



Guidance document 4

Financial security and financial contribution

EUROPEAN COMMISSION

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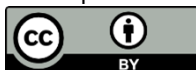
Financial security and financial contribution

The aim of this guidance document is to contribute to a better understanding of the requirements of Directive 2009/31/EC on the geological storage of carbon dioxide. It has been prepared by the European Commission on the basis of the views and knowledge provided by stakeholders. The purpose of this guidance is explanatory and illustrative. It does not create any rights or obligations.

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1. Revision history

Key changes relative to previous version
<ul style="list-style-type: none">• Tone and language in purpose of guidance document has been revised to reassure investors that the Carbon Capture and Storage Directive (CCS) does not require very strict and expensive financial security provisions, leaves flexibility to Member States to find appropriate arrangements, and provides competent authorities (competent authorities) with reasonable market-based options to develop such arrangements together with operators.• Edits to allow flexibility in selecting financial instruments.• Guidance provided on the opportunities and limitations with insurance, and approaches to cover gaps in insurance coverage.• Principles guiding determination of financial security amounts simplified. Probability weighting is included as a principle to be applied when calculating the amount of financial security required for uncertain future events.• Requirement for a 25% contingency removed – replaced by risk-based contingency to address uncertainties.

2. Purpose and scope of guidance documents

This guidance document (GD) is part of a set of guidance documents as follows:

- Guidance document 1: CO₂ storage life cycle risk management framework;
- Guidance document 2: Characterisation of the storage complex, CO₂ stream composition, monitoring and corrective measures;
- Guidance document 3: Criteria for transfer of responsibility to the competent authority;
- Guidance document 4: Financial security and financial contribution.

The aim of these GDs is to improve understanding of the requirements of Directive 2009/31/EC on the geological storage of carbon dioxide (the 'CCS Directive') and give indications on how it can be implemented. They should therefore facilitate a correct and uniform application of the CCS Directive across the EU. The guidance does not represent an official position of the Commission and is not legally binding. The binding interpretation of EU legislation is the exclusive competence of the European Court of Justice that can make final judgments concerning the interpretation of the CCS Directive.

GD 4 provides guidance on:

- Article 19 - financial security (Section 3); and
- Article 20 - financial mechanism (Section 4).

CCS is a proven technology that uses applications from well-established industries; thus, a catalogue of well-developed financial security tools can be used also for CCS. Member States and competent authorities should use the existing tools to develop predictable and balanced financial security and financial mechanism requirements that aim to limit taxpayer burdens, while reducing unnecessary financial burden on operators. This balance is important for the cost-effective implementation of CCS.

Financial security and financial mechanism requirements should be based on risk assessments of the actual site and project risks. General risk distinctions can, however, be made between different project settings (e.g. onshore vs. offshore; existing vs. new infrastructure; aquifer vs. depleted field, etc.), and should be considered when assessing operational costs and the associated amount of financial security or financial mechanism required.

It is the role of the Member States and competent authorities to ensure that CCS regulatory rulemaking encourages projects with lower risk profile by permitting financial security and financial mechanism instruments and amounts that are commensurate with the risks and financial needs of a storage project, as otherwise the associated requirements will deter deployment of CCS.

The guidance is not intended to be prescriptive, but rather to outline options open to the competent authority to support large-scale deployment of CCS value chains across Europe.

Member States that decide to support the development of CO₂ storage sites in the context of reaching climate neutrality may find it useful to share some of the financial risks or to cover part of the financial contribution. Some financial security and financial mechanism approaches may qualify as state aid within the meaning of Article 107(1) of the Treaty on the Functioning of the European Union (TFEU).

According to Article 108 of the TFEU, state aid may have to be notified to and authorised by the Commission before it is granted. Examples of state aid include risk sharing arrangements between Member State and operator, or cost-share financial security instruments that are more favourable than market conditions.

Note: See GD 1, Section 2.4, for interpretations of the main defined and non-defined terms used in the CCS Directive. Of particular relevance for GD 4 are the terms ‘financial security’, ‘financial mechanism’ and ‘financial contribution’.

3. Financial security

3.1. Legislative context

Article 19 of the CCS Directive requires that Member States ensure that, when applying for a storage permit, the potential operator must provide proof that adequate provisions can be established, by way of financial security or any other equivalent, on the basis of arrangements to be decided by the Member States.

- Article 19(3) states that the financial security will remain valid and effective:
 - after a storage site has been closed in accordance with Article 17(1) points (a) or (b), until the responsibility for the storage site is transferred to the competent authority in accordance with Article 18(1) to (5); and
 - after the withdrawal of a storage permit in accordance with Article 11(3);
 - until a new storage permit has been issued; and
 - where the site is closed in accordance with Article 17(1)(c), until the transfer of responsibility in accordance with Article 18(8), provided the financial obligations referred to in Article 20 have been fulfilled.
- Article 19(2) requires that the financial security should be periodically adjusted to take account of changes to the assessed risk of leakage and the estimated costs of the obligations under the permit issued under the CCS Directive.
- Article 19(1) clarifies that the amount of the required financial security is to be based on the estimated cost of meeting the obligations arising out of the permit, as well as obligations arising from the ETS Directive.

3.2. Selecting a financial security instrument

As far as possible, Member States and competent authorities should promote financial security instruments that are simple, based on established financial products, low risk, flexible, and low cost. It is recommended to avoid complex financial instruments that are beyond the core expertise of competent authorities, or that would preclude certain types of operators.

The intent of financial security is to protect taxpayers and, if the financial security instrument takes the form of capital that can be reinvested, the Member States must provide for strict prudential rules to prevent the risk of financial speculation. Member States and competent authorities should also aim to establish financial security requirements that promote competition for storage permits and ensure compliance with the Directive.

Financial security instruments should be defined by the competent authority, taking into account the type and likelihood of risks and financial products available on the market.

On this basis, the operator may propose one instrument, to be reviewed and approved by the competent authority. The competent authority must not unreasonably withhold or delay its approval. Member States should evaluate financial security instruments against criteria for desired certainty, amount, liquidity, duration and flexibility. Questions that can be considered part of this evaluation are listed in Appendix A.

The availability and features of financial security instruments will vary in different Member States, or across Member States. Ideal instruments may not be available in every Member State, which may mean having to accept some compromises.

To identify and select appropriate financial security instruments, Member States and competent authorities can review and evaluate existing instruments applied within the jurisdiction.

1. **Financial security instruments within existing laws and regulations.** This includes financial security instruments acceptable for closure and post-closure care of waste landfills, for waste from extractive industries, decommissioning of offshore structures¹, trans-frontier movements of hazardous wastes², environmental liabilities under Directive 2004/35/EC³, waste management in accordance with Directive 2008/98/EC⁽⁴⁾, and other relevant national programmes. Appendix B provides an overview of relevant financial security instruments. These instruments may be tailored for financial security obligations as best considered by the competent authority on a case-by-case basis.
2. **Insurance products.** Insurance companies issue a wide variety of insurance contracts with varying features, some of which resemble guarantees and others which are quite different (e.g. liability insurance).

Insurance designed for CCS may be similar to environmental liability insurance, which the European insurance and reinsurance federation (CEA)⁵ describes as a developing market, with specialist underwriters selectively offering products based on highly detailed risk criteria.

CCS insurance products may be similar to insurance for oil and gas activities. These insurance products are well-known and mature in the oil and gas industry for both onshore and offshore operations.

¹ The 1998 Convention on the Protection of the Marine Environment of the North East Atlantic (<https://www.ospar.org/convention/text>) established a regime for decommissioning disused offshore installations, including a ban on disposing offshore installations at sea. The North-East Atlantic Environment Strategy (NEAES 2030) was subsequently developed to establish an updated strategy, <https://www.ospar.org/documents?v=46337>. Legislation in Member States may authorise competent authorities to require financial security for such decommissioning.

² EC 1013/006 of the European Parliament and of the Council on the shipments of waste. <https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A32006R1013>.

³ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32004L0035>.

⁴ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098>.

⁵ <https://www.insuranceeurope.eu>.

The commercial insurance market should be able to provide insurance products to the CCS industry on a similar basis as the oil and gas industry for:

- a) assets installed by the CO₂ storage operator(s);
- b) drilling and well operations⁶;
- c) business interruption;
- d) third-party liabilities.

However, insurance will generally only provide coverage for fortuitous (unforeseen, sudden and accidental) occurrences which result from external causes, including negligence by employees of the operator or third parties.

Insurance will therefore only partially cover the obligations of financial security. For instance, gradual leaks from the reservoir via geological pathways will usually be excluded, unless caused by a fortuitous occurrence.⁷

Insurance will also usually not be available for loss of or damage to the storage site, such as lower-than-expected injectivity or incorrect estimation of storage capacity, which renders the operator incapable of meeting project objectives, irrespective of causation.⁸

Shell presented an evaluation of the insurability of different elements of their Peterhead CCS project in Shell UK Limited ('Peterhead CCS Project – insurance plan', 2014), and concluded that damage or loss from 'reservoir seepage and pollution, subsurface liability' and 'loss of carbon credits' are not insurable.⁹ This evaluation is still considered representative of what the commercial insurance markets are willing to offer.

⁶ Oil and gas companies insure their exploration risks under a cover called energy exploration and development insurance (EED-8/86), which provides control of well insurance (e.g. the cost of controlling a well blow-out incident), Re-drilling/extra expense (to redrill/restore a well lost by blow-out), and seepage & pollution, cleanup and contamination insurance (above ground and in water pollution from a well blow-out). The policy form also provides additional cover for care, custody and control of third-party equipment rental, underground control of well cover (communication between subsurface geological zones via the wellbore), making wells safe (when drilling or production unit/equipment is damaged and one "reservoir-to-atmosphere safety barrier" is lost), and finally extended re-drilling and restoration cost (re-drill/restoration of wells due to loss of drilling rig/platform, etc.).

⁷ There were attempts to insure reservoir risks in the USA in the early 1980s, but it turned out not to be a commercial success and it has since been accepted by the industry that reservoir risks are uninsurable.

⁸ Commercial insurance can be established to cover incidents of unforeseen geological leakage up to a limit; however, these policies would be expensive and require extensive documentation.

⁹ The figure summarising the evaluation is reproduced in GCCSI, Lessons and Perceptions: Adopting a Commercial Approach to CCS Liability (2019). www.globalccsinstitute.com/wp-content/uploads/2019/08/Adopting-a-Commercial-Approach-to-CCS-Liability_Thought-Leadership_August-2019.pdf.

To overcome the risk of potential gaps in insurance coverage, the insurance can be combined with other financial security instruments. Such combination of instruments would increase the effectiveness of the entire financial security scheme, to the benefit of the competent authority, and will increase the chance of the financial scheme being approved, thereby avoiding unnecessary delays, and also benefiting the operator.

3. **Any other equivalent instrument.** Member States and competent authorities may also consider instruments not covered by i) and ii) that can provide the required security. Some 'equivalent' options may, however, lack adequate certainty, amount or liquidity to be accepted as equivalent to financial security. This includes, for instance, pledges or assignments of future revenues (e.g. from injection) or assets.

Member States should avoid imposing financial security obligations on storage operators before start of the operations which are disproportionate to the initial amounts of CO₂ stored. Member States may therefore want to consider allowing operators to provide financial security in phases. No funds should be required for financial security prior to start of injection.

One option for phased accumulation of funds for financial security over time is to create a 'sinking fund' whereby the operator makes regular contributions to the financial security. This can be achieved by, for instance, with arrangements based on the aggregation of a levy per tonne of CO₂ stored, which accumulate as storage sites are being filled.

This option does pose a risk that the operator will default before the required amount of funds has built up. This risk can be mitigated by requiring that the operator complement the gradual build-up of funds with another financial security instrument that covers the balance. For example, the complementary instrument could be a bank guarantee, letter of credit, equity commitment letter or surety bond.

As the funds build-up toward the required amount, the amount of complementary financial security can be reduced. Furthermore, if financial security revisions (per Section 3.4.5) conclude that the required financial security is less than the accumulated amount, then the competent authority should allow instruments providing any excess amount to be withdrawn or released.

A Member State may also offer risk-sharing arrangements on a case-by-case basis – subject to state aid approval. This can include providing insurance in part or full, by accepting some transfer of risk.

The Member States may also want to pool financial security arrangements for the first-mover sites in an insurance scheme, and thereby reduce the premiums required to provide a given level of security to the competent authority. The Member States would need to establish the arrangements for financing any liability in excess of the pool, and for sharing any profits and losses from the pool.

3.3. Obligations that financial security must cover

Article 19 is intended to ensure that all obligations arising under the permit can be met in the following cases:

- (i) there is a need to cover competent authority costs for performing obligations under the permit if the operator fails to do so;
- (ii) the competent authority withdraws the storage permit and temporarily takes over all relevant obligations in accordance with Article 11(4):
 1. **Monitoring**, as specified by Article 13 and the approved monitoring plan. Related obligations are to update the monitoring plan in accordance with the requirements laid down in Annex II at least every 5 years and to prepare reports of monitoring results in accordance with Article 14.
 2. **Corrective measures** as specified by Article 16, and the approved corrective measures plan. This includes costs for updating the approved corrective measures plan.
 3. **Surrender of EU ETS emission allowances** for leaked CO₂ volumes.
 4. Update the **provisional post-closure plan**, taking account of risk analysis, best practice and technological improvements.
 5. **Closure** of the storage site as specified in Article 17 and the approved and updated post-closure plan, including sealing the storage site and removing the injection facilities.
 6. **Operating the site**,¹⁰ including obligations relating to CO₂ stream **acceptance_criteria** when the competent authority decides to continue CO₂ injection temporarily, after the competent authority withdraws a storage permit in accordance with Article 11(3).

According to Article 12, acceptance criteria obligations include keeping a register of the quantities and properties of the CO₂ streams delivered and injected, including the composition of those streams. In addition, the competent authority may need to conduct composition analyses and risk assessments and prepare reports in accordance with Article 14.
 7. **Reporting**, as specified by Article 14.

These obligations can be divided into two types:

- (i) obligations that are certain to occur (e.g. monitoring and reporting);
- (ii) obligations that are not certain to occur (e.g. corrective measures and surrender of allowances).

¹⁰ Although the CCS Directive refers only to obligations related to CO₂ acceptance criteria during temporary continuation of injection following permit withdrawal, the Commission believes that continuation of injection will require the competent authority to temporarily take over operation of the site as a whole.

Some financial security instruments may be suited to cover only one of these types of obligations. For instance, liability insurance instruments may be more suited for (ii) than for (i).

Other types of prepaid insurance may be amenable to financial security coverage of monitoring, closure and reporting. Table 1 shows when obligations may arise, i.e. during the operational period or during the closure/post-closure period.

Table 1: Obligations under the permit that must be covered by financial security.

Operations period	Closure and post-closure period
1. Monitoring, updates of monitoring plan, and required reports of monitoring results	1. Monitoring, updates of monitoring plan, and required reports of monitoring results
2. Updates of corrective measures plan, and implementing corrective measures, including measures related to protecting human health	2. Updates of corrective measures plan, and implementing corrective measures, including measures related to protecting human health
3. Surrender of allowances for any emissions from the site, including leakages, in accordance with ETS Directive	3. Surrender of allowances for any emissions from the site, including leakages, in accordance with ETS Directive
4. Update of provisional post closure plan	4. Sealing the storage site and removing injection facilities
5. Maintaining injection operations by the competent authority until a new storage permit is issued, if permit is withdrawn, including CO ₂ composition analysis, co-mingling of CO ₂ streams, risk assessment and registration and required reports of CO ₂ streams delivered and injected.	5. Making the required financial mechanism available to the competent authority

As shown in Table 1, some of the obligations to be covered by financial security may become moot or decrease with the passage of time. Specifically, after the site has been closed, the competent authority would have no need for financial security to cover temporary continuation of injection (i.e. to operate the site) nor would financial security for closure be necessary (because the site would have already been closed).

Once in the post-closure period, if the remaining time interval prior to site transfer decreases, the potential duration of monitoring obligations to be covered by financial security may also decrease.

3.4. Amounts of financial security

3.4.1. Responsibility for determining required amounts of financial security

Amounts of financial security can be derived by the operator and approved by the competent authority (in accordance with Article 9(9)), or by the competent authority with operator input. In either case, amounts should be based on:

- the relevant plans (e.g. the approved monitoring plan, the approved corrective measures plan and the approved provisional and updated post-closure plan);
- the performance of the storage site;
- costs for new relevant methods or technologies; or
- other obligations.

3.4.2. Principles for determining amounts of financial security

In preparing, reviewing or approving cost estimates that determine amounts of financial security, best practice consists of several principles.

1. Amounts should be sufficient for the competent authority and/or its agent (e.g. contractor) to perform the obligations stemming from the storage permit, while not hindering investment in the storage site operation.
2. Financial security and contingency costs should be calculated based on a site-specific assessment, considering technical risk and risk associated with the types of financial instruments used. The competent authority may request that an independent review of the site-specific risk assessment is commissioned and that the assessment of technical risk complies with the requirements of Step 3 in Annex I of the CCS Directive (see also Section 4.3 of GD 1).
3. Amounts of financial security for covering costs of uncertain future events should be probability weighted using conservative assumptions. This implies that the costs that may be incurred if an uncertain future event occurs should be multiplied by a conservative estimate of the likelihood of the event occurring, when calculating financial security amounts (see Box 1).
4. A cost-risk analysis should be applied to address uncertainties in the cost estimate. This can involve a Monte Carlo simulation approach combining all probability weighted future events, whereby the required contingency can be derived from the resulting cost-uncertainty distribution. Acceptable levels of the derived contingency and thereby the financial security amount can then be assessed by comparing the overall cost estimate distribution and its probabilistic values, such as the median (P50) and conservative (P90) values, with estimated costs for specific, individual, low-probability events with high costs (e.g. well blow-outs). The competent authority should communicate acceptable methodologies

for performing probabilistic or deterministic cost assessments and the resulting contingencies, and encourage the operator to describe and document the adopted costing methodology, data sources and assumptions. The methodology, data sources, and assumptions may be published by the competent authority, with the agreement of the operator.

5. Assumptions made in determining the amounts of financial security should be stated and agreed by the competent authority and operator, and included in the permit. This includes assumptions related to the availability to the competent authority of on-site equipment and infrastructure owned by or under the control of the operator of the storage site. This is relevant to enabling the competent authority to perform monitoring or take corrective action. Installing new equipment or infrastructure will generally entail greater cost and should therefore be avoided when possible.

Box 1: Example of principle 3 for determining amounts of financial security.

Here, the legacy wells are used to estimate corrective measures financial security rather than the injection well(s) because at the start of the project this produces the highest amount of financial security due to the low expected probability of them leaking.

A CO₂ storage project has 2 legacy wells, and the likelihood that leakage of CO₂ or formation fluids will occur in these wells during the project life is conservatively assessed to be 1.0×10^{-3} and 1.0×10^{-2} respectively. If leakage occurs, the operator has assessed that well intervention will be required, and that the cost of the well intervention will be between EUR 5 and 8 million.

Assuming well intervention costs will be EUR 8 million, the corresponding probability-weighted cost of intervention on legacy wells during operation is:

$$0.011 \times \text{EUR } 8 \text{ million} = \text{EUR } 88 \text{ 000.}$$

In addition to applying the principles for determining the amounts of financial security, the competent authority may also take into account any previous experience with the operator, as an understanding of its competency, capacity, financial position, geological knowledge of the storage area, ability to develop and operate the storage project or other established factors may be beneficial.

3.4.3. Calculating amounts of financial security in the event of permit withdrawal

Table 2 illustrates two scenarios that can arise if the competent authority decides to withdraw the storage permit during the injection phase. In accordance with Article 11(3), the competent authority can only withdraw the permit as a last resort. This suggests that the permit can only be withdrawn if the operator is in breach of permit conditions, or not able to stop leakages or implement required corrective measures to address significant irregularities, as per Article 11(3)(a-c).

The amount of financial security to be provided in the event of permit withdrawal should be based on the ‘minimum’ cost of the two options available to the competent authority:

- if the competent authority decides to close the storage site, the competent authority will need sufficient financial security for the closure and post-closure period; or
- if the competent authority decides to temporarily continue injection until a new permit is issued, the competent authority will need sufficient financial security until a new permit is issued.

If the competent authority decides to select the higher cost option, then the incremental cost of that option should be funded by the Member States by other means than through the financial security.

Table 2: Competent authority obligations in two scenarios after withdrawal of permit.

Competent authority withdraws permit and closes the site	Competent authority withdraws permit, but continues operations temporarily until new permit is issued
Monitoring, updates of monitoring plan and required reports on monitoring results through the end of the post-closure period	Monitoring, updates of monitoring plan and required reports on monitoring results for applicable period until new permit is issued
Updates of corrective measures plan and implementing corrective measures, including health protection measures through the end of the post-closure period	Updates of corrective measures plan and implementing corrective measures, including health protection measures until new permit is issued
Surrender of allowances for any emissions, including leakages, through to the end of the post-closure period	Surrender of allowances for any emissions, including leakages, until new permit is issued
Update of provisional post-closure plan, sealing the storage site and removing injection facilities	N/A
N/A	Temporary operation of storage site, including CO ₂ composition analysis, risk assessment, registration and required reports on CO ₂ streams delivered and injected until new permit is issued

The following subsections will provide guidance on calculating the amount of financial security for each of items 1-5 in Table 2.

In accordance with principle 3 in Section 3.4.2, conservative probability weighting should be applied to determine the amount of financial security for uncertain future events. This includes the amount of financial security for corrective measures (see Section 3.4.3.2) and amount of financial security for surrender of allowances (see Section 3.4.3.3).

It should be noted, however, that the estimated probability of future events occurring may change over time. The probability estimates should therefore be regularly updated to reflect changes in the risk profile for the site.

3.4.3.1. Calculating monitoring component of financial security

The amount of financial security for monitoring depends on:

- the duration of monitoring the financial security should cover; and
- the yearly cost of monitoring.

The approved monitoring plan will include information about monitoring activities, frequencies and equipment that can provide a basis for estimating costs.

Duration of monitoring

The operator should specify the assumptions applied to determine the duration of monitoring, and ensure that the amount of financial security is sufficient to cover the cost of monitoring for all relevant scenarios, including both circumstances in Table 2.

Article 18(1)(b) requires at least 20 years of monitoring after closure prior to transferring responsibility to the competent authority, unless the competent authority is convinced that the criterion in Article 18(1)(a) has been met before the 20 years has elapsed.

A 20-year post-closure monitoring period should be used as a starting point for calculating the amount of financial security, since the actual length of the post-closure period cannot be predicted in advance.

The duration of the post-closure monitoring period may be reconsidered if the site-specific post-closure plan demonstrates that quantitative key performance indicators used to measure compliance with the criteria for transfer (see GD 3) are likely to be met before the end of the 20-year post-closure period.

Annual costs of monitoring

Annual costs of monitoring depend on the scale, scope, and intensity of monitoring required. For example, a more expansive scale of monitoring may be required as more CO₂ is injected for storage, potentially from multiple CO₂ sources.

As described in GD 2, monitoring scopes may include:

- injection facilities;
- the storage complex;
- (where appropriate) the surrounding environment.

Increased monitoring intensity may be required if any leakages or significant irregularities are detected. These factors should be considered in a balanced manner when setting the initial amount for financial security and also in subsequent updates, taking into consideration the project-specific risk profile and available data. The annual costs of monitoring should include both the costs of a base case monitoring programme and a contingency monitoring programme for leakage scenarios.

The calculated annual monitoring cost should include the costs of updating the monitoring plan and preparing required reports of monitoring results. Monitoring costs

may include not only the direct costs of collecting and analysing monitoring data but also anticipated costs for maintaining, repairing and/or replacing (as necessary) the various components of the monitoring system, as may be needed over the relevant duration of monitoring.

3.4.3.2. Calculating corrective measures component of financial security

Obligations for corrective measures are described in Article 16, as well as in Article 11(4) and 17(2) regarding preventive and remedial actions in accordance with Articles 5 to 8 of Directive 2004/35/EC.

Articles 16(4) and (5) state that if the operator fails to take necessary corrective measures, the competent authority must do so and will recover its incurred costs, including by drawing on the financial security. Although the competent authority may withdraw the storage permit in this situation, withdrawal is not required. If the permit is not withdrawn, then the operator should be required to replenish the corrective measures financial security for amounts drawn by the competent authority.

The approved corrective measures plan should provide information about:

1. the likelihood that the described corrective measures are required;
2. the activities, labour, and equipment anticipated for different types of corrective measures, if they are required.

The plan can therefore form a technical basis for cost estimation. Considerations for defining the corrective measures plan are outlined in GD 2.

The amount of financial security for corrective measures should be conservatively weighted for probability in accordance with principle 3 in Section 3.4.2.

This means that estimated costs associated with item (2) above should be multiplied by a conservative estimate of the likelihood that the corrective measure is required.

The cost of the respective corrective measures (if required) will be affected by the following factors:

- **Scale, scope and duration.** The corrective measures plan will identify different scenarios calling for corrective measures, and will determine the scale, scope and duration of corrective measures. It is recommended that the future costs are estimated conservatively, relative to the uncertainty of these future costs. For instance, when determining the amount of financial security for corrective measures it is good practice to deploy cost estimates with 80% or higher confidence that the cost has not been underestimated.
- **Frequency.** Some corrective measures may be required more than once. The plan for any repeated implementation of corrective measures should be stated in the corrective measures plan.
- **Implementation period.** The amount of financial security should cover the cost of corrective measures during both the injection and post-closure periods.

3.4.3.3. Calculating component of financial security related to surrender of allowances

By virtue of the inclusion of geological storage sites under Annex I of the EU ETS Directive¹¹, installations will be required to surrender allowances for any leakages as defined by the CCS Directive and clarified in GD 1.

The leakages will be calculated in accordance with the Monitoring and Reporting Regulation (MRR) 2018/2066/EC, Annex IV, Section 23¹².

The amount of the financial security for this obligation can be based on the following formula:

$$\text{Amount of financial security} = (\sum_{\text{potential leakage events}} P(\text{event}) \times M(\text{event})) \times C(\text{allowances})$$

Where:

- $P(\text{event})$ = conservative estimate of likelihood of event occurring;
- $M(\text{event})$ = conservative estimate of mass of emissions if event occurs; and
- $C(\text{allowances})$ = estimate of cost of allowances for emissions.

Estimating potential leakage amounts

The determination of leaked amounts should be based on an evaluation of the site-specific leakage risks and the amount that can leak from each identified leakage pathway.

The amount of financial security for surrender of allowances should be based on an assessment of risk of leakage at the time the calculation is made, and should reflect the amount of CO₂ that has been injected. The estimated amount of leakage should then be updated throughout the project, as per Section 3.4.5.

Estimations of potential leakage amounts can be based on deterministic or probabilistic quantification approaches. If a probabilistic approach is used, then the competent authority should specify a particular percentile (e.g. 80%) that should be used to derive a 'conservative estimate of mass of emissions' from the probability distribution for estimated leakage, i.e. a value for $M(\text{event})$ in equation (1) above.

Estimating the costs of allowances

Emission Unit Allowance (EUA) prices vary with carbon market fluctuations. Therefore, to predict the future price of EUA (in order to determine the EUA price when a potential leakage event occurs), it is recommended that the operator uses projections of low- and

¹¹ <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32003L0087>.

¹² <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018R2066&rid=1>.

high-end EUA prices over the period until next revision of financial security, as per Section 3.4.5.

The base-case price may be based on the best-fit linear trend in the EUA price over the period since the revision of financial security.

The low- and high-end price may be based on the deviation from this linear trend over the period since the revision of financial security, i.e. the minimum and maximum EUA price, assuming that the best-fit linear trend observed continues over the next period.

3.4.3.4. Calculating the component of financial security related to closure and post-closure

The amount of financial security for closure and post-closure must be sufficient for:

1. updating the provisional post-closure plan during the closure period;
2. the costs of sealing the storage site and removing the injection facilities, including their recycling or disposal;
3. the estimated financial contribution to be provided, in accordance with Article 20¹³.

The activities, labour, equipment, and disposition plans for site closure should be described in the provisional post-closure plan. This plan can therefore provide a technical basis for estimating the amount required for closure financial security.

Although the operator may plan for closure to follow many years of successful operations, the amount of financial security should be sufficient to cover the eventuality that the facility must be closed earlier.

3.4.3.5. Calculating the component of financial security related to continued injection

In accordance with Article 11(4), the competent authority may temporarily continue CO₂ injection operations, following the withdrawal of a permit under Article 11(3). In doing so, the competent authority becomes responsible for legal obligations relating to CO₂ acceptance criteria, monitoring, potential corrective measures and surrender of allowances during the applicable period.

Article 11(4) authorises the competent authority to recover any costs it incurs from the former operator, including by drawing upon the financial security. This phrasing appears to allow Member States to require amounts of financial security for operating the site for

¹³ Article 19(3)(b)(ii) states that the financial security can only be released if the financial contribution under Article 20 has been provided. However, this condition might not be able to be met if, for example, the operator has become insolvent. The amount of financial security should therefore be sufficient to also cover the financial contribution required under Article 20.

the time period required to issue a new permit (e.g. 3 to 5 years), including all associated obligations (as per items 1, 2 and 3 in Table 2).

The amounts of financial security for site operations should initially be based on the operator's pro forma cash flow financial plan, and updated later using actual cost information from the operator. There should be no offset to the cost estimate for presumed revenues, which may be unlikely to materialise in this situation.

3.4.4. Accounting for the effects of inflation on the amount of financial security

Member States may take different approaches to reflect future inflation when determining amounts of financial security:

- **Method 1** – estimate all amounts (including for future years) in current year Euros and add up the yearly amounts;
- **Method 2** – inflate estimated costs in later years to incorporate potential for inflation and add up the yearly amounts;
- **Method 3** – periodically adjust the amount to account for actual inflation since the prior amount was calculated;
- **Method 4** – periodically recalculate financial security amounts anew, either in current-year (Method 1) or inflated (Method 2) Euros.

Methods 3 or 4 may be used to complement Methods 1 and 2 for purposes of updating financial security amounts.

Method 1 simplifies the determination of financial security amounts by excluding future inflation. There is some financial risk of underfunding the obligations with this method. Method 2 may also underestimate the future inflation. Regular updates to the financial security amounts can mitigate these financial risks. On the other hand, if Method 2 overestimates future inflation, then the operator will have incurred some unnecessary costs for financial security.

The technique of discounting can be used to determine a present value for a stream of monetary values over time. Discounting is used to calculate a present value by adjusting for both inflation and the time value of money. Member States may identify instances when discounting future amounts into a present value may be used as the required amount of financial security.

Discounting should be used only, if at all, in connection with financial security instruments where actual funds have been set aside in anticipation that their value will grow over time (e.g. in a trust fund or bank certificate of deposit).

It is recommended that the competent authority approves or determines the discount rate according to best practice and after tax, and that the discount rate reflects the earnings rate appropriate for the financial security instrument and the instrument's investment

restrictions, if any, and is consistent with the treatment of inflation in determining amounts of coverage.¹⁴

Otherwise, basing the financial security amount on the present value of the obligation is not appropriate. It is furthermore recommended that the competent authority approves or determines the discount rate for the obligation according to best practice and after tax, and that this discount rate is consistently used in determining amounts of coverage.

3.4.5. Periodic adjustment of the amount of financial security

Article 19(2) directs that the financial security must be periodically adjusted to take account of changes to the assessed risk of leakage and changes to the estimated costs of all obligations listed in Section 3.3.

Adjustments based on changes to the assessed risk of leakage should be based on the effect of changes to the site-specific leakage risk profile on the cost elements discussed in Section 3.4.2.

Such changes can occur as a result of factors such as:

- changes in scale or timing and volumes of injections;
- changes in the subsurface area covered by the CO₂ plume;
- advances in science and technology;
- changes in prices of emission allowances;
- inflation and currency exchange fluctuations;
- changes to the monitoring plan;
- changes to the corrective measures plan;
- updates to the provisional post-closure plan;
- changes to regulations; and
- changes to permits.

The CCS Directive does not specify when adjustments should be made to the amounts of the financial security (in the absence of a precipitating event, such as a change to the assessed risk of leakage). Member States may want to synchronise the timeframes for such updates with the timing of one of the following obligations:

- the monitoring plan must be updated every 5 years;
- the competent authority must review and where necessary update the storage permit 5 years after it was issued and every 10 years thereafter (in addition to the triggers listed in Article 11(3)(a)-(f)).

¹⁴ If Method 1 is used, the discount rate should not include an inflation component. If Method 2 is used, the discount rate may include an inflation component.

In scheduling periodic adjustments to the amounts of financial security, Member States may wish to consider the following:

- periods of high inflation may call for more frequent updates than periods of low inflation; and
- after closure, there will be no further injections, and changes in the subsurface area covered by the CO₂ plume should be minimal, suggesting that less frequent updates of financial security after closure may be acceptable.

3.5. Proof of validity and effectiveness of financial security

The operator is responsible for establishing and maintaining financial security. The operator must, as part of the storage permit application, present proof that adequate financial security will be valid and effective before injection starts.

The CCS Directive does not define what is meant by ‘valid and effective’ financial security instruments. The Member States should therefore provide clarity on what is required for the instruments to be valid and effective. The following options can be considered:

- an financial security instrument is ‘valid and effective’ when it satisfies the legal criteria for that type of instrument, is issued by an eligible party (see Appendix C), is enforceable by the competent authority and otherwise complies with the laws of the Member States jurisdiction where storage will occur; and
- an financial security instrument is ‘valid and effective’ when it has been properly executed by all required signatories and authorising, witnessing and/or attesting parties as being effective as of a stated date, prior to the date when injection starts.

Member States may require the documentation for the financial security in the permit application to include one or more of the following:

- draft of the financial security instrument and necessary accompanying documents (e.g. resolutions, powers of attorney);
- explanation how the financial security instrument satisfies the criteria for that type of instrument;
- demonstration that the issuing institution satisfies the eligibility criteria for issuers of that type of instrument;
- explanation of any deviation from the criteria and statement regarding the impact of such deviations on the certainty and liquidity of the financial security;
- independent legal opinion regarding financial security amount, validity and effectiveness;
- basis for proposed initial amounts of financial security, including description of all calculations, data, data sources and documentation of assumptions used; and

- confirmation that the financial security is sufficient, either independently or collectively (if more than one) to cover the estimated obligations.

If the operator seeks to add or replace a financial security instrument, the addition or replacement should be reviewed against criteria for instrument acceptability (Appendix A) and issuer eligibility (Appendix C).

The existing financial security should be valid and effective until the competent authority has approved the addition or replacement, after which the equivalent prior financial security instruments may be allowed to terminate or be cancelled.

Member States should further consider whether the validity or effectiveness of the associated financial security would be impaired by a proposed change in the entity serving as the operator of the storage site or a change in ownership of the site. For some instruments, such a change may require substitute or replacement financial security. Such changes may also affect issuer eligibility, where self- or related-party guarantees are being used.

3.6. Maintaining validity and effectiveness of financial security

Member State arrangements for financial security should include provisions relating to cancellation, termination, non-renewal, voiding or suspension of financial security instruments by issuers. Member States should consider requiring the following.

- No changes may be made to the terms and conditions of financial security instruments without the prior written approval of the competent authority (which is not to be unreasonably withheld or delayed).
- Sufficient prior notice should be given to operators and the competent authority of any intent by issuers to cancel, terminate, not renew, void or suspend an instrument so that a replacement instrument can be provided.
- The competent authority should be allowed to draw funds from an instrument prior to its cancellation, termination, non-renewal, voiding or suspension – if the operator does not produce an approved substitute instrument in good time. When reviewing proposed financial security instruments, the competent authority should consider that not all instruments will allow for such withdrawal.

As opposed to an issuer's voluntary decision to cancel, terminate, non-renew, void or suspend a financial security instrument, an instrument may become invalid or ineffective if the issuer:

- ceases to satisfy the eligibility criteria; or
- loses their legal authority to issue the financial security instrument.

Although desirable, giving prior advance notice of incapacity by the issuer to the operator and the competent authority may not be possible or may not occur. Member States should consider requiring that the operator provide a substitute or replacement financial

security instrument within a specified time period after learning of the issuer's incapacity to maintain a valid and effective financial security instrument.

3.7. Reporting

Article 14 states that at least once a year the operator must submit to the competent authority proof of establishing and maintaining the financial security. More frequent reporting, although authorised under the CCS Directive, should rarely be required.

Member States may wish to describe specific information to be provided by the operator in these annual maintenance reports. This could include the following:

- any changes made to the terms and conditions of financial security instruments without the written approval of the competent authority;
- evidence demonstrating that the issuing entity continues to meet eligibility criteria;
- information about costs (e.g. of site operations, of monitoring and of complying with CO₂ acceptance criteria); and
- evidence demonstrating that the financial security is still adequate with respect to the most recent risk assessment of the storage site.

Some financial security instruments may require additional information. For example, where an instrument (such as an insurance policy) requires regular payment of premiums, the operator's annual reports may provide evidence to the competent authority that the required payment was made. The operator should report when an instrument has been renewed or extended after a termination date.

3.8. Release of the obligation to maintain the financial security

Article 19 describes the following three situations when an operator no longer needs to maintain the financial security:

- when a new storage permit has been issued after the storage permit has been withdrawn in accordance with Article 11(3);
- when a storage site has been closed in accordance with Article 17(1)(a) or (b) and the responsibility for the storage site is transferred to the competent authority in accordance with Article 18(1) to (5); and
- where the site is closed in accordance with Article 17(1)(c) until the transfer of responsibility under Article 18(8), provided the Article 20 financial obligations have been fulfilled.

The competent authority should formally release the financial security to the operator following these situations. The competent authority should also release certain components of the financial security when it is no longer required to meet financial security obligations.

For example, after the operator completes closure, the competent authority should consider releasing the following financial security components:

- financial security for closure, and
- financial security for temporary continuation of injection.

Member States should provide transparency regarding the criteria and procedure for releasing financial security components. The competent authority should, for instance, clarify whether:

- the operator must ask the competent authority for permission to release the financial security, and the reasons for which the competent authority may decline to release the financial security;
- the operator may unilaterally release the financial security; or
- the competent authority alone may release the financial security.

Issuers should be formally notified about any release of financial security, including when the financial security need no longer be maintained.

Where the financial security took the form of funds or other assets given to the custody of the competent authority, release will entail the return of those funds or other assets to the operator. The competent authority is recommended to require a written receipt or acknowledgement from the operator as evidence that the financial security was received by the operator.

4. Financial contribution

Article 19 Financial security and Article 20 Financial mechanism in the CCS Directive are linked by similar intent, and by similar options available to Member States:

1. One intent of Article 19 is to ensure that the costs of performing the obligations listed in Section 3.3 can be fulfilled, if the operator is unable or unwilling to do so, or if the permit is withdrawn under Article 11(3).

Article 19 also intends to limit any delays in the performance of these obligations by ensuring that funds are readily available.

Article 20 shares the intent that the post-transfer costs of at least the monitoring obligation for a period of 30 years need to be fully covered by the operator and that necessary funds be made readily available to the competent authority.

2. The same principles used to determine the financial security can be used to determine the financial contribution covered by the financial mechanism. There is, however, a significantly different risk profile for storage sites before and after responsibility is transferred in accordance with Article 18. This may impact the appropriateness of the instruments, as well as the cost to obtain and maintain them.

The competent authority is recommended to perform a robust and independent review of the risks for each phase before approving an instrument. Before accepting a financial mechanism, the competent authority is recommended to take the operational history of the storage site into consideration, in order to assess the risk profile of the storage site post-transfer and thus the acceptable size and format of the financial mechanism.

This section elaborates on how the financial contribution to be covered by the financial mechanism can be estimated, to provide transparency and predictability for operators. Due to the similarities in the intent and options noted above, this section will focus on options for the financial contribution that may differ from the guidance for the financial security, and it will discuss provisions that are unique to Article 20.

Member States should specify procedures and timetables for the financial contribution. It is anticipated that the financial contribution will involve a one-time transaction between the operator and the competent authority, but Member States may allow other arrangements. The financial contribution should be considered available to the competent authority when the competent authority can exercise exclusive rights of ownership, control, possession and disbursement of the financial contribution, and the operator transfers to the competent authority or relinquishes all rights and claims with respect to the financial contribution.

However, although the financial contribution need not be made available to the competent authority until the end of the post-closure period, the operator's injection-related revenues will have ceased with site closure and there might appear to be a financial risk to the competent authority, unless the financial contribution has been secured at an early stage of the storage project.

Art. 19(3)(b)(ii) requires that the financial security can only be released if the financial contribution under Art. 20 has been provided. However, this condition might not be able to be met if, for example, the operator has become insolvent and if the financial security has at this stage already been exhausted to meet other obligations under the storage permit. Therefore, the financial security should in substance also cover the financial contribution required under Art. 20.

4.1. Legislative context

Article 20(1):

‘Member States shall ensure that the operator, on the basis of arrangements to be decided by the Member States, makes a financial contribution available to the competent authority before the transfer of responsibility pursuant to Article 18 has taken place. The contribution from the operator shall take into account those criteria referred to in Annex I and elements relating to the history of storing CO₂ relevant to determining the post-transfer obligations, and cover at least the anticipated cost of monitoring for a period of 30 years. This financial contribution may be used to cover the costs borne by the competent authority after the transfer of responsibility to ensure that the CO₂ is completely and permanently contained in geological storage sites after the transfer of responsibility’.

Article 18(1) states that the post-transfer obligations of the competent authority include the following:

- monitoring – reduced level which will enable leakages or significant irregularities to be detected (Article 18(6));
- corrective measures in the event of leakages or significant irregularities;
- surrender of allowances in the event of leakages, in accordance with the ETS Directive; and
- obligations for preventive and remedial action under Articles 5(1) and 6(1) of Directive 2004/35/EC.

Some financial mechanism approaches may trigger state aid, such as when the competent authority accepts a lower financial contribution than required by the CCS Directive. Where state aid within the meaning of Article 107(1) of the Treaty on the Functioning of the EU (TFEU) is involved in establishing the financial contribution, in accordance with Article 108 of the TFEU, that state aid must be notified to and authorised by the Commission before it is granted.

4.2. Obligations to be covered by the financial contribution

The CCS Directive does not require that the financial contribution covers all costs which the competent authority will incur for the post-transfer obligations, but requires that the financial contribution covers ‘at least the anticipated cost of monitoring for a period of 30

years'. Member States should clarify their requirements for items that are to be included in calculating the financial contribution.

As per Article 18(1), the financial contribution should cover costs for three principle components:

- **Monitoring.** The plan for post-transfer monitoring should be based on the assessment of any residual risk of future leakage and any residual risk to the environment and human health. For circumstances where such residual risk is considered to warrant monitoring, the competent authority should conduct monitoring at a level which allows for detection of leakages or significant irregularities. If any leakages or significant irregularities are detected, monitoring must be intensified as required, to assess the scale of the problem and the effectiveness of corrective measures.
- **Corrective measures and preventive and remedial action.** As per GD 3, a pre-condition for transfer is that 'modelling projections demonstrate that the CO₂ will remain contained through various trapping mechanisms in the storage complex over the modelled time-period, and that there is no significant risk for future leakage'. The likelihood that corrective measures or preventive or remedial action is required is therefore low.
- **Surrender of allowances.** In the unlikely event that leakage does occur after transfer, the financial contribution should cover costs related to the surrender of any allowances.

4.3. Estimating the amount of the financial contribution

The principles and approach described in Section 3.4.2 to determine amounts of financial security may also be used for estimating the amounts of the financial contribution. This means that costs related to obligations that are certain to occur (i.e. monitoring at a level which allows for detection of leakages or significant irregularities for at least 30 years) should be estimated deterministically; and that estimated costs associated with contingent obligations should be probability weighted. The latter relates to obligations that occur if leakages or significant irregularities are detected, i.e.:

- intensification of monitoring as required to assess the scale of the problem and the effectiveness of corrective measures;
- implementation of corrective measures and preventive and remedial action; and
- surrender of allowances.

However, whereas the calculation of the amount of the financial security related to contingent obligations should use a conservative probability weighting, it is recommended that the corresponding amount of the financial contribution is calculated based on a best estimate of the likelihood of the associated future events.

This means that the best estimate of contingent costs should be multiplied by the best estimate of the probability that the event giving rise to the contingent cost will occur. This will then ensure that the financial contribution does not put an undue cost-burden on project developers.

Section 3.4.3.4 clarifies that the financial contribution should be incorporated into the estimated amount of the financial security related to closure and post-closure. Section 3.4.5 further specifies that the amount of financial security must be periodically adjusted to take account of changes to the assessed risk of leakage and the estimated costs of all obligations.

This therefore means that amount of the financial contribution should be adjusted, as required, based on the site's history, risk profile, technology developments and other relevant information, including the occurrence of any leakages or significant irregularities or the detection of significant adverse effects, and the effectiveness of any corrective measures taken.

Appendix A: Acceptance criteria for financial security instruments

Member States may wish to evaluate the following criteria when determining which instruments to accept as financial security:

1. **Certainty** presented by the instrument. For example:

- Will the instrument be valid and effective in the Member State jurisdiction where the storage site is located?
- Is the financial security instrument accessible and enforceable by the competent authority in the Member State jurisdiction where the storage site is located?
- Will the instrument protect the financial security against claims by creditors and other competing claimants in the event of the operator's insolvency or bankruptcy?
- Will the instrument effectively remove the financial security from the operator's ownership or control?
- Under what conditions, if any, can the financial security instrument be cancelled, terminated, non-renewed, voided or suspended?
- Is the instrument issuer a financial institution that is subject to financial supervisory oversight of its solvency?
- For parent company guarantees or self guarantees, what is the company's corporate credit rating?

2. **Amount of funds guaranteed.** For example:

- Is there an adequate level of confidence that the funds will be sufficient to cover all obligations listed in Section 3.3? For instance, are the scenarios used in Section 3.4.2 to determine the probability weighting as per principle 3 adequately conservative?
- Will the instrument provide the necessary coverage if funds are required prior to a future maturity date? (This may be an issue for deposit certificates which impose a penalty for liquidation prior to maturity.)
- Will the instrument cover funding needs from the first euro? (This may be an issue for instruments such as types of insurance that include a deductible or retention which remains the responsibility of the operator.)
- Is the value of the security independent of the operator's financial situation? Other operator assets may be subject to prior or subsequent claims in whole or in part by regulators, authorities, lenders, suppliers or customers, thus impairing their value.

3. **Liquidity** of funds (can they be accessed whenever needed, with no penalty?). What conditions must be met for the competent authority to gain access to the security? (For example, must proof of the operator's default be adjudicated?)

4. **Duration** or term of the instrument. How often must the instrument be renewed or replaced, given the expected duration of the permit?
5. **Flexibility regarding necessary adjustments.** For example, if the required amount of financial security coverage increases, can the instrument be readily amended accordingly or will an additional financial security instrument be required to make up the difference?

Appendix B: Options for financial security instruments

A.B.1 Funds ('deposits') to the competent authority

Deposits are typically provided as a lump sum but possibly also as instalment payments. This gives funds directly into the custody and control of the competent authority, which can either create an account on behalf of the operator or turn the funds over to the government treasury.

This approach puts the responsibility on the competent authority to access funds when needed and to return funds to the operator when the financial security is released. Whether the funds earn interest will vary across Member States.

Unlike with trust funds and escrows, the competent authority itself will be responsible for all recordkeeping. The competent authority is recommended to protect the funds from other uses by ring-fencing the financial security, ensuring it is available throughout all relevant project phases.

A.B.2 Collectively financed CO₂ fund

This may involve either a state-owned or private body collecting fees from the operators of various projects prior to or during operation, linked to e.g. a euro amount per tonne stored.

The CO₂ fund may in return provide financial security for all or parts of the liabilities during the individual project's lifetime, depending on the approval of the competent authority.

Following the instructions of the competent authority, the CO₂ fund may release funds as needed to satisfy obligations, when the operator is unable or unwilling to do so, or as a financial contribution prior to transferring responsibility under Article 18, in accordance with Article 20.

A.B.3 Irrevocable trust fund

This involves the legal transfer of property to a trustee who acts as a fiduciary on behalf of the competent authority, which is the beneficiary of the trust. The trust is considered irrevocable because the operator cannot unilaterally terminate the trust and reclaim the property.

A trust is advantageous when the property constituting the trust is protected from claims in the event that the operator becomes insolvent or goes bankrupt. The trustee provides or arranges for the professional management of property in the trust.

The certainty of the availability of funds is increased by restrictions on investing the trust fund in any stock, bonds or other securities of the operator and its legal affiliates (including corporate parents and subsidiaries). This certainty could outweigh the lost income from investing the trust fund in higher risk securities, which typically provide a higher return.

Following the instructions of the competent authority, the trustee may release the trust fund assets to the operator when the financial security is no longer required or as reimbursement for expenses incurred by the operator. Alternatively, the competent authority can instruct the trustee to release assets as needed to satisfy obligations, when the operator is unable or unwilling to do so.

A.B.4 Parent company guarantee/affiliated company guarantee/self-guarantee

This is an agreement in which one party, called the guarantor, takes on the payments or obligations from the debtor if the debtor is unable or unwilling to do so. This also includes issuance of an 'equity commitment letter' issued to the operator from one or more of its equity holders.

In the event of self-guarantee, the corporation or legal entity responsible for providing the financial security will also be the guarantor. To this end, proof must be provided that adequate funds for the financial security cannot be accessed by the company for other purposes than to cover the obligations covered by the financial security in accordance with Article 19.

Member States and competent authorities should ensure that guarantee requirements are limited to covering the obligations under the CCS Directive, based on a site-specific assessment.

A.B.5 Escrow

This involves setting aside property in accordance with a written agreement. Legal protection of escrowed property from the claims of creditors may not be available in some Member States.

Escrows that are revocable by the operator lack the desired certainty for a financial security. The escrow agent is not typically a fiduciary of the beneficiary, but instead is responsible to the party putting property into the escrow.¹⁵

¹⁵ In many parts of Europe notaries have traditionally functioned as depositories who stored and administered valuables on behalf of their clients. In some MS jurisdictions notaries may be able to provide escrow agent services.

A.B.6 Bank guarantees

These can take many forms. For example, a bank guarantee may accompany a cheque drawn on the operator's account; a guarantee like this gives assurance to the competent authority that the operator's cheque will be honoured by the bank.

Bank guarantees often are used as a performance bond, to allow the beneficiary (e.g. the competent authority) to make a demand on the bank in the event of non-performance of the obligations covered by the guarantee.

Banks may issue a payment guarantee instead of a standby letter of credit.

The International Chamber of Commerce developed Uniform Rules for Demand Guarantees (URDG) in 1991 and revised the rules and model forms in 2010.

The UN Convention on Independent Guarantees and Stand-by Letters of Credit is designed to facilitate the use of independent guarantees and standby letters of credit where only one or the other of those instruments is traditionally in use.

A.B.7 Irrevocable standby letter of credit issued by a bank

The competent authority can draw funds from the letter of credit to use for the costs of the assured obligations. Although irrevocable by the operator, the issuing bank may set a finite term on the letter so that the issuing bank can periodically review the operator's creditworthiness. This instrument is widely used in international commerce, following the Uniform Customs and Practice for Documentary Credits of the International Chamber of Commerce.

A.B.8 Bond issued by a surety company (or a bank)

The bond gives assurance to the competent authority that, if the operator fails to perform its assured obligations, the surety will make the required amounts available ('payment bond') or will arrange for performance of the obligation ('performance bond').

Surety companies make bonds available only to creditworthy parties. Bonds are effective until cancelled or terminated; sureties may set a finite term on the bond because the operator's creditworthiness may change over time. Bond terms of 5 to 10 years are not uncommon.

Some Member States may not have legislation authorising surety bonds. Surety bonds are industry standard in the United States for drilling activities and 'plugging and abandonment' ('P&A') to ensure payment for and performance of well P&A. They are not as commonly used in the European market.

A.B.9 EU emission allowances (EUAs)

To provide funds for possible surrender of allowances for leakage, in accordance with the CCS Directive, and as per inclusion of geological storage sites as an EU ETS facility under Directive 2003/87/EC, the operator may elect to purchase excess emission allowances and include these excess allowances in the financial security or financial contribution.

This instrument has the advantage of avoiding risk related to EUA price changes for potential future leakages and associated surrender of allowances.

Member States should consider whether these EUAs, even when placed outside the administrative control of the operator (e.g. in a trust fund, or transferred directly to the competent authority), provide sufficient certainty, amount, liquidity and duration to be acceptable as equivalent to a financial security.

Member States should in any case ensure that EUAs held as a financial security to meet obligations arising from inclusion of the storage site under ETS Directive 2003/87/EC are not held as financial security for any other purposes, or for emissions at the same time. In this case, the amount of EUAs tendered as financial security should be equal to at least the amount of allowances used to determine the amount of required financial security, as described in Section 3.4.3.3.

The EUAs valid in a certain trading period held as financial security should be replaced in a timely fashion by a substitute, e.g. by banking the allowances in accordance with Article 13(2), second subparagraph, of Directive 2003/87/EC.

If the operator chooses to use EUAs as a financial security to meet the obligations arising from inclusion of the storage site under Directive 2003/87/EC, instead of EUAs, EUA futures or forwards can also be used.

Appendix C: Eligibility criteria for issuers of financial security instruments

The security provided by a financial security instrument depends on the terms and conditions of the instrument and on the financial strength of the body issuing the instrument. Therefore, an Member States may wish to define criteria for determining acceptable issuers.

To this end, the Member States can adopt eligibility criteria used for national financial security programmes for waste facilities (e.g. landfills), extractive operations, decommissioning of offshore installations, trans-border movements of hazardous waste, environmental liabilities under Directive 2004/35/EC, waste management in accordance with Directive 2008/98/EC, and similar programmes, taking into account lessons learned from those programmes.

A.C.1 Criteria for determining the eligibility of issuers that are financial institutions

Member States and competent authorities may wish to specify criteria for identifying types of institutions eligible to issue acceptable financial security instruments for purposes of Article 19. Criteria may address the types, sizes or other characteristics of such institutions.

For example, if a Member State decides that bank guarantees are acceptable instruments, it is recommended that the Member State determine whether to accept such guarantees from any bank or only from certain types of banks, banks of certain sizes, or banks meeting other criteria (e.g. credit ratings from recognised or accredited rating organisations).

It is recommended that eligibility criteria are chosen to support the certainty and liquidity of an instrument and in consideration of the enforceability of the instrument by the competent authority. For example, issuing institutions that are subject to a higher level of financial supervision and approval may provide greater certainty and liquidity than institutions subject to less oversight.

Member States should keep in mind that as eligibility criteria become more stringent, fewer issuers may qualify, which can affect the availability and cost of financial security instruments to operators.

A.C.2 Eligibility criteria for instruments issued by government agencies

Member States may decide that eligibility criteria are not needed when the financial security instrument is issued by a national government. Governments typically have ample liquidity and can secure funds through their powers to tax.

Governments at sub-national levels and government agencies lacking legal authority to tax or otherwise raise funds may provide less certainty and liquidity. Member States may wish to specify eligibility criteria for such bodies. Criteria may relate eligibility to their type, size, financial characteristics or other features (e.g. credit ratings from recognised or accredited rating organisations).

A.C.3 Eligibility criteria for self-insurance, captive insurance, and related-party guarantors

Eligibility criteria are important when the issuer of the allowable Financial security instrument is the operator themselves or a related corporate parent or subsidiary. Financial security provided by such instruments do not entail a potential independent third-party source of funds; without that independence, there is a greater risk that whatever may cause the need for financial security also may cause the self- and related-party instruments to fail.

Because of this lack of independence, some Member States may decide not to accept such instruments. Other Member States may decide to accept such instruments because:

- the probabilities of issuer default for self or related-party guarantees remain exceedingly low, even if somewhat greater than for default by an issuing financial institution;
- the costs of alternative instruments are much higher;¹⁶
- alternative instruments are not readily available;
- some bodies issuing self and related-party guarantees may have greater resources than banks and other financial institutions.

Eligibility criteria for issuers of acceptable self-guarantees and related-party guarantees may be based on the issuers' size, type of organisation (e.g. a public utility), indicators of financial strength or other characteristics that may affect the certainty and liquidity of their commitments (e.g. credit ratings from recognised or accredited rating organisations).

As is true for the other categories of issuing institutions, eligibility criteria will reduce the potential pool of parties that may provide acceptable financial security instruments, with possible implications for cost and competition.

¹⁶ The costs of alternative instruments will always be greater than the nominal costs of self- and related-party instruments. Alternative instruments provided by financial institutions are often issued for customers who are considered creditworthy. The costs of such instruments should not be interpreted as evidence of the customer's potential for default. Instruments acceptable for financial security purposes are intentionally not well-suited for speculative activities.

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