

# POLICY BRIEF

## The future regulatory framework applicable to Carbon Capture and Storage Infrastructure - issues for discussion.

### Introduction

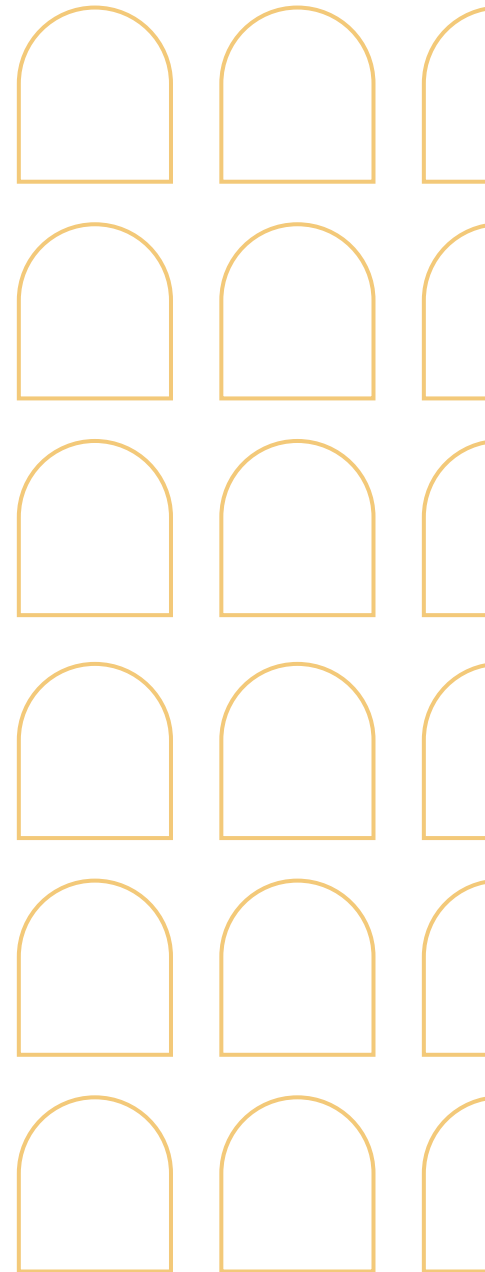
The basic objective of the European Commission's Carbon Capture Use and Storage Communication in Q1 2024 must, of course, be to catalyse the rapid development of carbon capture and storage ('CCS') - which is essentially just infrastructure - both to serve as a transition technology to decarbonise certain hard to abate sectors and to lay the foundations for large scale permanent storage of 'negative emission CO2' from biogenic and direct air capture sources in the run up to 2050.

European Commission modelling, and many other studies, concur that CCS will need to play a major role to enable the EU to meet its 2050 net zero target, as well as globally, and indeed in the US and China we see a similar push to accelerate this technology and infrastructure.

It is equally clear that catalysing investment at scale in a new CCS grid and storage is urgent. Not least, due the introduction of the Carbon Border Adjustment Mechanism ('CBAM'), the EU will phase-out free ETS allowances for *inter alia* the steel, cement and fertiliser industries, starting already in 2026, with full application of the ETS by 2036. At the same time, the EU is restricting the issue of free allowances to all energy intensive industries under the ETS reform, even when not covered by the CBAM.

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Without a cost-effective CO<sub>2</sub> grid and storage compatible with this timeframe, these EU industries might generally not be able to decarbonise existing plant at a cost compatible with expected ETS prices (alternative decarbonisation options such as renewable hydrogen or renewable electricity generally being technically incompatible with existing plant or requiring investments significantly above the ETS price and compared to the CCS option)<sup>1</sup>. In other words, if these energy intensive industries do not have access to a cost-effective CO<sub>2</sub> grid and storage within this timeframe, they will not have the tools available to decarbonise, but will need to simply buy ETS allowances for the CO<sub>2</sub> they emit. The effect will be to reduce the competitiveness of EU industry without saving CO<sub>2</sub> in the industries concerned, which is at best a climate/ industrial policy of highly questionable merit. Equally it is logical to assume that we need the 'backbone infrastructure' (transport and storage) to 'come first' (at least in terms of clear commitment and timing) so that individual companies that will use the CO<sub>2</sub> grid can plan and invest accordingly.

Whilst the exact amount of CO<sub>2</sub> that will need to be captured and stored every year up to and beyond 2050 in the EU will depend on a number of policy, economic and technological elements that cannot be predicted with certainty today (such as the ETS price development and the cost of decarbonising industry via CCS compared to direct electrification or (renewable) hydrogen for new industrial plant, the use of low carbon electricity for balancing the grid, and how negative emissions will be priced), there is basically common ground that 'no CCS at scale, no net zero'<sup>2</sup>.

## The specific challenges of establishing an EU-level regulatory framework for CCS.

A central part of the Commission's forthcoming CCUS strategy - the issue of how CCS infrastructure should be regulated in the future - must logically figure prominently. Commissioner Simson confirmed that this is the Commission's intent at

the 2023 CCUS Forum. Indeed, this issue needs to be addressed as a matter of urgency, and getting the approach to this issue right is both crucial and rather complicated:

- Compared to, for example the electricity and gas grids, the CCS value chain will be far more fragmented, with far more actors, and with very different business models.

Capture, for example, can (generally) be expected to be 'plant specific' - the investment will be made by the company needing to decarbonise the (cement, steel, chemical...) plant in question. Third party access may therefore not be relevant here.

CO<sub>2</sub> transport from an industrial facility or cluster is likely to be made up of a number of different approaches, models, and options. We may see, at least initially, some transport by truck or rail. We may see local CO<sub>2</sub> networks in industrial clusters, and privately owned 'direct lines' serving a single industrial emitter to the nearest CO<sub>2</sub> main network. A 'national CO<sub>2</sub> grid' linking key clusters with major storage sites (especially where they are offshore) makes sense in order to benefit from economies of scale and will certainly be part of the future CO<sub>2</sub> grid in many countries. However, it cannot be excluded that one or more private lines from an industrial cluster to storage is built as a first step.

Offshore CO<sub>2</sub> pipelines may develop after, or side-by-side, with CO<sub>2</sub> transport via ships<sup>3</sup>. They may develop as direct lines from the coast exclusively to a given storage facility. Or they may develop through an integrated offshore CO<sub>2</sub> network, serving multiple storage sites. They may be owned by the storage operator, or a separate pipeline operator, or a grid company.

- Equally, storage sites may present very different characteristics. Some may be onshore facilities of limited size to serve a specific capture project or be an inter-linked system of major offshore storages. Some may be one of many options available to a given company seeking to store its emissions, others may be the only

1 See, for example, <https://fsr.eu.europa.eu/publications/?handle=1814/73658>; <https://www.iea.org/commentaries/is-carbon-capture-too-expensive>

2 See for example the speech of Commissioner Simson at the 2022 Oslo CCUS Forum and 2023 Aalborg meetings. [https://energy.ec.europa.eu/events/carbon-capture-utilisation-and-storage-forum-2023-11-27\\_en](https://energy.ec.europa.eu/events/carbon-capture-utilisation-and-storage-forum-2023-11-27_en)

3 See, for example, the [Longship project](#).

reasonable cost-effective option, and thus an essential facility.

- Many of these pieces of infrastructure will differ considerably in nature compared to what may be described as traditionally regulated infrastructure under EU law. Typically, when the EU regulatory model was developed (TPA, unbundling, regulated tariffs..), it was applied to existing networks. This enabled regulation to be based on a regulated asset base. Thus, a TSO or DSO would be required to give TPA to its network but could invest in additional capacity knowing that any approved investments that it made could be recouped, or at least de-risked, by being spread over a group of assets.

However, with respect to the CCS network, many of the above-described investments may be 'one-off' or isolated investments to serve a particular customer, rather than part of a wider network. Apart from a central CO<sub>2</sub> grid, and potentially an integrated offshore CO<sub>2</sub> grid and/or group of connected storage sites, almost none can be expected to have a grouped or regulated asset base. The future hydrogen grid exhibits some of the same such characteristics - for example with respect to hydrogen storage facilities and import terminals - and the regulatory framework in this respect can serve as a starting point for discussion for the CO<sub>2</sub> network. Nonetheless, the hydrogen network may well be far less 'atomistic' in terms of its constituent parts than the CO<sub>2</sub> grid value chain. It is therefore very different to regulate (with proper incentives to incentivise additional investment) an already existing infrastructure than to create the conditions for the uptake of a greenfield investment. However, this does not mean that the concepts/tools we have at our disposal are useless (merchant, nTPA, etc.), but rather that considerable care needs to be taken when applying them to these different circumstances.

This is especially relevant in considering the risk profile attached to a given (class of) investments, and how to balance regulation vs investment incentives. Should a company, for example, invest in a small-scale transport and onshore storage facility intended to serve a given industrial facility, and is it required to give TPA to industrial competitors located nearby, how will it know how large to build the capacity to

be able to be certain to have sufficient capacity to meet its own needs? Must it therefore 'overbuild' the infrastructure and take on the risk that its upstream competitors (in steel, cement, chemicals...) may or may not require access to 'its' CO<sub>2</sub> transport assets? Where, or indeed if, companies invest in infrastructure to serve their own requirements, a careful balance will need to be drawn.

- 'Over-regulation' can therefore undermine investment in the CO<sub>2</sub> value chain during a period when the EU needs billions of Euros in investment, and over a short timeframe. But equally 'under-regulation', or at least inadequate transparency on what the future regulatory regime will be applicable to a given investment, can have the same effect.
- 'Under-regulation' - the lack of effective TPA when an essential facility exists - can also stifle investment, for example in capture capacity. Energy intensive industrial companies, for example, will not be able to invest in CO<sub>2</sub> capture infrastructure unless they know that they will be able to access transport and storage for the CO<sub>2</sub> that they are capturing. If an essential facility exists in this context - such as access to a central CO<sub>2</sub> grid and essential offshore pipelines/storage - transparency with respect to if, when, and how such users will have access will be essential.
- The question of 'too early strong regulation' also needs to be addressed. In the context of the Hydrogen and Decarbonised Gas Package the argument was raised, and has been supported by Council and Parliament, that even essential facilities - where in due course regulated TPA and unbundling under the ownership/ISO/ITO models is justified - merit an initial period where nTPA can be applied, in order to catalyse investment and reduce regulatory costs at the initial stage in investing in new infrastructure. In the Hydrogen and Decarbonised Gas Package this has been resolved by permitting Member States to apply nTPA until 2031 for the main hydrogen 'backbone' grid, after which rTPA will be mandatory. The same issue evidently applies to CCS infrastructure that exhibits similar essential facility characteristics.
- The challenge of establishing an effective regulatory regime for CCS infrastructure that will support rapid investment along the whole value

chain is compounded by the fact that the issues that must be addressed are not just substantive in nature, but equally temporal.

A Commission proposal for the regulation of the future EU CO<sub>2</sub> grid cannot reasonably be expected before (at the very earliest) 2025, and probably later, given that the next Commission will only take office (at best) in November 2024, as well as the need for preparatory consultations and a detailed impact assessment. This means that any legislation establishing an EU regulatory framework for CCS infrastructure will not have legal effect until at best 2029, and probably later<sup>4</sup>. Thus, if the future regulatory regime applicable to CCS infrastructure would be based on the usual EU legislative approach, investors must inevitably assume the risk that any assets in which they invest before this date will be subject to an uncertain level of regulation, to a greater or lesser degree. This can only stifle investment.

Ammonia dissociators (or 'crackers') within the context of the Hydrogen and Decarbonised Gas Package provide a good example of how the interplay between regulatory uncertainty and time can have a problematic effect in terms of incentivising investments.

In the Gas and Hydrogen package, ammonia dissociators situated in terminals where ammonia is imported are subject to negotiated TPA, with an option for Member States to opt for rTPA<sup>5</sup>. In order to meet its hydrogen objectives, the EU will need to import a lot of green hydrogen, and green ammonia will be a key medium. Investments in import capacity and dissociators needs to happen in the short-term if the EU is to meet its H<sub>2</sub> objectives. Companies investing in dissociators, however, are generally speaking companies that wish to be active on the future EU hydrogen market and are separate from the physical ammonia import terminal operator - they invest in a dissociator to meet their own planned ammonia imports for cracking into hydrogen for onward sale.

Thus, in normal circumstances, these companies would build a dissociator for their own use, based on the capacity level that they expect to need. However, the Directive requires<sup>5</sup> that nTPA applies to the entire ammonia import terminal Member States could also opt for regulated TPA) but envisages the possibility of the grant of an exemption from regulation by the relevant national regulatory authority with confirmation by the Commission - the hydrogen equivalent to the procedure under Article 36 of the Gas Directive that resulted in multiple exemptions for interconnectors and LNG terminals.

Thus, in principle, a company investing in a new dissociator in 2024 within an ammonia import terminal will be faced with the uncertainty that when the Directive is implemented, the relevant Member States concerned may apply rTPA. Even if nTPA is applied, the investor would be uncertain whether the relevant NRA would accept that it could reserve all the capacity of the dissociator that it requires for its own needs. Whilst the possibility of an Article 36 equivalent exemption is foreseen, it is uncertain whether a NRA would be legally able or willing to apply the procedure foreseen under the Regulation (which will enter into force presumably in early 2024), until the Member State has transposed the law (presumably towards the end of 2025). Whilst an NRA could immediately apply the derogation under the Regulation (as it immediately enters into force on publication), it remains to be seen whether they will be willing to do so before a member state implements the Directive, as until this date they will be uncertain exactly what they would be giving an exemption to. Thus, on this basis, investment in a dissociator within a terminal would be at best very challenging until the end of 2026, when an exemption decision could be adopted, or an NRA would define the nTPA approach proposed by the investor acceptable.

This example is illustrative of the importance of giving regulatory certainty to companies in the short term to promote investment. Whilst this will be particularly crucial for companies

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4 Proposal in 2025, adoption by Council and Parliament in 2027, 18 months for Member States to transpose a Directive into national law...

5 On the date of completion, the Council and Parliament had reached a political agreement on the legislation, but the agreed text had not yet been published. This statement represents the author's understanding of the position agreed rather than a reading of the final text.

investing in pipeline/storage capacity for their own needs (and such a company specific case may be expected to be a limited part of the CCS value chain - steel, cement and chemical companies cannot reasonably be expected to spend billions of Euros on CO2 infrastructure), the issue is equally relevant to the wider CO2 grid and storage. It is notable that 'on the ground' investment in the hydrogen grid has been limited whilst the regulatory framework is being completed.

- In addition to these substantive and temporal issues, a third issue - financial - will need to be addressed. Investing in the CCS grid will be - at least in the initial stages - very risky. The extent to which CO2 transport and storage demand will grow depends entirely on future regulatory decisions - stored CO2 having, in the case of CCS, only a negative value. For example, whilst the future direction of the ETS is largely known, it is not possible to guarantee that the current trajectory emission withdrawal will not be changed. Nor can the future ETS price be accurately predicted. The use of blue (compared to green) hydrogen for industry, aviation and maritime remains unclear. The extent to which electricity generation based on CCS will be used to balance the grid rather than using renewable hydrogen or other storage technologies is uncertain. How negative emissions capture and storage will be priced is unknown.

Thus, to enable companies to invest the billions of Euros in the next few years in the CCS value chain some form of regulatory intervention will be needed. The options are:

- » State/EU support in the form of capital grants, CfDs....
- » Cross-subsidies from another activity, for example the gas network, similar to that provided under the Hydrogen and Decarbonised Gas Package<sup>5</sup>. Such an option may, however, be difficult to implement in practice, *inter alia* given the potential effect on gas tariffs.
- » State guarantees, also similar to the approach in the Hydrogen and Decarbonised Gas Package<sup>5</sup>. Under this approach, a future network operator, for example, would submit an investment plan to an NRA, based on expected CO2 transport

levels and tariffs over the relevant amortisation period. If that volume subsequently fails to arise, the Member State would guarantee the financial shortfall, and logically, if the CO2 transported and revenue level it exceeded this level, the network company would pay the 'excess revenue' to the member state (thus, a type of infrastructure CfD guarantee).

- » A different approach, envisaged in the Commission's proposed Net Zero Industry Act ('NZIA'), is to simply oblige companies to construct infrastructure. In the NZIA proposal, oil and gas companies would have a legal obligation to collectively deliver 5 MT of CO2 storage by 2050, with the obligation being divided between them based on their oil and gas production in the EU over the previous three years. Negotiations on this innovative approach under EU law are ongoing between Council and Parliament, and both institutions have so far in their positions broadly supported the underlying approach proposed by the Commission. In any event, this model is not reasonably applicable to the whole CCS value chain.

In the light of the above analysis, it is clear that:

- establishing the future regulatory regime that must apply to CCS will be tricky; the electricity, gas and hydrogen approaches do not represent an automatic template that can simply be transposed on to the CCS grid,
- the types of CO<sub>2</sub> infrastructure and their nature (and thus whether they should be classified as an essential facility) are likely to vary from country to country and even region by region (depending, for example on whether onshore or local storage options exist and the presence of large-scale CO2 industrial clusters or isolated plants) so that 'one size-fits all' will not be an option, and
- given the need to catalyse massive investments in the next few years - not after 2030 when a legal framework could enter into force - the issue of how to deal with the intervening potential regulatory uncertainty will need to be addressed. The issue of sequencing in this context seems important.

## The tests to be applied in establishing the correct regulatory approach to CCS infrastructure.

Thus, two key questions that should be addressed in considering the approach that might be taken in the forthcoming CCUS strategy are:

- what test should be applied in determining whether a given class of asset be subject to regulation, and what should be the appropriate form of regulation?
- How should the EU approach the issue of intervening regulatory uncertainty and the need to rapidly incentivise investment (or at very minimum not to undermine it).

With respect to the first question, the decision whether an asset should be subject to regulated access, and the strictness of the control of the access (rTPA or nTPA, possible level of horizontal unbundling, possibility of exemption by the NRA), has in previous legislative exercises been based on the extent to which an asset can be considered to be an essential facility - i.e., whether access to it is essential to enable competition to develop. In turn, this is based on the question whether the asset holds a dominant position for the service in question (transport/storage of electricity, gas or hydrogen...).

The Court of Justice has developed a doctrine to determine when such access should be required in the context of antitrust cases, generally referred to as the 'Bronner Doctrine'<sup>6</sup>. In summary, the Court considers that a company may under the competition rules be required to give TPA when (i) the firm in question holds a dominant position in an upstream market, (ii) the service or product to which access is being denied is indispensable to compete in the downstream market, (iii) the refusal to grant access would lead to the elimination of effective competition in the downstream market, and (iv) there is no objective justification for the refusal to supply. It is equally notable that the Court has been very restrictive in applying the Bronner criteria to justify TPA<sup>7</sup>, even in the case of dominance. This

would indicate a careful and prudential application of TPA to CCS infrastructure, as considerable uncertainty exists as to the extent that at least parts of it will constitute an essential service.

In the case of CCS, this picture is complicated by the fact that there is no (or at least currently a limited) downstream market for CO<sub>2</sub> - the focus is on simply permanently and safely storing it (and in any event, CO<sub>2</sub> use is unlikely to exceed production and thus the need for storage). Equally the companies that compete with one another that are relevant here - in upstream rather than downstream markets; steel, cement, chemicals etc - are unlikely to be the owners/operators of the infrastructure in question. Rather, we can expect, generally speaking, pipelines to be owned by network operators, and storage to be owned by oil and gas companies (although this is a vast oversimplification; Who will own onshore salt cavern storage where this is accepted by Member States? Who will own local networks or direct lines bringing CO<sub>2</sub> to the main grid? Who will own the offshore pipes? Will an integrated offshore network develop quickly, or will it start with direct lines as is currently the case?).

Thus, given that potential competitive foreclosure effects (denying competitors access to essential facilities) are only likely to be an 'outlier event' (e.g., if a steel company would own an essential evacuation pipe/local network and refuse access to another steel company), it is very rare that TPA will be required to prevent foreclosure, one of the two main rationales for unbundling. Assume, for example that a gas TSO owns and operates the national CO<sub>2</sub> grid, and an oil and gas company owns the relevant offshore pipes and storage, they have no interest in favouring one steel company over another (assuming no cross-shareholdings etc.).

However, where an essential facility exists in the CCS value chain, the second reason for effective regulation - preventing excessive pricing - remains perfectly relevant. Thus, the specific nature of the CO<sub>2</sub> grid means that whilst unbundling is unlikely to be an issue with respect to CCS grids, the need for

6 The Bronner case: <https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX%3A61997CJ0007> Articles analysing the case/doctrine; <https://www.jstor.org/stable/4508596> and <https://academic.oup.com/jeclap/article-abstract/13/4/278/6334041?redirectedFrom=fulltext>

7 See for example the recent Judgment in BEH, where the General Court annulled the Commission Decision according to which the BEH Group abused its dominant position by refusing access to strategic gas infrastructures in Bulgaria. <https://curia.europa.eu/jcms/upload/docs/application/pdf/2023-10/cp230160en.pdf>

appropriate regulation when an essential service exists remains relevant.

## First considerations on a possible way forward, for discussion.

A careful balance between these issues needs to be drawn. In particular, the need to provide regulatory certainty to investments made today needs to be addressed in the short term, and not in 2030. Equally, the fact that within a given class of assets - for example storage - there will be a huge variation of whether a given investment is an essential facility or not, needs to be factored in - 'one size certainly does not fit all' when it comes to CCS regulation.

To balance these issues, the following approach is tentatively put forward for the purpose of discussion. This should not be viewed as a proposal as such, because far more evidential and factual analysis on how the value chain is likely to develop, and the extent that asset classes are likely to be essential facilities, is required before a proposal can validly be tabled. The intention is to provide a basis for discussion.

- In 2025, the Commission may consider putting forwards two regulatory measures:
  - » The first would be a short-term Regulation, of very limited length and complexity, with the aim of its rapid adoption.

This would empower NRAs with the right to adopt regulatory decisions for given classes of infrastructure where it is clear that rTPA, without the possibility of exemption, would not be the appropriate default regulatory model. This may, for example, apply to all CCS infrastructure with the possible exception of a core onshore CO<sub>2</sub> grid. But further work is required to determine the classes of assets to which this possibility may apply.

For qualifying categories of assets, a procedure based on the exemption procedure provided in Article 36 of the Gas Directive could be envisaged. An NRA would take a draft decision, which would then have Commission review, with the

NRA being obliged to take into account Commission comments in its final decision. In this manner, distortions in the function of the EU's market could be avoided. An investor would of course be free not to avail itself of this procedure, assuming that TPA would not be applicable to its asset in any EU CCS regulatory framework and taking the associated risk. But at least it would give the investor the option of receiving regulatory certainty.

The NRA would have a menu of options to choose from when deciding the precise regulatory framework applicable to a given piece of infrastructure (rTPA, nTPA with clear definitions as to the obligations to be respected when applying the negotiated access, time limited derogations, no regulatory requirements...). The decision would take into account the specific nature of the given asset and whether or not it may act as an essential facility. Exemption decisions can, for example, have review clause after 5 or 10 years, and competition law can still remain applicable to an exempted asset.

Whilst such an NRA/Commission decision could not provide completely watertight legal protection against a future EU regime changing the regulatory approach applicable to a given asset<sup>8</sup>, a clear Commission statement/recital in the Regulation, indicating the intention that any decision would be grandfathered in any future legislative proposal, would provide a strong level of certainty, and possible legitimate expectations.

This would address the 'temporal' issue, as immediate regulatory certainty could be very largely provided. Investments made in asset classes potentially excluded from the exemption possibility (because they fall under the 'default rTPA' category and are thus excluded from the scope of the Regulation) would be undertaken on the assumption that rTPA would be applied post-2030 when the EU framework would be adopted, again providing certainty.

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<sup>8</sup> EU legislation cannot legally prevent the Union from adopting a different approach in future.

This approach would equally address the ‘no one size fits all’ issue, as decisions would be taken on a case-by-case basis.

- » A Communication could be adopted in 2025, setting out guidelines on how the Commission considers that the initial regulatory decisions of NRAs should be shaped/applied (i.e., presumptions on the appropriate regulatory approach per asset class, guidelines on how to determine whether a given asset constitutes an essential facility...). This would be based on widespread consultation and an opinion from ACER. This would enable the decision-making process to be streamlined, limiting the resource implications for NRAs and the Commission of this approach.

The following table illustrates how such a Communication might focus the regulatory decisions of NRAs, illustrating a ‘default’ approach, and the options available to an NRA for each asset class (please note that the classification is illustrative and should not be viewed as a proposal. Far more detailed work needs to be undertaken to understand the real factual situation before such a substantive approach could be proposed. Red represents an option, black the ‘default’ choice):

Capture facilities	Monopoly, and (r)TPA always essential	Basically monopoly, and (r)TPA in principle required, but exemptions possible	Depends on situation and competitive alternatives – nTPA and exemptions	Always competitive, TPA and unbundling never required
CO2 capture and Associated temporary storage			x	x
Local networks/direct lines		x	x	x
TSO national network	x	x		
Onshore pipelines	x	x	x	
Offshore pipelines	x	x	x	
Onshore storage		x	x	x
Offshore storage		x	x	x

- » State aid guidelines with respect to the funding of the CCS value chain may be issued in 2024-2025. Whilst the approach of state guarantees set out above appears to have value (the CO2 value chain should in principle be self-financing given rising ETS prices, and providing that NRAs carefully review investment plans, there is no reason to believe that state guarantees should ever be called upon), it may be appropriate to leave the choice of support to Member States, subject to relevant conditions.
- In 2026, based on experience and a full impact assessment, a Directive and Regulation setting out the regulatory framework for assets not subject to a decision under the above mechanism, and for all new infrastructure, could be tabled.



**Conclusion:** the above, rather superficial, analysis has identified several substantive particularities of the future CCS value chain that merit careful consideration as to whether the approach that has been taken regarding gas, electricity and hydrogen is fully or simply transposable to CCS, given the particularities of CO<sub>2</sub> capture, transport and storage. It equally identifies an important temporal issue that needs to be addressed if the lack of regulatory framework until around 2030 that would result from a traditional legislative approach does not result in a disincentive to invest. Finally, it identifies a financial challenge, requiring transparency regarding the permissible nature of state support.

This paper does not purport to provide the answer to meeting these three challenges but identifies a possible framework for discussion and further work.

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*The Florence School of Regulation (FSR) was founded in 2004 as a partnership between the Council of the European Energy Regulators (CEER) and the European University Institute (EUI), and it works closely with the European Commission. The Florence School of Regulation, dealing with the main network industries, has developed a strong core of general regulatory topics and concepts as well as inter-sectoral discussion of regulatory practices and policies.*

*Complete information on our activities can be found online at: [fsr.eui.eu](https://fsr.eui.eu)*

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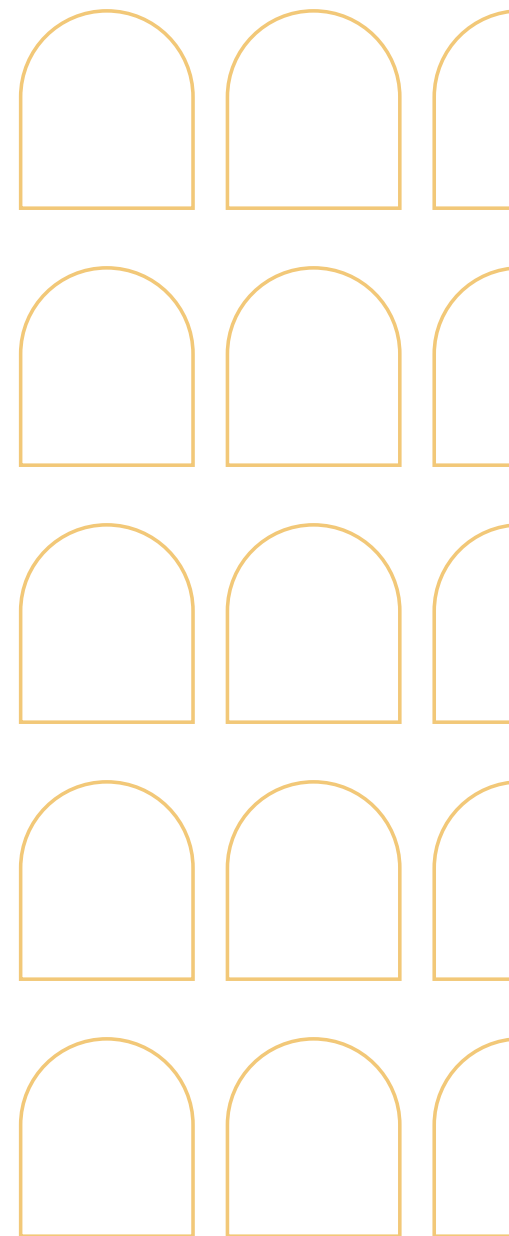
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