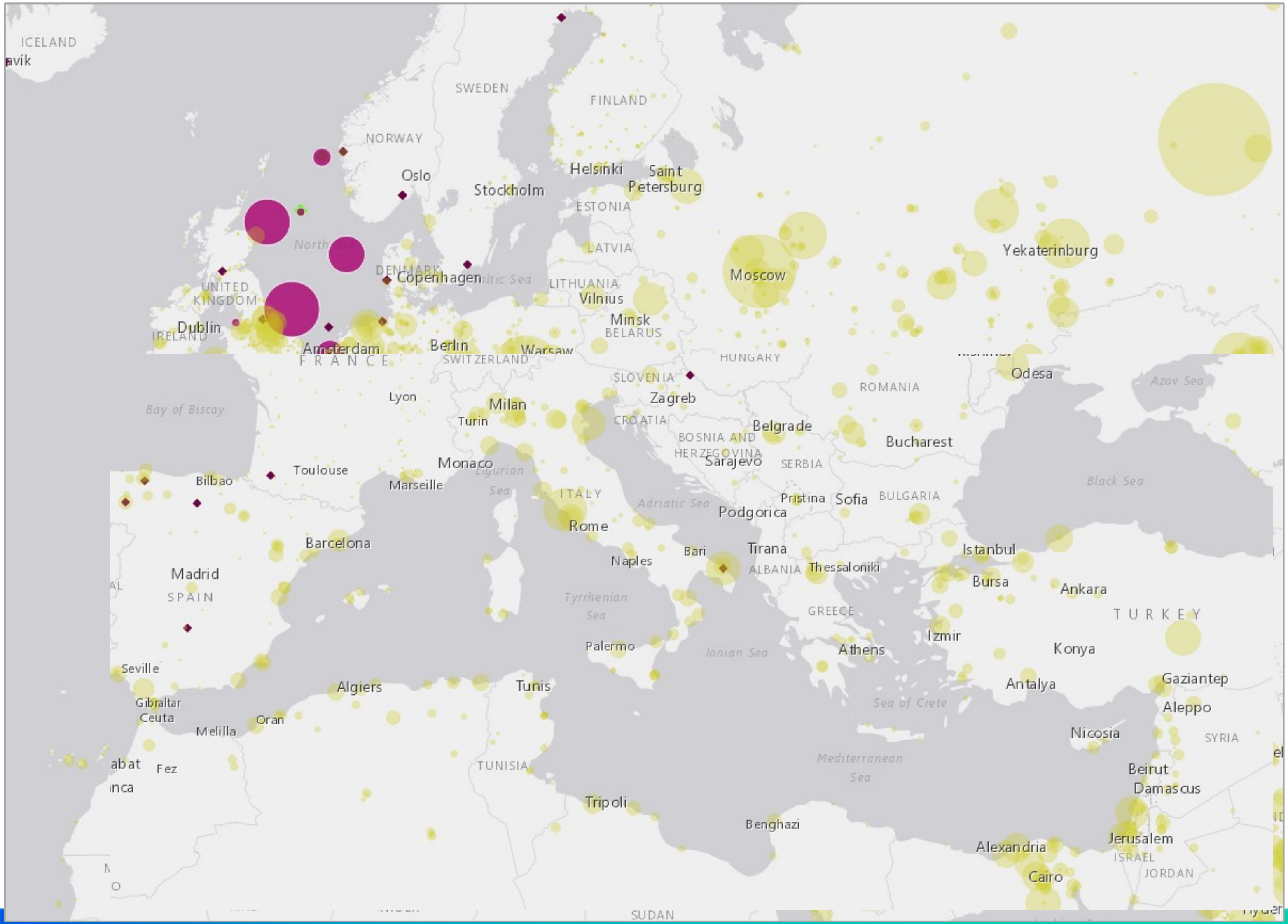
Building a Bridge
to a Carbon Free
FUTURE
Natural Gas
CCS
Offshore Wind Farms
H2
60% to 100%
Experience & know-how from the E&P sector
Benefits of cyclic economy
Urgency to deliver material progress

CO2 emissions and CCS projects

A much-needed solution for the hard to abate heavy industries



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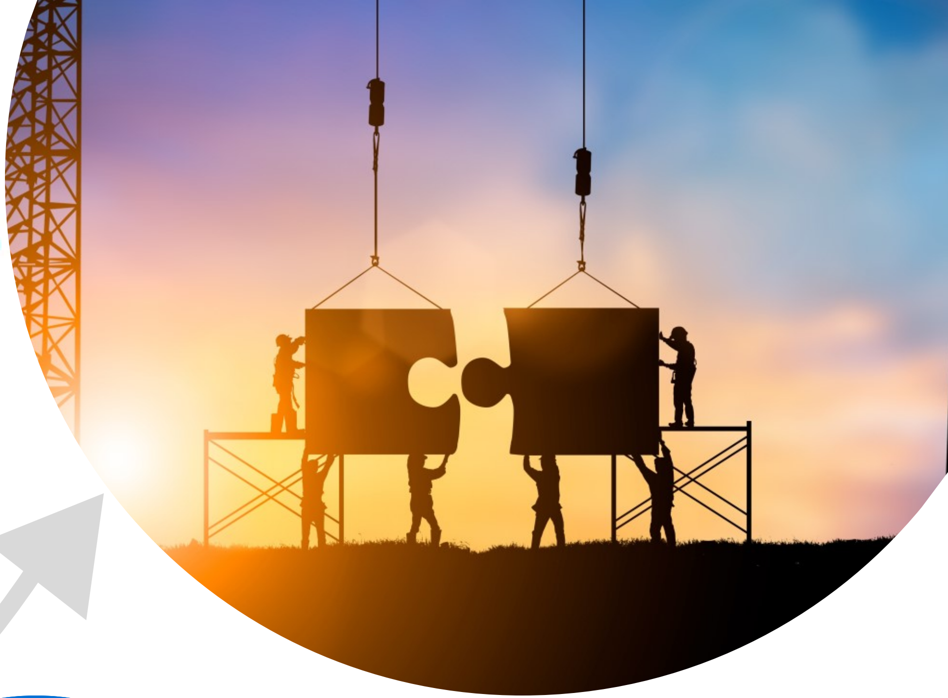
Connecting the pieces



CCS is critical technology to meet the NECP 2050 goals

+ 44%
2021-2022
Increase of CCS projects worldwide

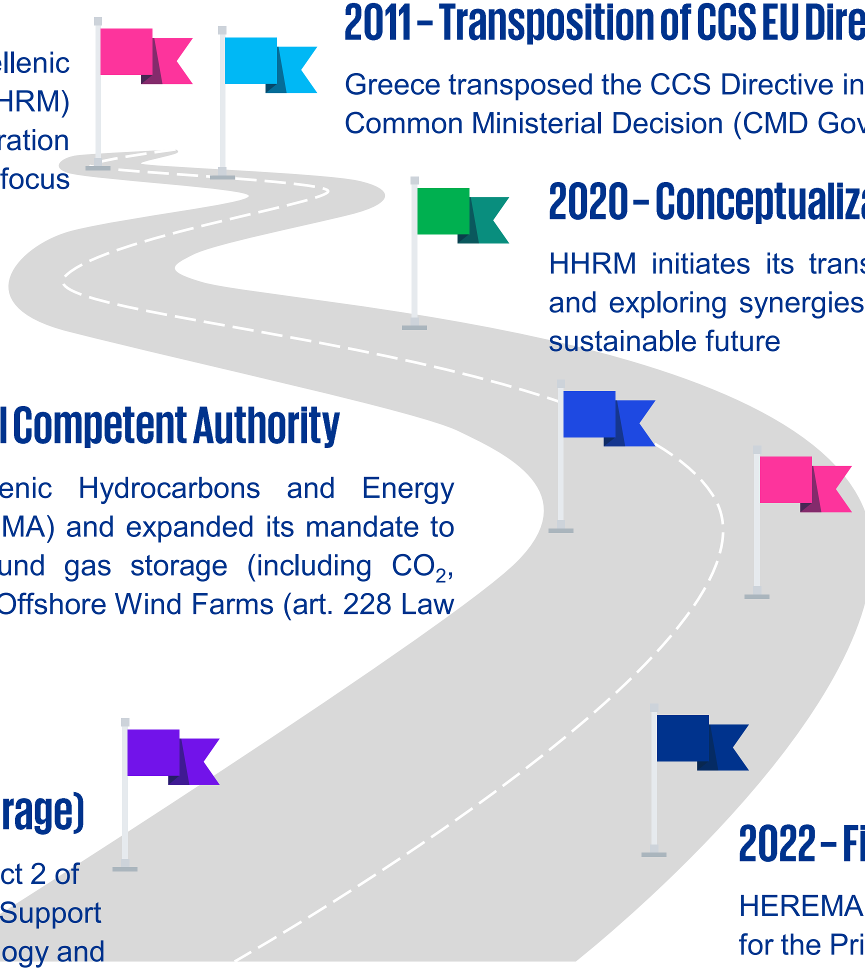
USA
$12 billion
public investments related to CCS

Netherlands
6 CCS by 2025
Denmark
CCS subsidies
UK 4 clusters by 2030

in Norway
Longship
80% CAPEX & large % OPEX committed

HEREMA

The CCS roadmap in Greece



2011 – Establishment of HHRM

With the Greek State as its sole shareholder, Hellenic Hydrocarbon Resources Management S.A. (HHRM) manages the national interests related to the exploration and production of hydrocarbons, with a particular focus on natural gas

2011 – Transposition of CCS EU Directive

Greece transposed the CCS Directive into National Law through Common Ministerial Decision (CMD Government Gazette B 2516_2011)

2020 – Conceptualization of HHRM Transformation Strategy

HHRM initiates its transformation by strengthening its ESG standards and exploring synergies among various energy sectors towards a more sustainable future

2022 – HEREMA CCS National Competent Authority

HHRM is rebranded to Hellenic Hydrocarbons and Energy Resources Management (HEREMA) and expanded its mandate to include permitting of underground gas storage (including CO_2, natural gas, and hydrogen) and Offshore Wind Farms (art. 228 Law 4920/2022)

2022 – Legislative provision for CO_2 storage to E&P license holders

Entities that hold a right or a license to explore and exploit hydrocarbons in a certain area have the right to apply for CO_2 storage license in that same area, if proven suitable.

2023 – HEREMA Implementation Agent for RRF (carbon storage)

HEREMA was designated as the implementation agent of Sub-project 2 of Axis 3-1.3 "Transition to a green and sustainable transport system - Support green manufacturing and transport - development of capture technology and de- carbon dioxide storage"

2022 – First exploration permit for CO_2 storage

HEREMA awards the first exploration license to Energean for the Prinos field (Government Gazette B 5247_2022)

CCS Regulatory Framework and Overall Structure

White Paper Presentation

24 April 2023

Contents

01

Introduction to the White Paper

Dimitris Papakanellou
Partner, KPMG

HEREMA

KPMG

EU climate targets and policies

The Paris Agreement is a legally binding treaty on climate change adopted by 196 parties at COP21 in Paris on December 12, 2015, and came into effect on November 4, 2016.

Combat climate change and adapt to its effects

01 Limit **global warming to below 2°C, preferably 1.5°C**, compared to pre-industrial levels.

02 The Paris Agreement is a significant milestone in the global effort to combat climate change because it is **the first binding agreement** that unites all nations in a common cause to undertake ambitious efforts to mitigate and adapt to its effects.

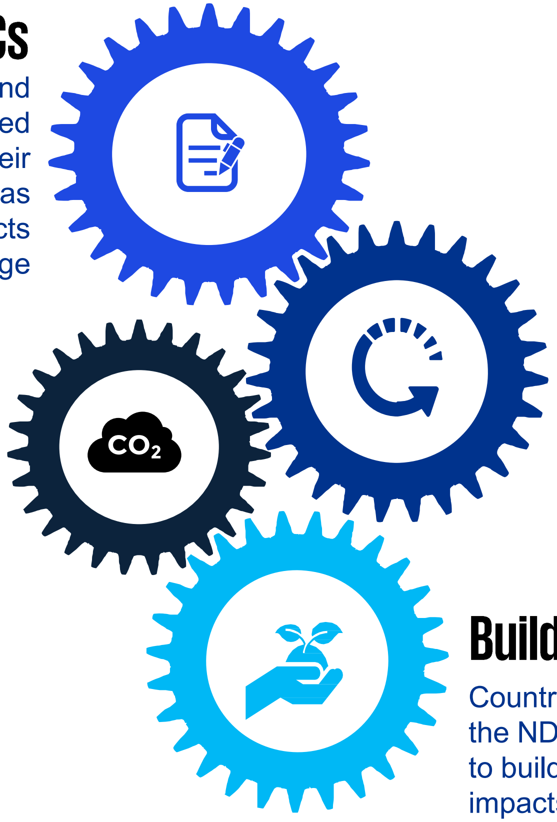
03 To achieve the long-term temperature goal, countries aim **to peak global greenhouse gas emissions as soon as possible** and achieve a climate-neutral world by mid-century

NDCs

Countries are required to submit and communicate their nationally determined contributions (NDCs), which outline their plans for reducing greenhouse gas emissions and adapting to the impacts of climate change

GHG emission reduction

In their NDCs, countries communicate actions they will take to reduce their Greenhouse Gas emissions in order to reach the goals of the Paris Agreement



5 year cycles

The Paris Agreement works on a 5- year cycle of increasingly ambitious climate actions carried out by countries

Building resilience

Countries also communicate in the NDCs actions they will take to build resilience to adapt to the impacts of rising temperatures

The European Green Deal

The most up-to-date approach to the green transition in the European Union (EU) is outlined in the European Green Deal, which is the EU's flagship policy framework for achieving climate neutrality and a sustainable economy by 2050. The European Green Deal was introduced in 2019 and is continuously updated as new policies and initiatives are developed.

Climate Neutrality	The EU aims to achieve climate neutrality by 2050, meaning that the EU's greenhouse gas emissions will be balanced by carbon removal or offsetting measures.
Energy Transition	The EU aims to transition to a clean energy system by increasing the share of renewable energy, improving energy efficiency, and phasing out the use of fossil fuels. The EU has set a target of producing 40% of its energy from renewable sources by 2030.
Circular Economy	The EU aims to transition to a circular economy, where waste is minimized and resources are conserved and reused. This includes measures such as promoting recycling, reducing waste, and designing products for durability and reuse.
Just Transition	The EU recognizes that the green transition must be socially and economically just, ensuring that no communities or individuals are left behind. This includes measures such as providing support for workers in industries that are transitioning away from fossil fuels and promoting the development of new green jobs.
International Cooperations	The EU recognizes the need for global cooperation and collaboration to achieve the necessary emissions reductions, and is working to build partnerships with other countries and international organizations to support the green transition.

The Greek National Energy & Climate Plan (NECP)

The Greek NECP outlines the country's strategy to achieve its energy and climate goals by 2030, aligned with the EU's 2030 climate and energy framework to reduce greenhouse gas emissions by at least 40% (55%) below 1990 levels.

By 2030, the aim is to increase the share of renewable energy in the final energy consumption to 35% (45%). This will be accomplished through the deployment of:

- wind and solar power
- Other renewable sources such as geothermal, hydropower, and biomass.

The plan aims to promote low-emission vehicles, such as electric cars and alternative fuels, to reduce greenhouse gas emissions from the transport sector

The plan supports research and innovation in energy and climate, with a focus on developing new technologies and solutions that can help Greece achieve its energy and climate goals

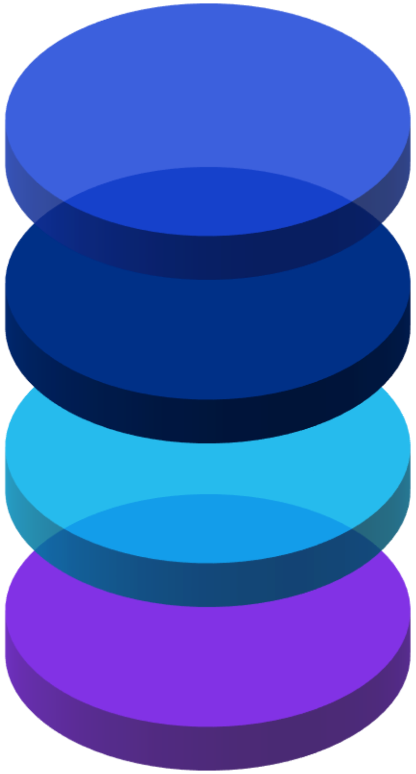
The goal is to increase energy efficiency in buildings, transport, and industry by at least 32.5% by 2030, compared to 2007 levels

Greece aims to build resilience to the impacts of climate change, such as increasing the use of water resources, promoting sustainable land use practices and protecting biodiversity.

Note: Figures in parenthesis () refer to the expected revised targets according to initial drafts of the updated Greek NECP

Reaching Net Zero is virtually impossible without CCS

CCS technologies is expected to contribute to clean energy transitions in several ways:



01

Tackling emissions from existing energy infrastructure

CCS can be retrofitted to existing power and industrial plants that could otherwise emit 600 billion tons of CO_2 over the next five decades – almost 17 years' worth of current annual emissions

02

A solution for some of the most challenging emissions

CCS is one of the most suitable technologies for deep emissions reductions from several industries such as cement production. It is also considered as one of the most cost-effective approaches in many regions to curb emissions in iron and steel and chemicals manufacturing

03

A cost-effective pathway for low-carbon hydrogen production

CCS can support a rapid scaling up of low-carbon hydrogen production to meet current and future demand from new applications in transport, industry and buildings

04

Removing carbon from the atmosphere

For emissions that cannot be avoided or reduced directly, CCS underpins an important technological approach for removing carbon and delivering a net-zero energy system

Source: IEA, 2020, Energy Technology Perspectives: Special Report on CCUS – CCUS in clean energy transitions

Structure of the Whitepaper

Global status of CCS

- EU climate targets and policies
- What is CCS and how does it work?
- What is the current status of globally and in Europe?
- Focus on major operational or under development projects globally
- The status in Greece and the role of HEREMA

Legal framework

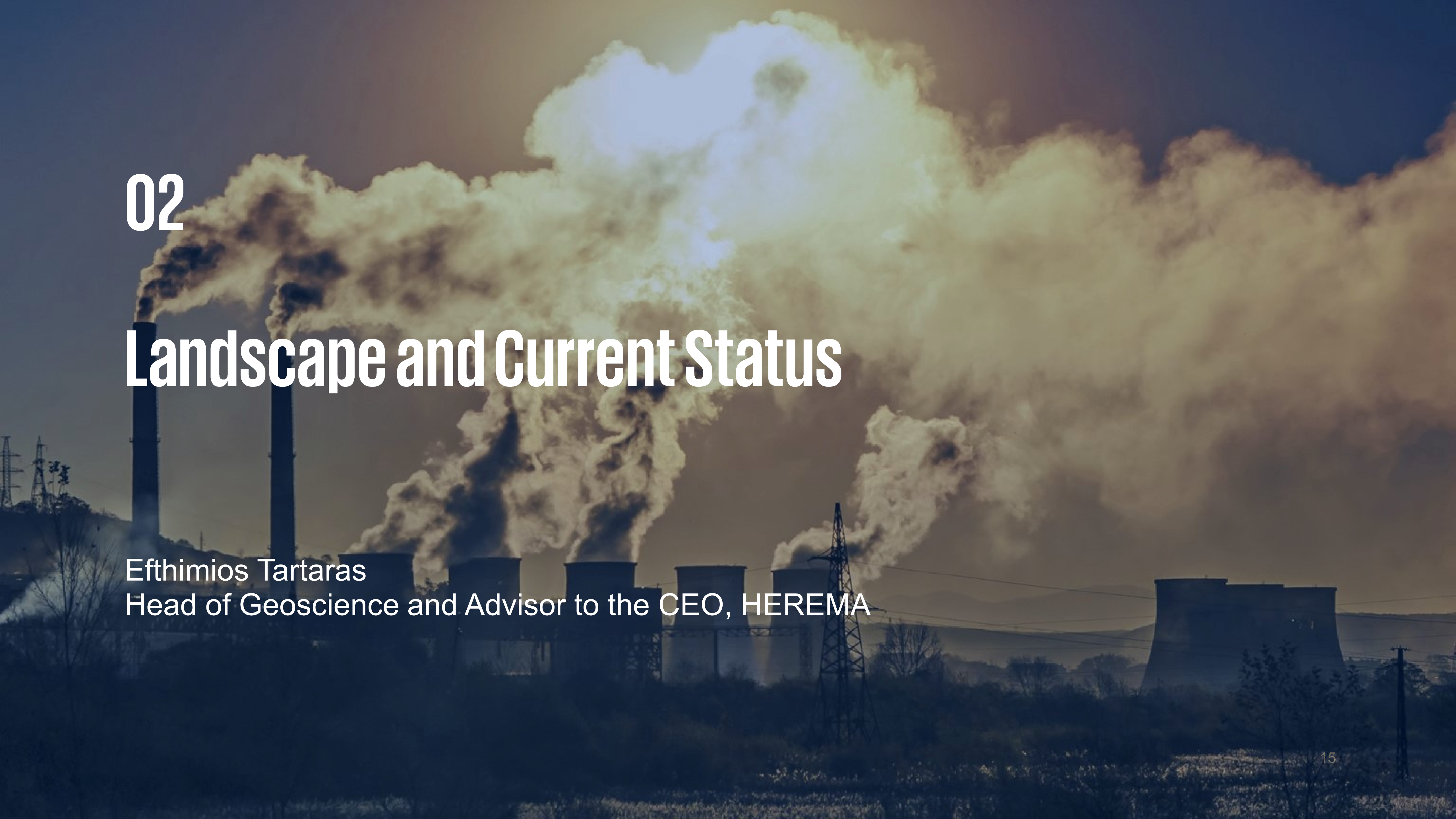
- Overview on EU Law: the CCS Directive
- Presentation of the legal framework in selected EU countries
- The Greek legislation: transposition of the CCS Directive and other key decisions and acts
- Gap analysis between Greece and the prementioned EU countries

Revenue models

- Identification of key challenges and risks related to CCS value chain
- Different business/ revenue models used in the capture as well as T&S phases
- Comparison and scoring between the different models
- Potential funding sources

The way forward

- Key conclusions from the detailed analysis of the first 3 parts of the study
- What are the most important issues that need to be addressed with priority?
- Which business/ revenue models seem to be more suitable?

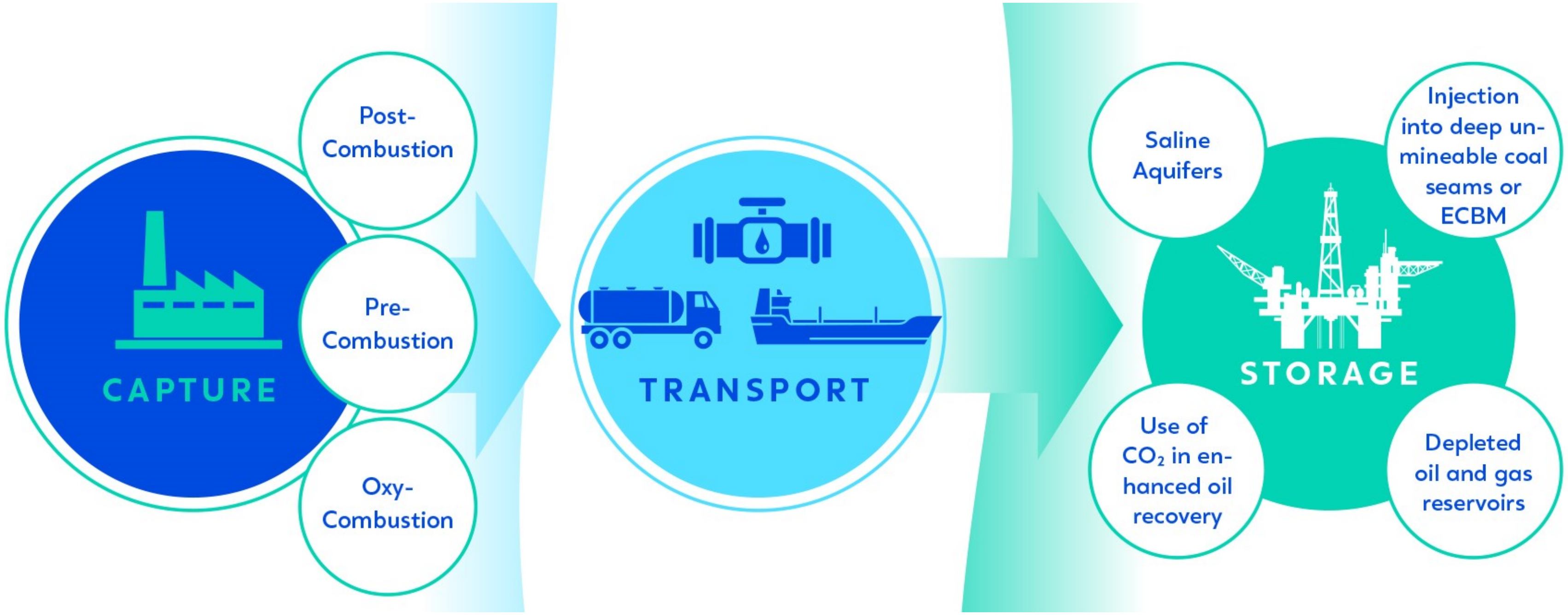


02

Landscape and Current Status

Efthimios Tartaras
Head of Geoscience and Advisor to the CEO, HEREMA

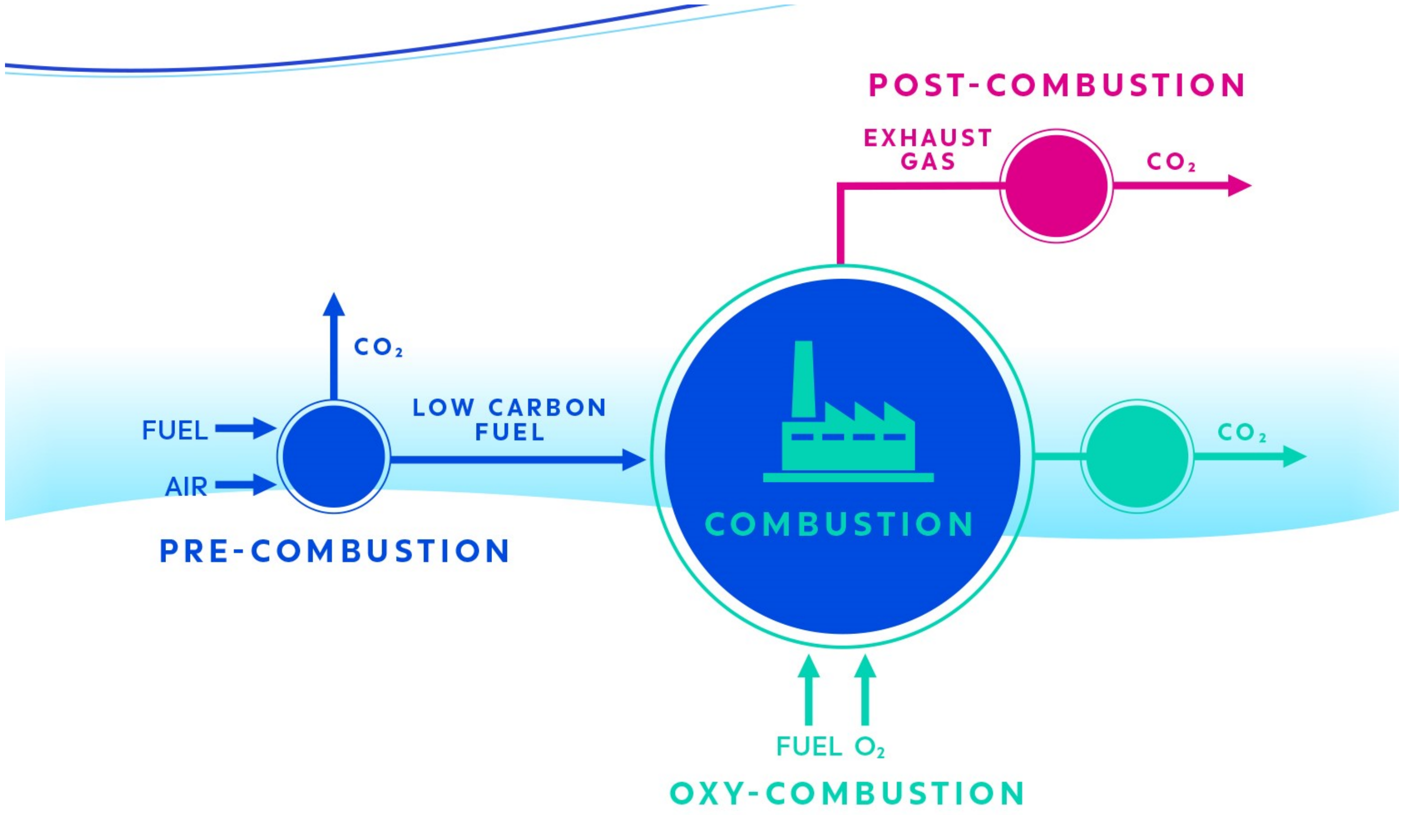
CCS Technology & Value Chain



01 CCS is crucial in mitigating climate change as it **captures and securely stores CO_2 emissions from hard-to-abate industries**, limiting their release into the atmosphere. Being a mature technology, CCS can facilitate the decarbonization of heavy-emitting industrial sectors.

02 CCS will play a critical role in **the development of a hydrogen economy**, enabling the production of blue hydrogen from natural gas with carbon capture and storage. Therefore, CCS projects will be essential in developing a long-term hydrogen strategy.

CCS Value Chain : Capture



Capture Technologies

- **Pre-combustion:** A process that turns a primary fuel, such as natural gas, into a type of gas called syngas. This gas can then be used to produce energy while separating out carbon dioxide.

- **Post-combustion:** A process that captures carbon dioxide emissions after a fuel has been burned to produce energy. This can help reduce carbon emissions.

- **Oxy-combustion:** A process that burns a fuel with oxygen instead of air, resulting in a gas that contains a lot of water vapor and carbon dioxide

CCS Value Chain : Transportation

Pipeline Transport

— Technology is available and mature : USA – about 2000 miles of CO_2 pipelines

Ship Transport

— Ship transport could make the economics consideration of CO_2 transport more flexible (Mix and Match with pipeline transport)

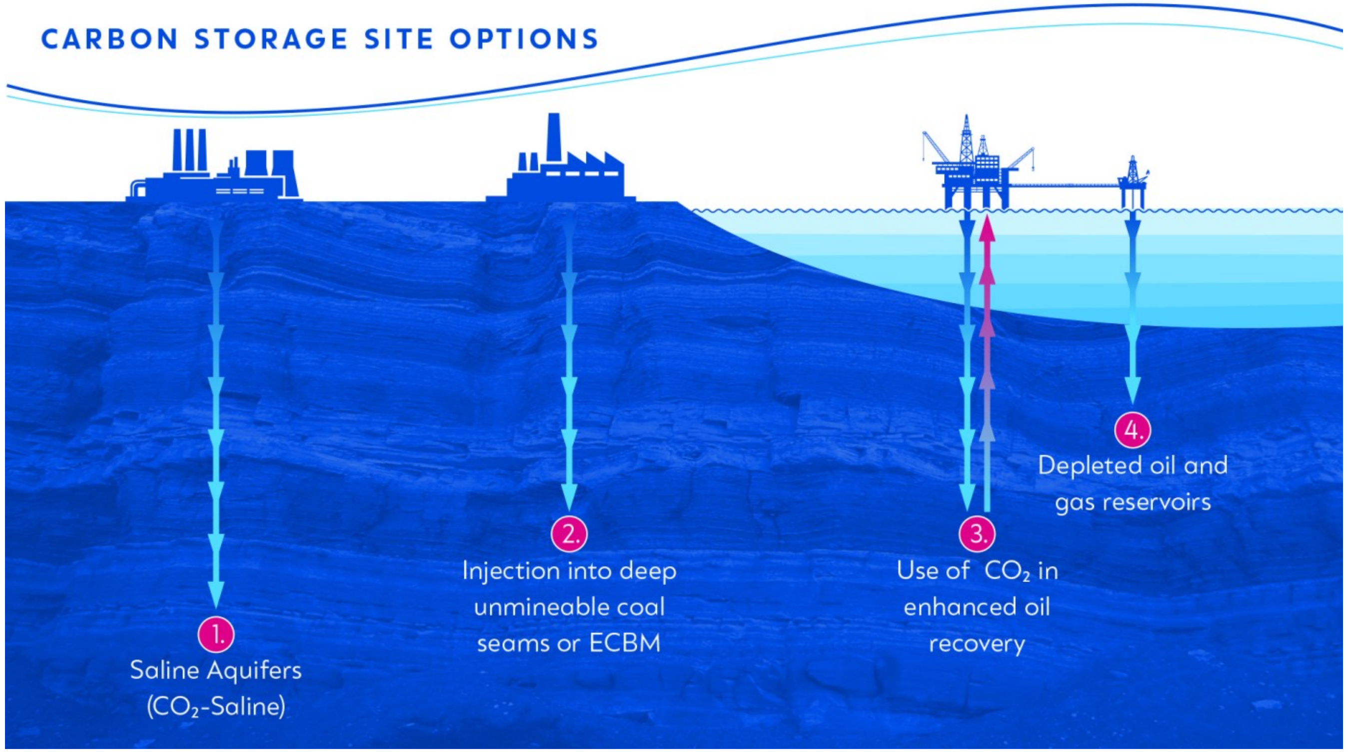
— Transport of CO_2 by ship in smaller volumes (i.e. <1500m^3) is currently practiced in the industry

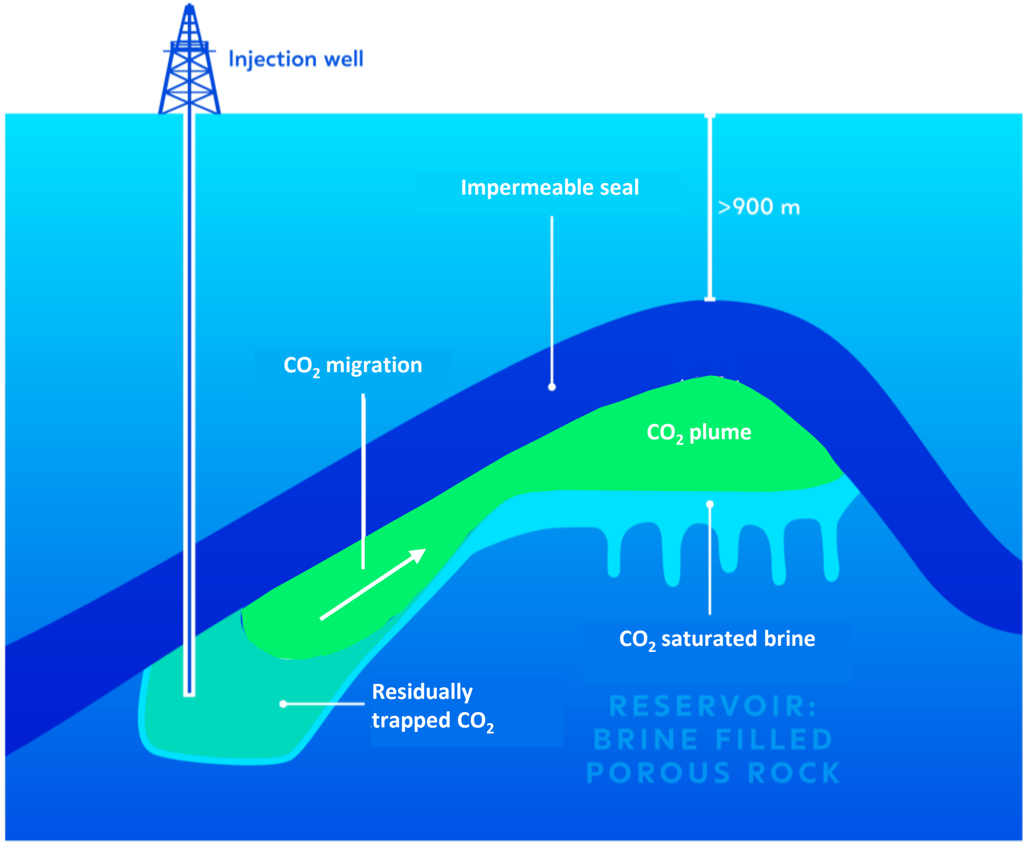
— Shipping at lower pressure is preferred whereas scaling up LCO_2 carbon carriers is required: 7k-70k m^3

Quality specification for liquified CO_2 in the Longship Project

Component	Concentration, ppm (mol)
Water (H_2O)	≤30
Oxygen (O_2)	≤10
Sulfur oxides (SOx)	≤10
Nitric oxide/Nitrogen dioxide (NOx)	≤10
Hydrogen sulphide (H_2S)	≤9
Carbon monoxide (CO)	≤100
Amine	≤10
Ammonia (NH_3)	≤10
Hydrogen (H_2)	≤50
Formaldehyde	≤20
Acetaldehyde	≤20
Mercury (Hg)	≤0.03
Cadmium (Cd), Thalium, (TI)	Sum ≤0.03

CCS Value Chain : Storage





Some interesting facts about CCS development in 2022

244 Mtpa

…capacity of CCS projects in development (late 2022)

New CCS projects have been announced each month in 2022

- **196 projects** in the CCS facilities pipeline (September 2022)
- an **impressive 44% growth** in the number of CCS facilities since the Global Status of CCS 2021 report

Source: Global CCS report 2022

North America

- **The US** Infrastructure Investment and Jobs Act **provides over US$12 billion for CCS** and related activities.
- The Inflation Reduction Act in **the US enhances the 45Q tax credit** to accelerate CCS deployment.
- **Canada introduces a US$2 billion tax credit** for CCS projects.
- Saskatchewan **extends its 20% tax credit** under the Oil Infrastructure Investment Program to CO_2-carrying pipelines.

Europe

- **EU Innovation Fund**: **4** out of 7 **selected projects were CCS projects**.
- **Netherlands**: **€2.2 billion in state+EU funding** approved **for CCS projects**.
- **Denmark**: has announced **€5 billion subsidies for CCS**.
- **Norway**: announced US$100 million to support 3 blue hydrogen projects. **Will cover 80% of investment cost for Longship CCS project**.
- **UK**: CCUS Investor Roadmap announced. **Public funding provided for the main CCS projects**.

Asia-Pacific

- **Australia**: announced additional acreage for CO_2 storage, carbon credit method, and **A$200 (US$135) million funding for CCS** projects.
- **Japan:** Sixth Strategic Energy Plan **highlights CCS as a prominent solution for achieving net-zero emissions** by 2050.
- **China** has issued **over 10 national policies and guidelines promoting CCS.**

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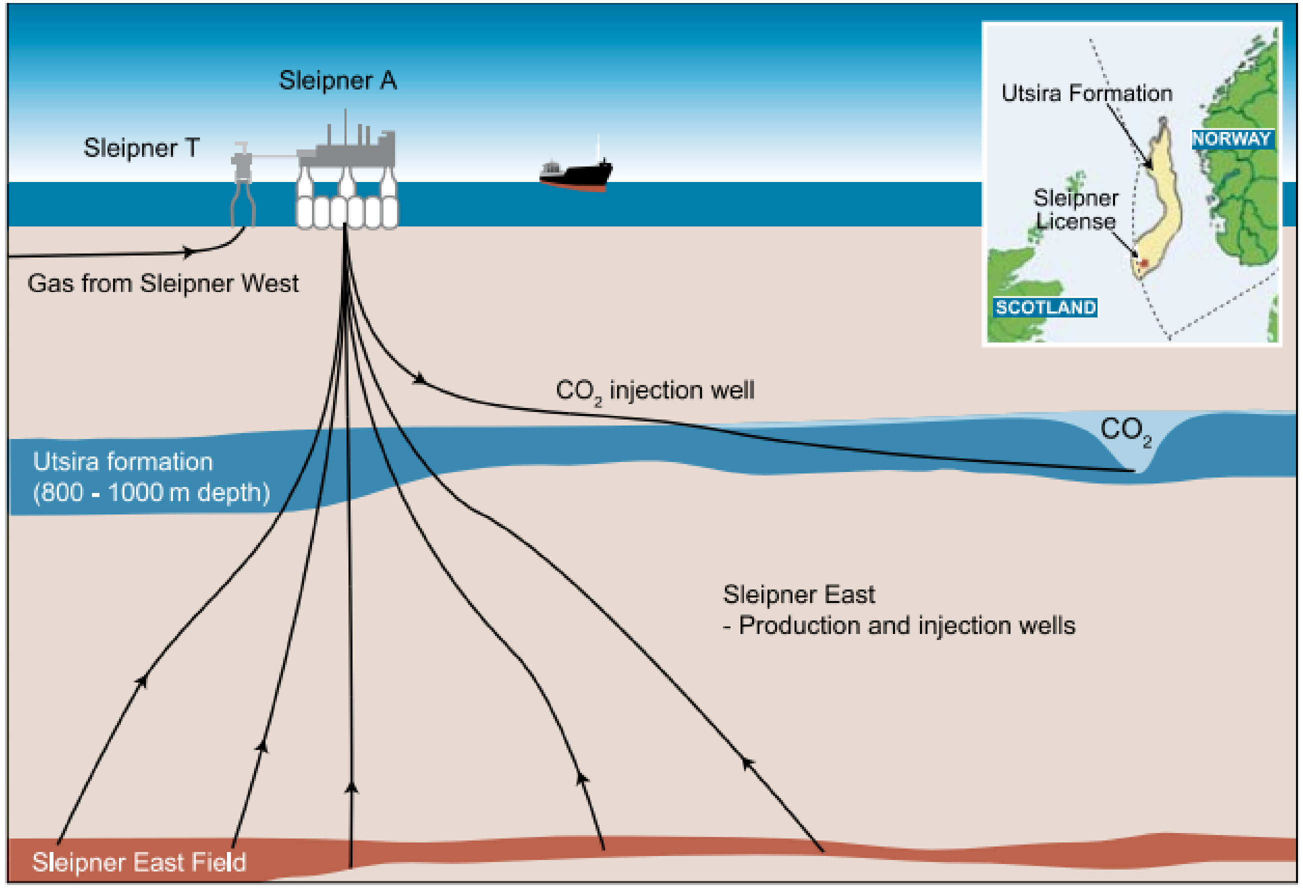
Case Study: Sleipner - Norway

- **The world's first commercial CO_2 storage project, in continuous operation since 1996**.
- In order to reduce the CO_2 content in the produced Sleipner West natural gas from the original 9% down to (a maximum of) 2.5%, the **CO_2 is separated at the platform from the produced natural gas before being injected into Utsira Sand formation**, a relatively shallow saline aquifer
- The Sleipner CCS project has been highly successful, with **more than 20 million tonnes of CO_2 stored beneath the seabed** since its inception, and has been a model for other CCS projects around the world, demonstrating that CCS is a viable technology.

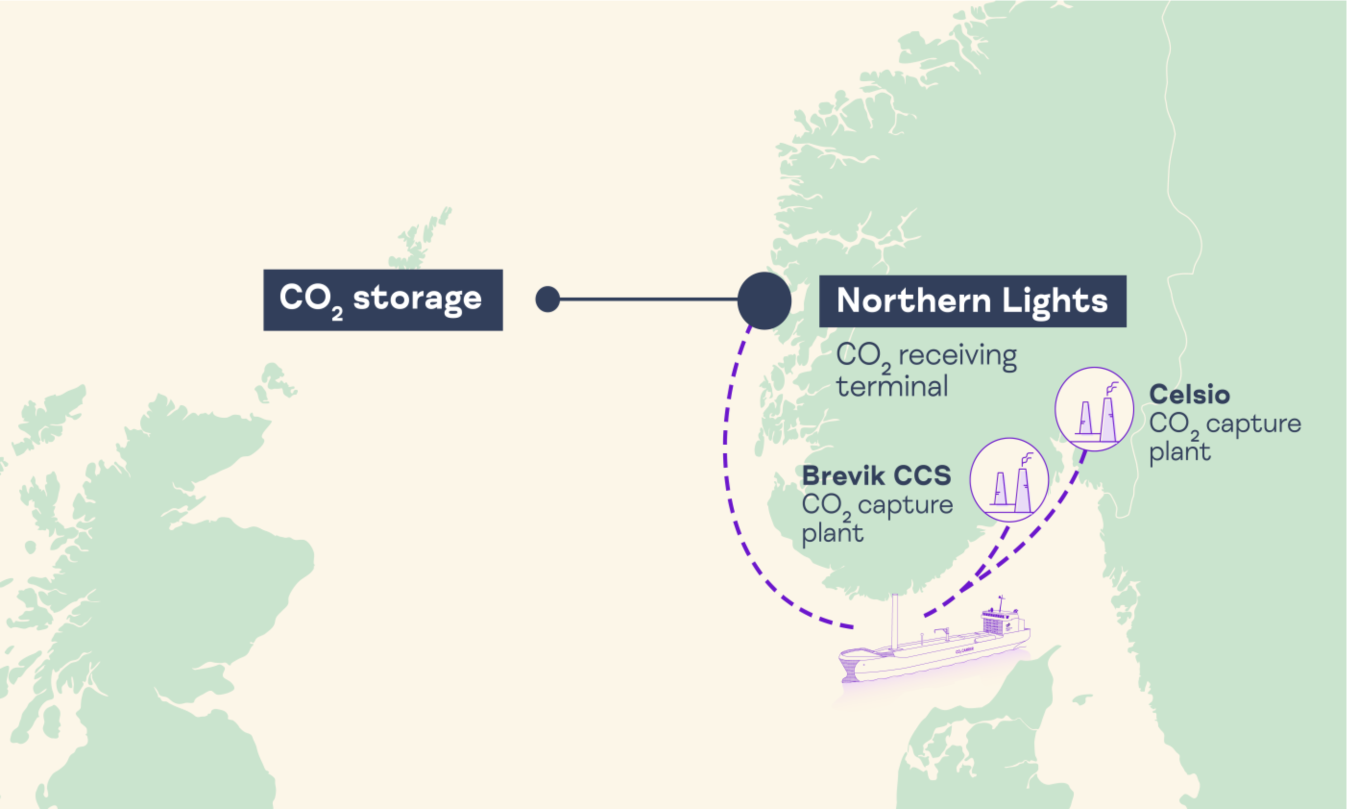


Case Study: Longship - Norway

— The Longship project will capture CO_2 from a cement factory and from a waste to energy plant in the Oslo area (**1.5 Mtpa for the next 25 years**).

— The captured **CO_2 will be shipped to Norway's west coast**, from where **it will be transported offshore** (approx. 100km) **through a pipeline** to be permanently stored in a saline aquifer formation.

— The **transport and storage part** of the project (**"Northern Lights")**, is designed to take additional volumes in the future from other capture sites (**2nd project phase is expected at 5 Mtpa**).



Source: Norwegian Ministry of Petroleum and Energy

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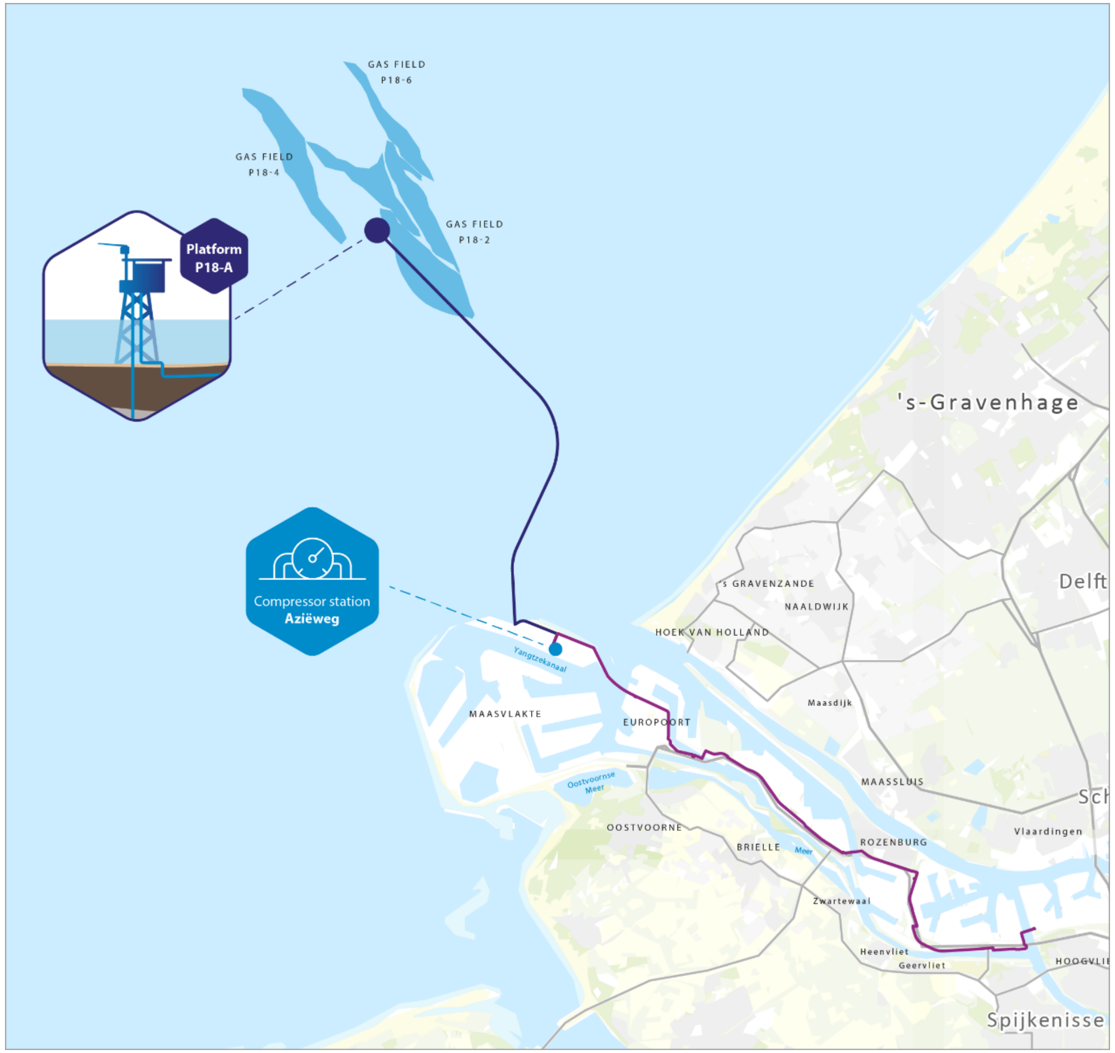
Case Study: Porthos - Netherlands

- The Porthos CCS project aims to capture and store up to 2.5 Mtpa of CO_2 from industrial facilities in the Rotterdam port area. **A collective pipeline will collect the CO_2 which will then be pressurized in a compressor station and transported through an offshore pipeline to a platform in the North Sea**, approximately 20 km off the coast.

- The project is expected to play an important role in **helping the Netherlands achieve** its climate targets, which include **reducing greenhouse gas emissions by 49%** by 2030 compared to 1990 levels.

- Porthos is currently mainly focusing on the permit procedures and technical details before a final investment decision (FID) can be taken in 2023. **It is expected that the system will be operational by 2026**.



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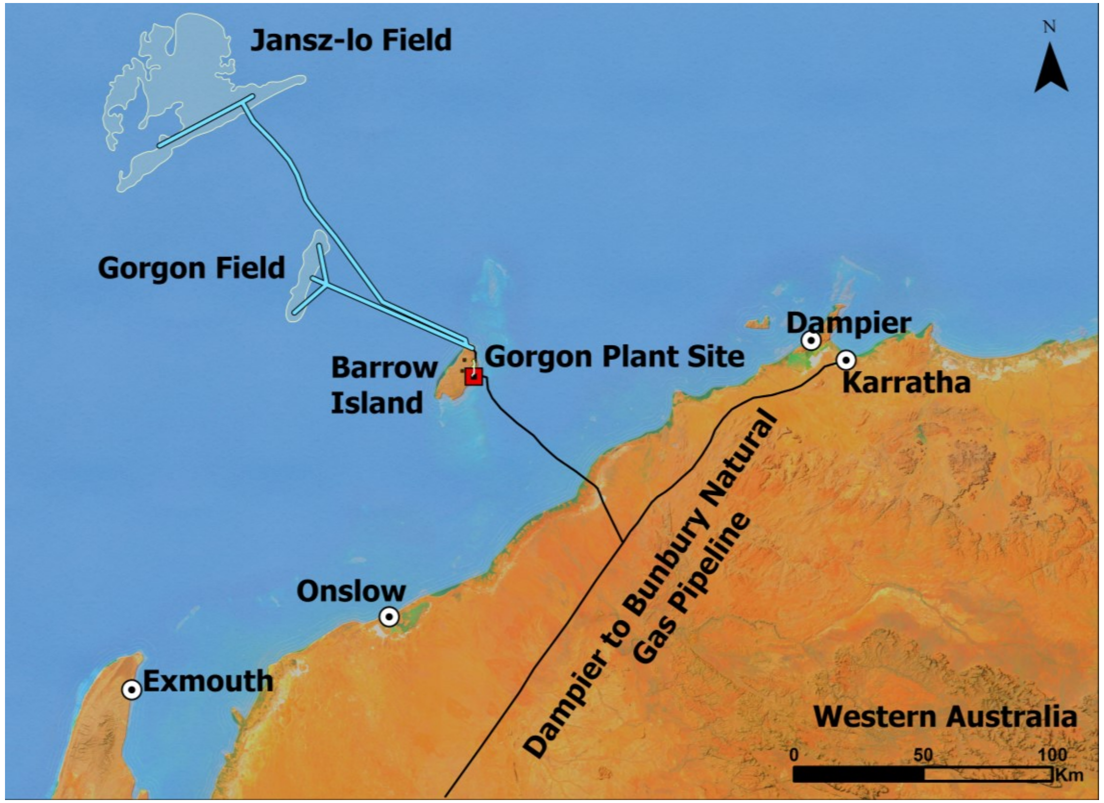
Case Study: Gorgon - Australia

- The Gorgon Project is one of the world's largest natural gas projects. With total production averaging 2.1 bcf/day (~21 bcm annually) of natural gas and 15,000 barrels/day of condensate in 2020, the Gorgon Project will continue to be an important pillar of the Australian economy for decades to come.

- The CO_2 Injection Project involves the design, construction and operation of facilities **to inject and store CO_2 sourced from the gas processing facility into Dupuy saline aquifer formation** located at more than two kilometers beneath Barrow Island.

- This is expected to reduce greenhouse gas emission from the Gorgon Project by **approximately 40%, or more than 100 million tonnes** over the life of the injection project.

- The project is in Operational phase since 2019 and **more than 7 million tonnes of CO_2 have been injected by July 2022**

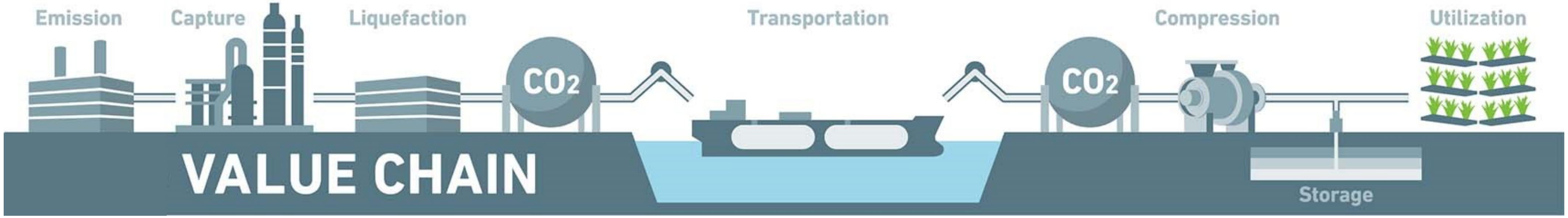


03

Legal framework

Theodosis Tompras
Partner/Lawyer, KPMG

The Role of Regulations in the Market Value Chain : Objective



Maturity

Mainly technology & infrastructure driven

Momentum

Transition into a Green Economy, Demand & Supply side momentum,

Regulations

Regulatory framework maturity, simplicity, clarity, certainty

Goal: Cost Competitiveness

Inherent cost opportunity: CO_2 certificates cost vs CCS cost

The working map for the Legal Framework

EU Law: CCS Directive

The Directive (June 2009) establishes a regulatory framework for permitting the exploration of potential CO_2 storage sites, the actual storage operation and post closure obligations. The CCS Directive focuses on the storage part of the CCS chain.

National Regulations: Norway, Netherlands, Spain, Italy and the UK

Most of the countries examined simply adopt and incorporate the text of the Directive without significant changes. The Directive deliberately leaves room for initiatives by national legislators, taking into account the characteristics and specificities of each region.

CCS Development in Greece and National Legislations

In Greece, the Ministerial Decision 48416/2037/E.103/2011 (Government Gazette B' 2516/2011), as amended, transposed the CCS Directive 2009/31/EC into Greek law. The decision largely follows in the most part the philosophy of the CCS Directive.

Gap Analysis and Best Practices

The resulting statute in Greece is a full, simple and uncomplicated transposition of the Directive. There is no "gold-plating", but slight divergences do occur.

Moving Forward: Actions Needed

Slight divergences have been noted in the Greek transposition, with the main topics to be revisited being the need for a secondary legislation, a carbon storage secondary market, the elimination of uncertainties and reduction of risks.

The CCS Directive : Overview

The main objective of the EU Directive (2009/31/EC) on the geological storage of CO_2 is to regulate the safe and environmentally sound storage of captured CO_2

Site selection, exploration and storage permits

The Directive sets out the criteria for the selection and characterization of storage sites and the issuance of exploration and storage permits. These criteria analyze the application process, conditions, content, as well as the requirement for the Commission to review permits, and modifications and withdrawal of permits. Some of the topics covered are:

– Site selection and characterization
– Exploration and Storage permits
– Operation, closure and post-closure obligations
– Third-party access

Implementation of the CCS Directive

The European Commission works to ensure the coherent implementation of the CCS Directive throughout the EU. This includes reporting on the implementation, facilitating exchanges between the competent authorities, publishing guidance documents, and adopting Commission Opinions on draft storage permits. Some of the topics covered are:

– Reports on the implementation of the CCS Directive
– Information Exchange Group
– Guidance Documents
– Commission review of draft storage permits

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The CCS Directive : Guidance Documents

Four (4) guidance documents were published in 2010 that:

- provide an overall methodological approach for implementing the key provisions of the CCS Directive and
- help ensure environmentally safe geological storage of CO_2 across the EU.

Guidance Document 1: CO_2 Storage Life Cycle Risk Management Framework	Outlines CO_2 storage life cycle risk management framework addressing different geological options for CO_2 storage as well as different storage risks (geological and manmade leakage pathways
Guidance Document 2: Characterization of the Storage Complex, CO_2 stream composition, monitoring and corrective measures	Examines in more detail issues such as the characterization of the storage complex. Selecting the appropriate storage site ensures that the stored CO_2 will be completely and permanently contained. Also, CO_2 stream composition, monitoring and corrective measures are being examined.
Guidance Document 3: Criteria for Transfer of Responsibility to the Competent Authority	The criteria for transfer of responsibility to the Member State are addressed by the third guidance document, putting emphasis on the minimum period for post-closure monitoring, site sealing and transfer of data.
Guidance Document 4: Article 19 Financial Security and Article 20 Financial Mechanism	Provides an overview of what is considered "financial security", which obligations are covered by it and in general, how to establish and maintain it. In respect of the amount of financial security, it discusses the basic principles, the obligations covered and lastly, the acceptable instruments for it

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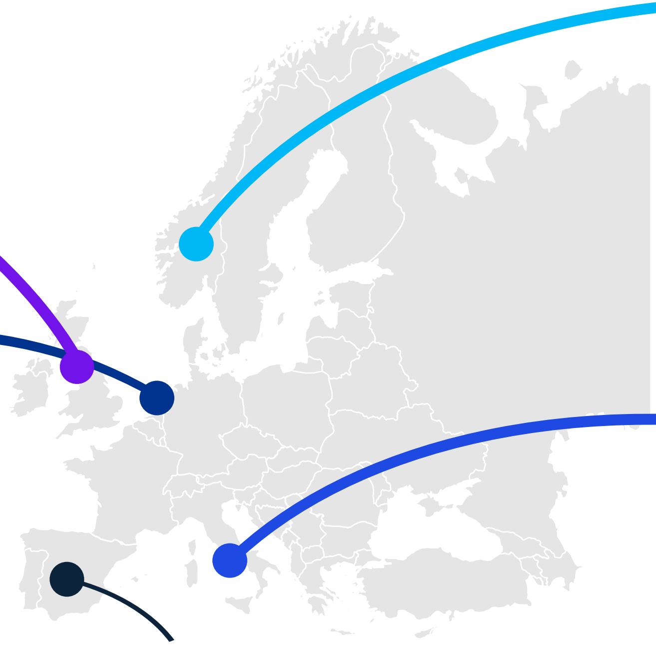
Analysis of National legislation: Selected countries

A detailed analysis for each country has been performed. **11 different parameters have been examined in each country**: Responsible parties, Implementation, Scope, Ownership, Permitting System, Licensing System, Environmental regulation, Monitoring / Inspections, Responsible party and scope of liability, Shutdown and post-operation, Comments / Review of the implementation regulations



UK

In 2011, the Storage of Carbon Dioxide (Amendment of the Energy Act 2008) Regulations extended the licensing regime to include the onshore and the adjacent internal waters in the UK, apart from just offshore CCS. The Crown Estate holds the territorial seabed rights for CO2 transportation and storage within the UK Exclusive Economic Zone (excluding Scotland). CCS activities require an exploration and storage permit.

Netherlands

The CCS Directive has been adopted in the Dutch Mining Act, the Dutch Mining Decree, and the Dutch Mining Regulation. Multiple parties have the opportunity to apply for the same area.

Norway

Under the current regulations, exploration and storage of CO_2 is only allowed on the continental shelf. The resources belong to the state, and any CCS activity requires an exploration permit and an exploitation permit. **Norway is the only country in Europe that has adopted specific provisions on leakage from CO_2 transport pipelines and considers the potential for force majeure.** Norway has also included provisions for CO_2 transportation.

Italy

Geological storage of CO_2 in the Italian territory is permitted in the exclusive economic zone and the continental shelf. An exploration permit and a storage permit are required.

Spain

Geological storage of CO2 is permitted in underground structures, including territorial sea, the exclusive economic zone, and the continental shelf. An exploration and a storage permit are required.

The Greek legislation on CCS

In Greece, the **Ministerial Decision 48416/2037/E.103/2011 (Government Gazette B' 2516/2011)**, as amended, transposed the CCS Directive 2009/31/EC into Greek law. The decision largely follows in the most part the philosophy of the CCS Directive

01 Subject matter and purpose

Intends and seeks to establish rules, measures and procedures for the environmentally safe storage of CO_2

02 Scope

Provides the details regarding areas that storage is permitted and/or forbidden. Additionally, defines the competent authority

03 Exploration permit

The application for the permit shall include data and information demonstrating the necessary technical ability and competence of the exploration body concerned

04 Storage permit

The exploitation of a storage site requires a storage permit, one operator for each storage site and lastly, the prohibition of conflicting uses of that site

Entities that already hold a right or a license to explore and exploit hydrocarbons in a certain area, and who already have sufficient data that prove the eligibility of the area as a storage site, have (they or an associated entity) the right to apply for CO_2 storage license in that same area.

In line with the CCS Directive, withdrawal of a storage permit is foreseen only as a last resort if no other measure is effective.

05 Third party access

Access by the Competent Authority shall be provided in a transparent and non-discriminatory manner determined by taking into account multiple parameters

06 Dispute settlement

A Settlement Committee for the Storage of Carbon Dioxide in Geological Formations is established as an out-of-court body for the rapid resolution of all disputes related to transport networks and storage sites

Even though, the Greek Ministerial Decision has transposed the corresponding provision of the CCS Directive amending the Directive 2000/60/EC in order to allow for CO_2 injection in saline aquifers, the same Ministerial Decision also prohibits storage in underground aquifers. The result is that two opposing provisions coexist, and this leads to confusion. An amendment of the relevant framework is required in order to explicitly allow for CO_2 storage in saline aquifers.

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Legislative targets : Gap Analysis & Next Steps

Legal and regulatory frameworks should address all aspects of the CCS value chain (capture, transport, and storage)

The scale-up of CCS technologies requires an effective legal and regulatory framework to ensure the effective management of CO_2 storage sites and obligations of CCS stakeholders, including relevant authorities, operators, and the public, and to provide clarity and certainty to project developers and their investors.

Secondary Regulation

A first gap identified in the Greek regulatory framework is that the procedure for issuing an exploration permit is not exhaustively defined in the Ministerial Decision. To some extent these issues were addressed in the recent Law 4964/2022, but still the respective piece of legislation (art. 178) provides for a new Ministerial Decision to be issued in order to further detail the respective framework.

Carbon Storage Secondary Market

Another issue is the transferability of the permits/licenses. Other regimes (Italy, Spain, Netherlands) allow under certain conditions and authorizations the transfer of both the exploration and the storage permit. The opportunity to be able to transfer or acquire a permit is an important risk - mitigant and could, therefore, make the investment more attractive.

Eliminate Uncertainties and Reduce Interface Risks

The matter of saline aquifers creates uncertainty. Even though, the Greek Ministerial Decision has transposed the corresponding provision of the CCS Directive amending the Directive 2000/60/EC in order to allow for CO_2 injection in saline aquifers, the same Ministerial Decision also prohibits storage in underground aquifers. The result is that two opposing provisions coexist, and this leads to confusion that should be resolved.

International CO_2 Market

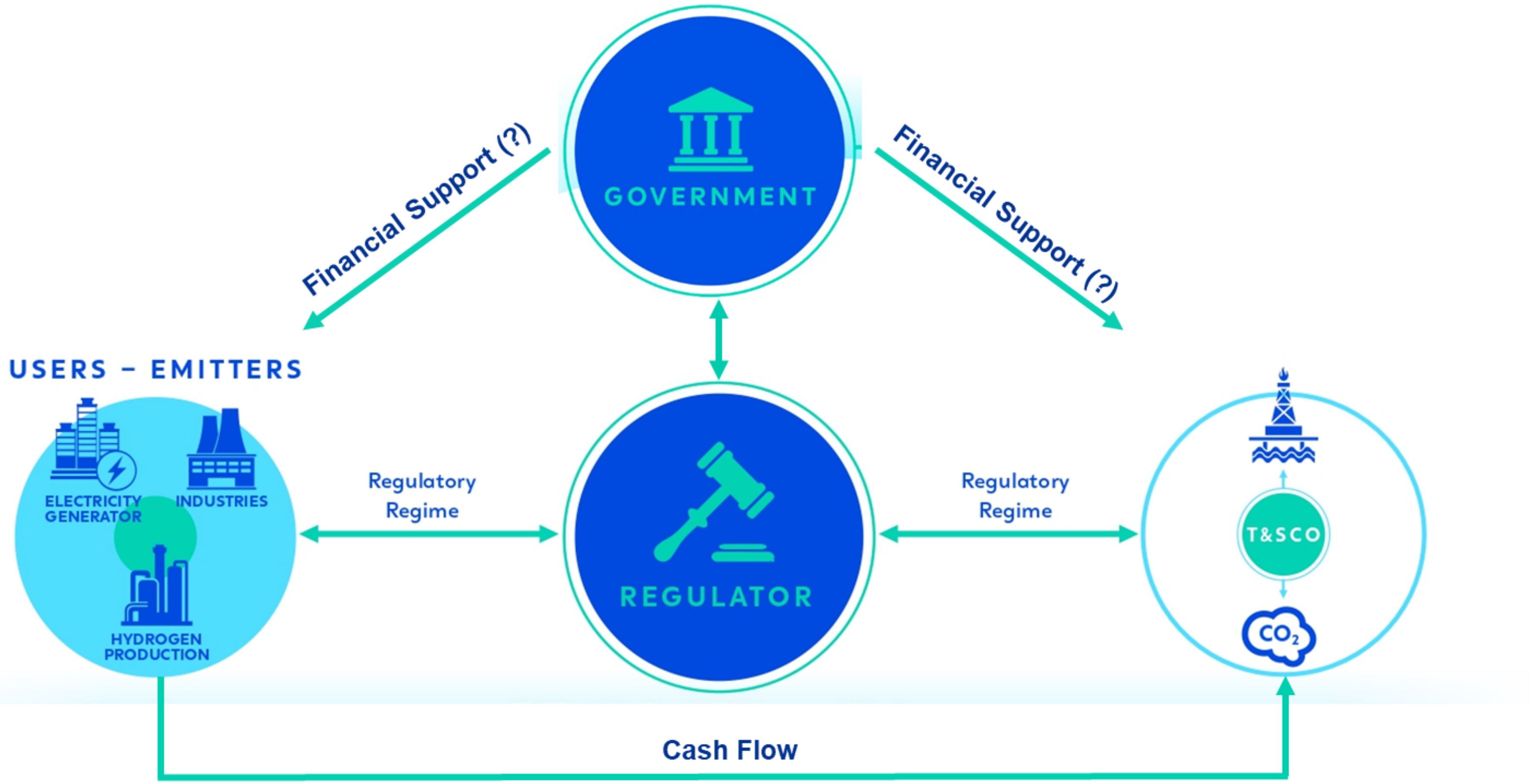
Greece should ratify the London Protocol and the 2009 art. 6 amendment (relevant for CO_2 export and cross-border transport) and provisional application of the amendment.

04

Revenue Models

Ismail Ismail – Project Manager, HEREMA
Giannis Mitsios – Manager, KPMG

The market involves four main participants



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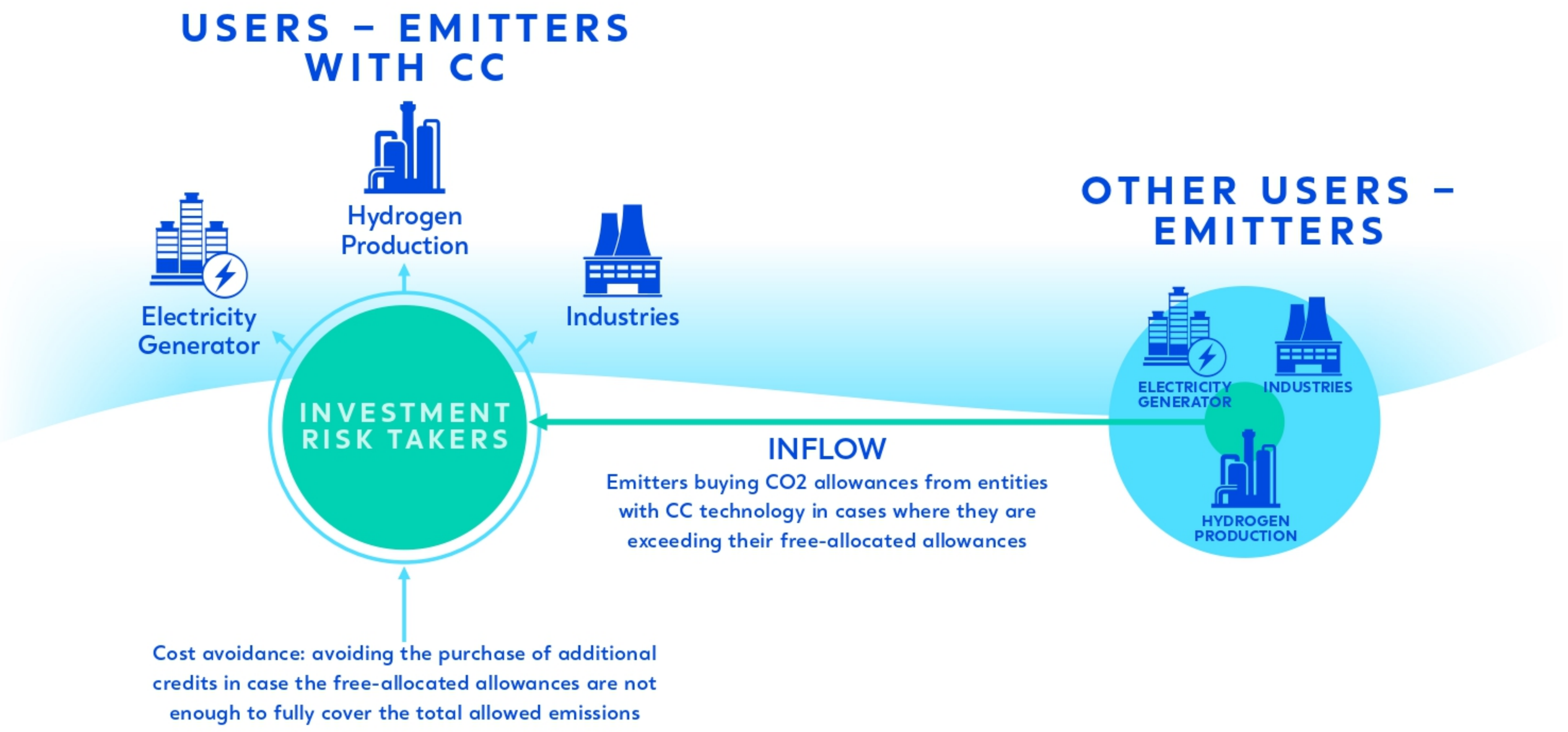
The models

01

ETS

An Emissions Trading System (ETS) is a system in which emitters can trade emission units to meet their targets. These systems have been widely adopted by the EU Member States. The EU ETS is a cornerstone of the EU's climate change policy and a very useful tool to reduce GHG significantly and cost-effectively. Emissions Trading Systems are applied worldwide; however, the EU ETS is the world's first and biggest carbon market.



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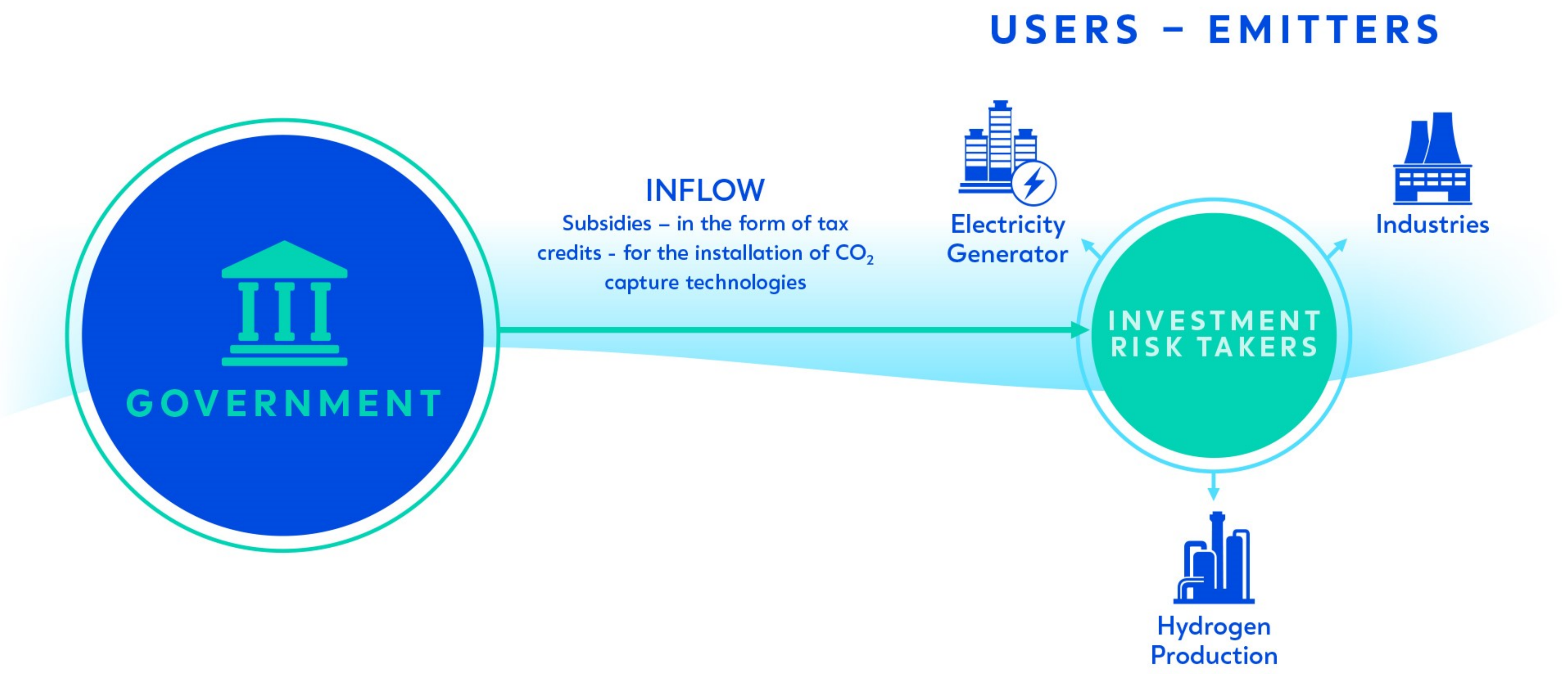
The models

02

Tax Credits

Reductions in the tax liability of a firm when it meets certain requirements. The cost reduction (through taxes) that results from avoided environmental impacts and the simultaneous creation of value for customers and society as a whole is a “win-win” situation. This business model is prevalent in the U.S.

The level of tax credits, contractual certainty, capital availability and the ability to account for CO_2 prices are important determinants for the potential success of the policy.

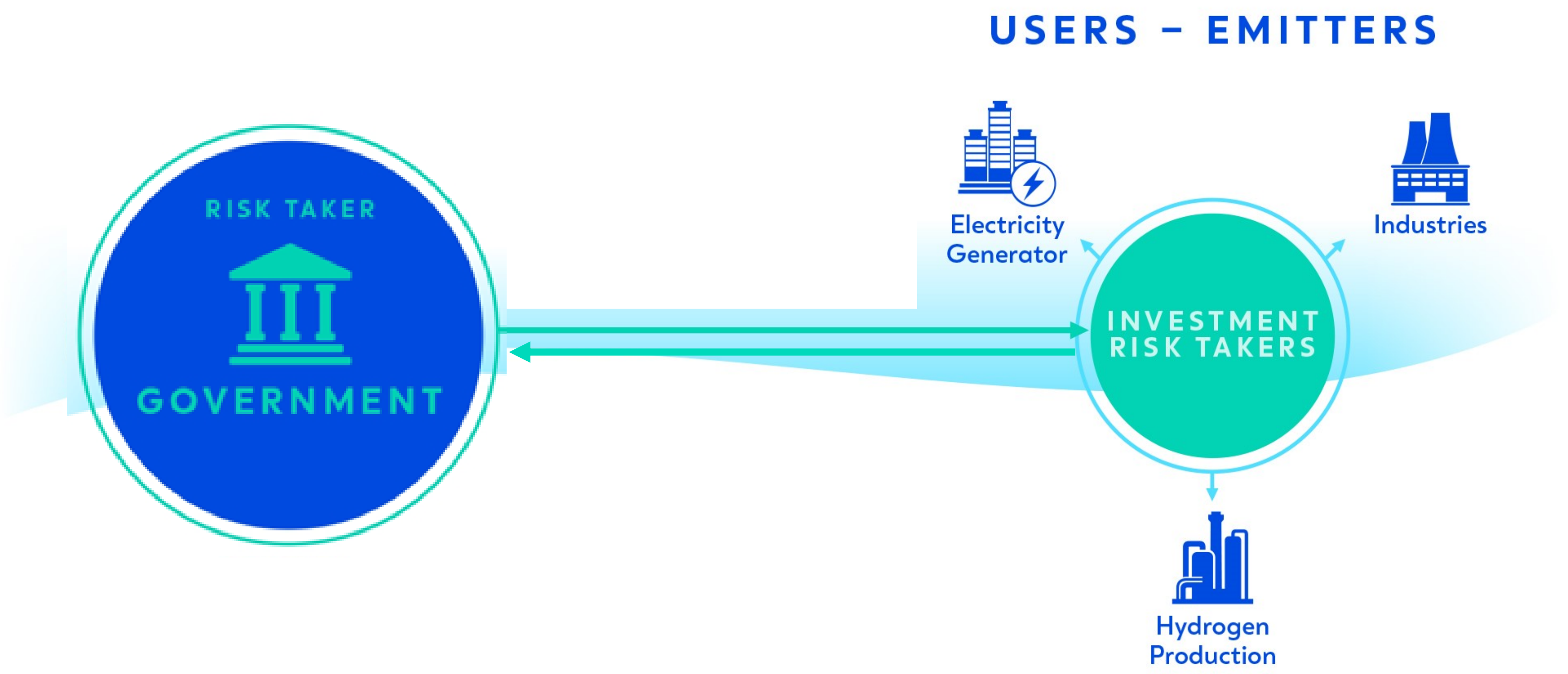


The models

03

Contract for Difference (CfD)

CfD is a contract between two parties (typically a buyer and seller), creating a guaranteed price for a product. **This guaranteed price is called the “strike price” and one party must pay the other the difference between the strike price and the market price of the product.** If the closing trade price is higher than the opening price, then the seller will pay the buyer the difference, and that will be the buyer’s profit. The seller’s profit is the difference that the buyer pays if the closing trade price is lower than the opening price.

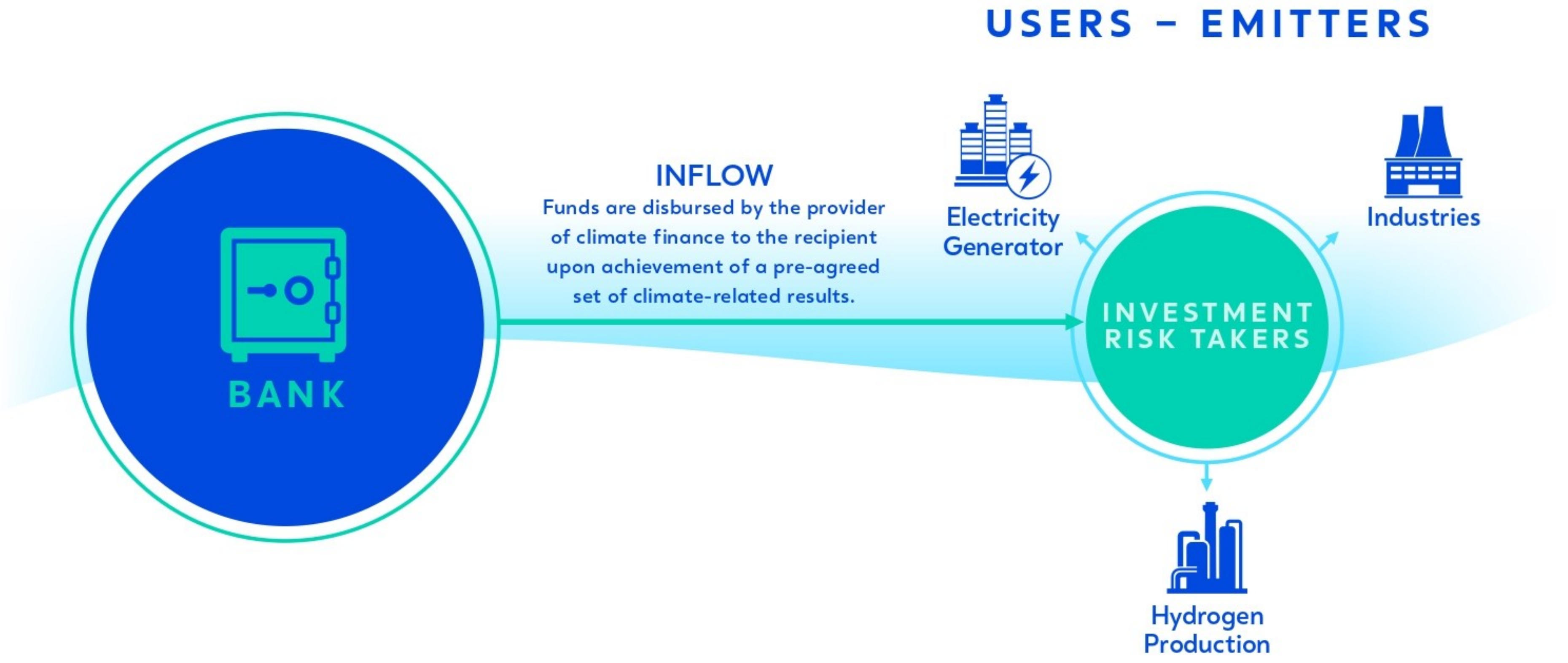


The models

04

Results-Based Climate Finance

RBCF is a form of climate finance where funds are disbursed by the provider of climate finance to the recipient upon achievement of a pre-agreed set of climate-related results. Results in RBCF can be defined as any milestone that indicates progress toward reducing GHG emissions. Payments are made once GHG emission reductions have been verified as real and additional – meaning they would not have occurred otherwise.

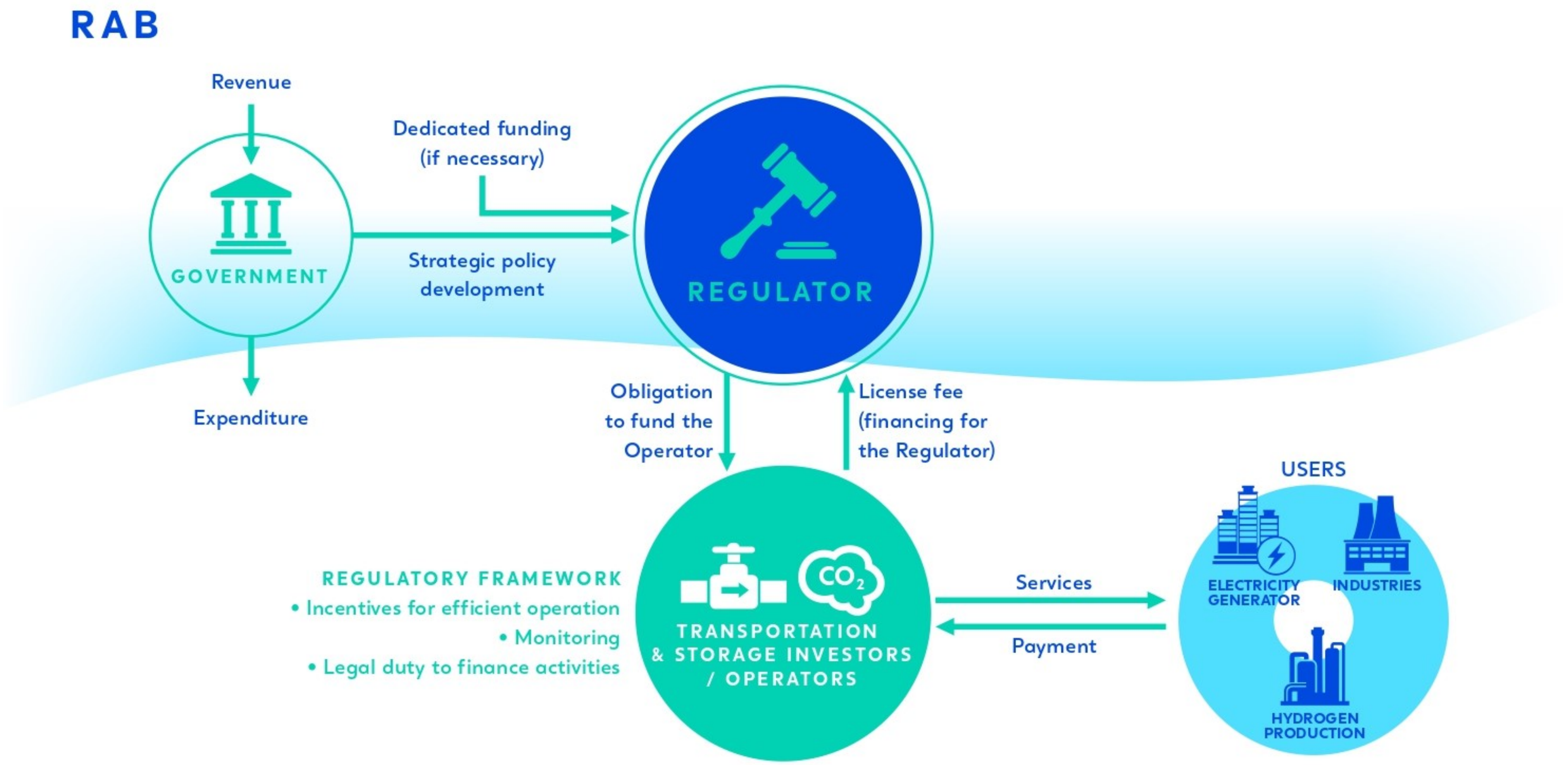


The models

05

Regulatory Asset Base (RAB)

The RAB model was developed to value existing assets as part of the privatization process in the UK. The model itself does not preclude any particular form of ownership for the infrastructure company – its assets can in principle be privatized or remain in public ownership. In practice, it is an accounting number that reflects the value of past investments into the network infrastructure. It is calculated periodically by summarizing Regulated Assets plus regulated working capital and net new CAPEX.



The models

06

Cost Plus

The cost-plus open book model is a process where the T&S should submit invoices to the government that include documentation of all hard costs. This would include invoices for materials and subcontractors as well as working hours and billing rates for direct labor supplied by the T&S company.

This is a “Trust-but-Verify” process to ensure that the T&S company is keeping good records and billing responsibly.

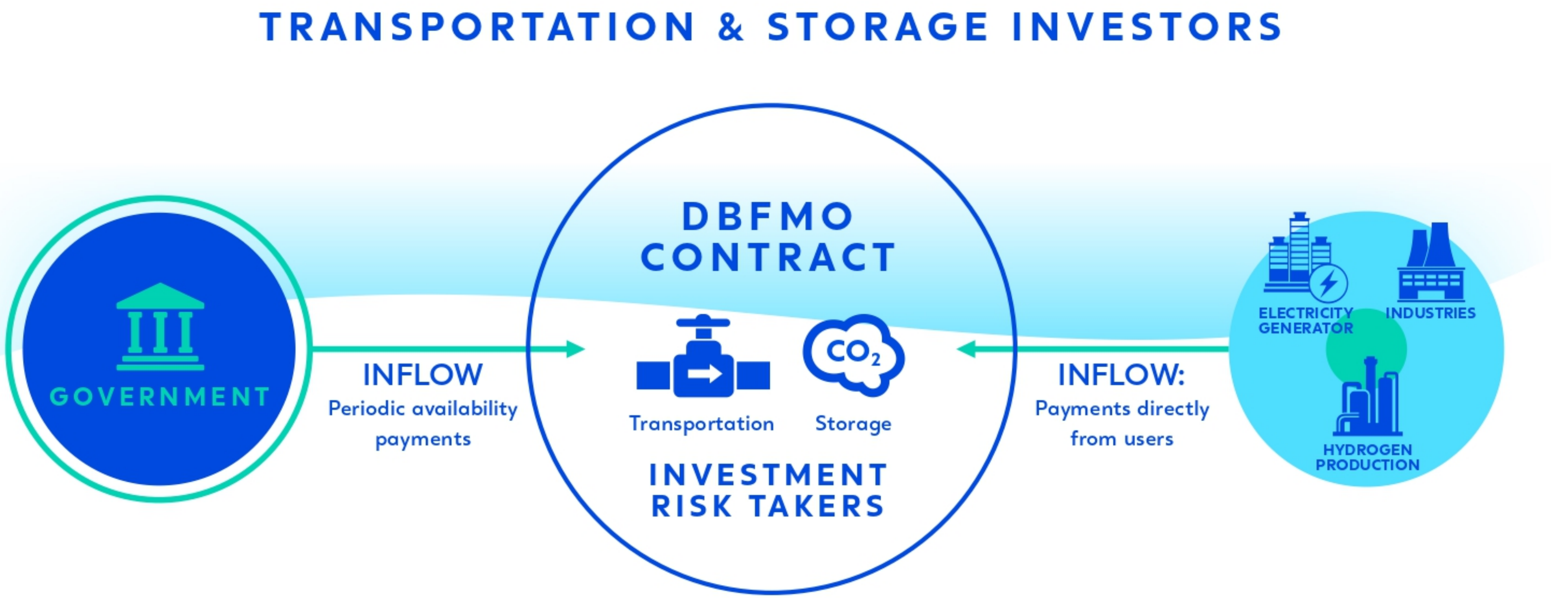
The models

07

Public Private Partnership (PPP)

In the Public Private Partnership (PPP) model of public infrastructure delivery, the government calls for tenders for a contract of a single infrastructure project.

The contract gives the successful private consortium the responsibility for all aspects of project financing, delivery and operation for periods often spanning decades.



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The models

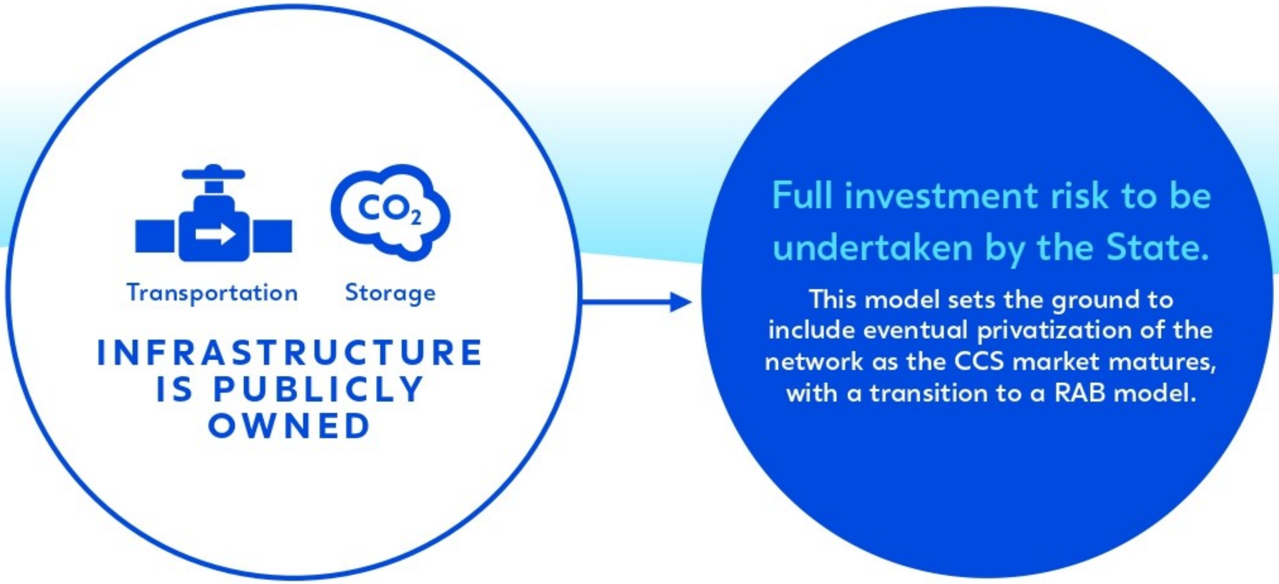
08

Government-owned model

The government sets up a regulated, publicly owned CO_2 T&S network that is responsible for delivering and operating the T&S infrastructure and implementing goals set by the government.

In the UK, this would likely involve eventual privatization of the network as the CCS market matures, with a transition to a RAB model. However other jurisdictions, for example the Netherlands, may pursue continued state ownership.

TRANSPORTATION & STORAGE INVESTORS = GOVERNMENT



Comparison between the models: Criteria

In order to evaluate the different models, 9 selection criteria were chosen. The selection was driven by the risks and challenges section where some common areas were identified. The first 4 criteria are assessed in terms of risks allocation between the involved parties.

Risks

1. **CAPEX Risk (budget overrun)**
   Risk of a potential increased investment cost during implementation

2. **Commercial Risk**
   The event where there are no capturers or their business activity is very low and therefore the captured CO_2 volumes are low

3. **Infrastructure Risk**
   Risks each phase will face in case of no operation, either due to no availability, size or timing

4. **Market Risk (CO_2 price volatility)**
   Volatility of CO_2 allowance price as determined in the market

Various criteria

5. **Funding participation**
   Scheme of investors participating in a certain investment

6. **Potential commercial upside**
   The degree at which a revenue model can foster a potential increase in value

7. **Probability of investment recovery**
   The ease or difficulty to recover occurred costs (whether construction or operational)

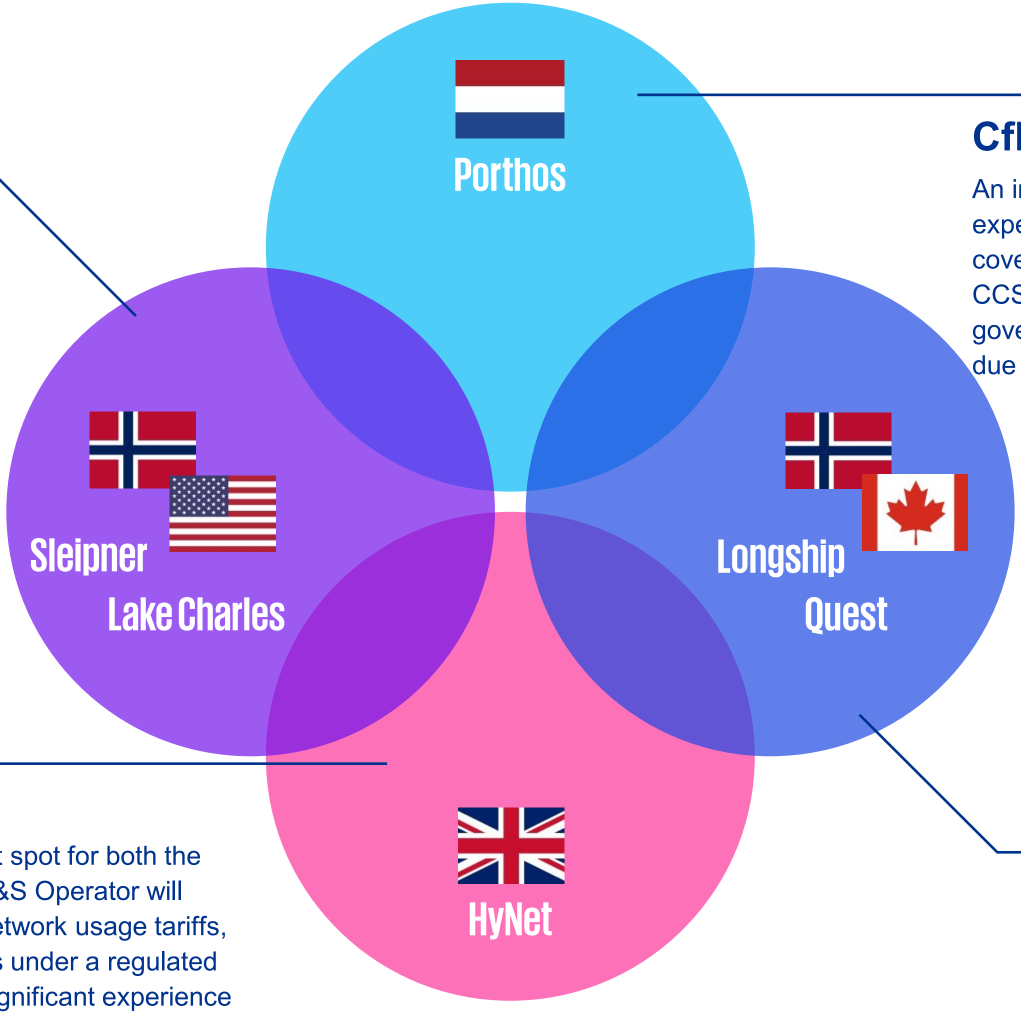
8. **Model implementation complexity**
   Challenges the investors will have to face when implementing a model in terms of administration, resources, time, procedures

9. **Model public acceptance**
   The difficulty for a specific model to overcome public acceptance constraints

Comparison between the models: Qualitative Assessment

For the evaluation purposes, it is assumed that each revenue model is being implemented on its own, without combination with another (meaning no hybrid models are examined).

Main findings from the revenue models analysis



Preferred by the State

Tax Credits

Tax credits can be a good revenue model from the government's perspective, as they can incentivize the development projects without requiring a direct financing. Instead of providing funding to support CCS projects, governments can offer tax credits that reduce the tax liability of project developers.

CfD

An interesting CfD application in the capturing side is expected in the Porthos project. The Dutch government will cover the cost difference between EU ETS and the cost of CCS in order to boost the deployment of the project. The government's contribution will most likely decrease over time due to the expected increase in ETS prices.

RAB

The RAB model seems to be a sweet spot for both the State and the Investors, where the T&S Operator will recover the incurred costs through network usage tariffs, payable directly by the emitters/users under a regulated tariff revision mechanism. There is significant experience already in place and acceptance of this revenue model by both the State and the private sector.

Cost Plus

With regards to the private side, the revenue model that is considered the most attractive is the Cost-plus. Under this framework, all costs are reimbursed along with a guaranteed profit margin..

Preferred by the Private Sector

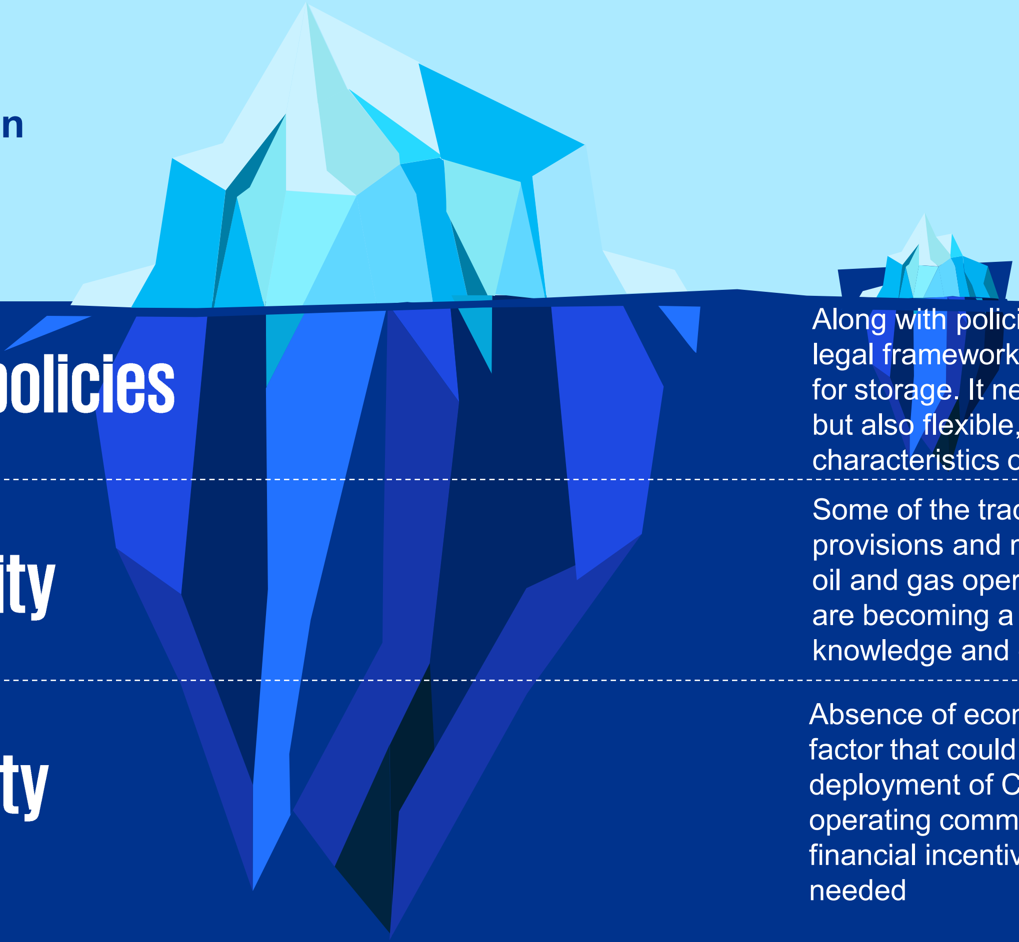
05

The way forward

Aristofanis Stefatos – CEO, HEREMA
Dimitris Papakanellou – Partner, KPMG

The way forward

Which are the key factors for the successful implementation of CCS in Greece?



01 Legal framework and policies

Along with policies, the development of suitable legal frameworks for CCS is critical, particularly for storage. It needs to be clear and predictable but also flexible, focusing on the unique characteristics of each project/plant

02 Manage Risk and liability

Some of the traditional risks and liability provisions and models have been adopted from oil and gas operations, but the storage aspects are becoming a novel risk, exposing a still limited knowledge and experience of the industry

03 Economic sustainability

Absence of economic sustainability is a key factor that could terminate planning and deployment of CCS projects. Experience from operating commercial units in Europe shows that financial incentives and state support are needed

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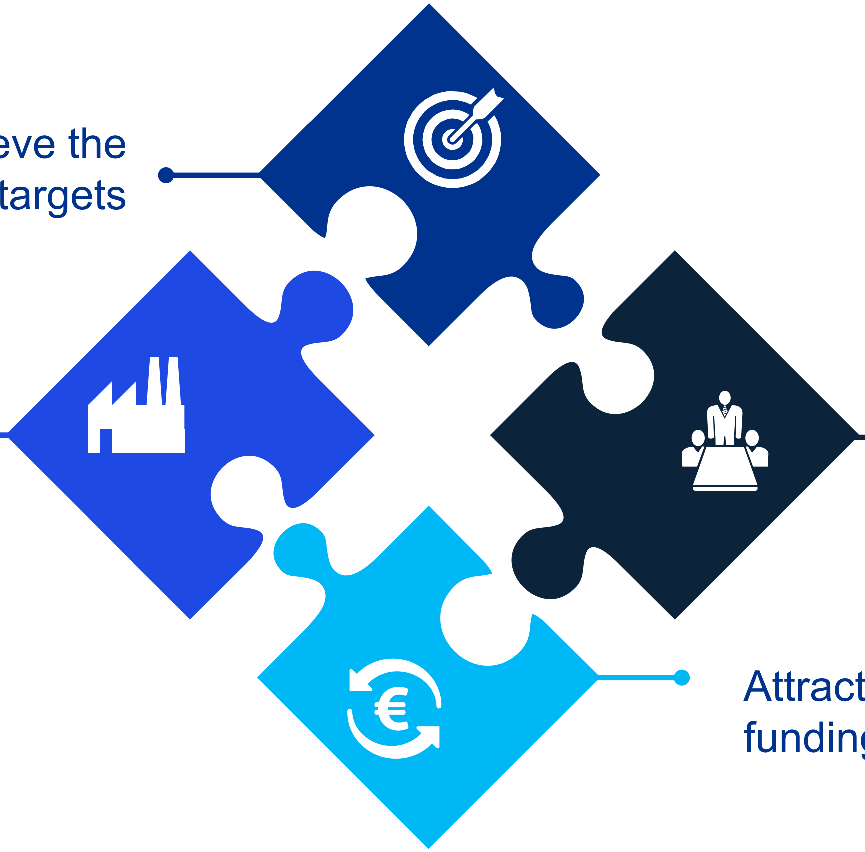
KPMG

What will be the benefits of CCS deployment in Greece?

Help to achieve the
National **Net-Zero** targets

Ensure the competitiveness
of the Greek Industry



Generate significant
job opportunities

Attract substantial
funding from the EU