

Public consultation: Industrial Carbon Management

Fields marked with * are mandatory.

Introduction

This public consultation gives you the opportunity to share your views on the technological options available for the transport, use, and storage of carbon dioxide (CO₂) captured from fossil fuel, biogenic or atmospheric sources, e.g. directly from the air.

These processes are known as:

- Carbon Capture and Storage (CCS): when the CO₂ is captured from industrial emissions or directly from the air and subsequently permanently stored
- Carbon Capture and Utilisation (CCU): when the CO₂ is captured and reused (e.g. through mineralisation or to make fuels and other products)
- Industrial Carbon Removals: when the process leads to net negative CO₂ emissions e.g. when the CO₂ is captured from non-fossil industrial sources and permanently stored. This consultation is concerned only with technological carbon removal solutions, not nature-based solutions.

In October 2022, the Commission announced its intention to develop a Communication on its strategic vision for the deployment of Carbon Capture, Utilisation and Storage (CCUS) in the EU, to be published by the end of 2023. The main purpose of the public consultation is to gather views and opinions on various CCS, CCU and Industrial Carbon Removals related issues, including specific policy recommendations. The feedback will inform the development of an EU strategy on industrial carbon management.

Guidance on the questionnaire

This public consultation consists of a set of introductory questions related to your profile, followed by a questionnaire split into two sections: a general section and a section for experts. Please note that you are not obliged to respond to both parts, and you can choose to fill in only the general part.

The results of the questionnaire will be published online, along with uploaded position papers and policy briefs.

About you

* Language of my contribution

- Bulgarian
- Croatian

- Czech
- Danish
- Dutch
- English
- Estonian
- Finnish
- French
- German
- Greek
- Hungarian
- Irish
- Italian
- Latvian
- Lithuanian
- Maltese
- Polish
- Portuguese
- Romanian
- Slovak
- Slovenian
- Spanish
- Swedish

* I am giving my contribution as

- Academic/research institution
- Business association
- Company/business
- Consumer organisation
- EU citizen
- Environmental organisation
- Non-EU citizen
- Non-governmental organisation (NGO)
- Public authority
- Trade union
- Other

* First name

Aymeric

* Surname

Brouillac

* Email (this won't be published)

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* Organisation name

255 character(s) maximum

TotalEnergies

* Organisation size

- Micro (1 to 9 employees)
- Small (10 to 49 employees)
- Medium (50 to 249 employees)
- Large (250 or more)

Transparency register number

255 character(s) maximum

Check if your organisation is on the [transparency register](#). It's a voluntary database for organisations seeking to influence EU decision-making.

1849405799-88

* Country of origin

Please add your country of origin, or that of your organisation.

This list does not represent the official position of the European institutions with regard to the legal status or policy of the entities mentioned. It is a harmonisation of often divergent lists and practices.

- Afghanistan
- Djibouti
- Libya
- Saint Martin
- Åland Islands
- Dominica
- Liechtenstein
- Saint Pierre and Miquelon
- Albania
- Dominican Republic
- Lithuania
- Saint Vincent and the Grenadines

- Algeria
- American Samoa
- Andorra
- Angola
- Anguilla
- Antarctica
- Antigua and Barbuda
- Argentina
- Armenia
- Aruba
- Australia
- Austria
- Azerbaijan
- Bahamas
- Bahrain
- Bangladesh
- Barbados
- Belarus
- Belgium
- Belize
- Benin
- Bermuda
- Bhutan
- Bolivia
- Bonaire Saint Eustatius and Saba
- Bosnia and Herzegovina
- Ecuador
- Egypt
- El Salvador
- Equatorial Guinea
- Eritrea
- Estonia
- Eswatini
- Ethiopia
- Falkland Islands
- Faroe Islands
- Fiji
- Finland
- France
- French Guiana
- French Polynesia
- French Southern and Antarctic Lands
- Gabon
- Georgia
- Germany
- Ghana
- Gibraltar
- Greece
- Greenland
- Grenada
- Guadeloupe
- Guam
- Luxembourg
- Macau
- Madagascar
- Malawi
- Malaysia
- Maldives
- Mali
- Malta
- Marshall Islands
- Martinique
- Mauritania
- Mauritius
- Mayotte
- Mexico
- Micronesia
- Moldova
- Monaco
- Mongolia
- Montenegro
- Montserrat
- Morocco
- Mozambique
- Myanmar/Burma
- Namibia
- Nauru
- Nepal
- Samoa
- San Marino
- São Tomé and Príncipe
- Saudi Arabia
- Senegal
- Serbia
- Seychelles
- Sierra Leone
- Singapore
- Sint Maarten
- Slovakia
- Slovenia
- Solomon Islands
- Somalia
- South Africa
- South Georgia and the South Sandwich Islands
- South Korea
- South Sudan
- Spain
- Sri Lanka
- Sudan
- Suriname
- Svalbard and Jan Mayen
- Sweden
- Switzerland
- Syria

- Botswana
- Bouvet Island
- Brazil
- British Indian Ocean Territory
- British Virgin Islands
- Brunei
- Bulgaria
- Burkina Faso
- Burundi
- Cambodia
- Cameroon
- Canada
- Cape Verde
- Cayman Islands
- Central African Republic
- Chad
- Chile
- China
- Christmas Island
- Clipperton
- Cocos (Keeling) Islands
- Colombia
- Comoros
- Congo
- Cook Islands
- Guatemala
- Guernsey
- Guinea
- Guinea-Bissau
- Guyana
- Haiti
- Heard Island and McDonald Islands
- Honduras
- Hong Kong
- Hungary
- Iceland
- India
- Indonesia
- Iran
- Iraq
- Ireland
- Isle of Man
- Israel
- Italy
- Jamaica
- Japan
- Jersey
- Jordan
- Kazakhstan
- Kenya
- Netherlands
- New Caledonia
- New Zealand
- Nicaragua
- Niger
- Nigeria
- Niue
- Norfolk Island
- Northern Mariana Islands
- North Korea
- North Macedonia
- Norway
- Oman
- Pakistan
- Palau
- Palestine
- Panama
- Papua New Guinea
- Paraguay
- Peru
- Philippines
- Pitcairn Islands
- Poland
- Portugal
- Puerto Rico
- Taiwan
- Tajikistan
- Tanzania
- Thailand
- The Gambia
- Timor-Leste
- Togo
- Tokelau
- Tonga
- Trinidad and Tobago
- Tunisia
- Türkiye
- Turkmenistan
- Turks and Caicos Islands
- Tuvalu
- Uganda
- Ukraine
- United Arab Emirates
- United Kingdom
- United States
- United States Minor Outlying Islands
- Uruguay
- US Virgin Islands
- Uzbekistan
- Vanuatu

- Costa Rica
- Côte d'Ivoire
- Croatia
- Cuba
- Curaçao
- Cyprus
- Czechia
- Democratic Republic of the Congo
- Denmark
- Kiribati
- Kosovo
- Kuwait
- Kyrgyzstan
- Laos
- Latvia
- Lebanon
- Lesotho
- Liberia
- Qatar
- Réunion
- Romania
- Russia
- Rwanda
- Saint Barthélemy
- Saint Helena
- Ascension and Tristan da Cunha
- Saint Kitts and Nevis
- Saint Lucia
- Vatican City
- Venezuela
- Vietnam
- Wallis and Futuna
- Western Sahara
- Yemen
- Zambia
- Zimbabwe

The Commission will publish all contributions to this public consultation. You can choose whether you would prefer to have your details published or to remain anonymous when your contribution is published. **For the purpose of transparency, the type of respondent (for example, 'business association', 'consumer association', 'EU citizen') country of origin, organisation name and size, and its transparency register number, are always published. Your e-mail address will never be published.** Opt in to select the privacy option that best suits you. Privacy options default based on the type of respondent selected

* Contribution publication privacy settings

The Commission will publish the responses to this public consultation. You can choose whether you would like your details to be made public or to remain anonymous.

Anonymous

Only organisation details are published: The type of respondent that you responded to this consultation as, the name of the organisation on whose behalf you reply as well as its transparency number, its size, its country of origin and your contribution will be published as received. Your name will not be published. Please do not include any personal data in the contribution itself if you want to remain anonymous.

Public

Organisation details and respondent details are published: The type of respondent that you responded to this consultation as, the name of the organisation on whose behalf you reply as well as its transparency number, its size, its country of origin and your contribution will be published. Your name will also be published.

I agree with the [personal data protection provisions](#)

Part 1 - General public questions

CCS is a technology whereby CO₂ is captured at industrial installations or directly from the air. The CO₂ is then transported to a permanent storage site where it is injected deep underground. This process could lead to negative emissions when the captured CO₂ is of atmospheric or biogenic origin. It is then called Industrial Carbon Removals. In both cases, the environmental integrity of the storage sites used is ensured through permits that are awarded in compliance with Directive 2009/31/EC (e.g. permanence, monitoring, liability, etc.)

Carbon removals, or the removal of CO₂ from the atmosphere, are integral to achieving climate neutrality by 2050. Important international organisations and institutions, such as the Intergovernmental Panel on Climate Change (IPCC), International Energy Agency (IEA) and the USA National Energy Technology Laboratory (NETL) argue, in line with the European Commission, that without carbon removals it will be difficult to achieve the Paris Agreement goal of limiting temperature rise to well below 2°C.

Instead of storing CO₂ permanently, it can be used in some industrial processes as input. It can also be used to make synthetic fuels or more permanent products like cement or plastics. These applications are referred to as CCU.

Taken together with all other decarbonisation and energy technologies CCS, CCU and Industrial Carbon Removals are part of the toolbox of solutions that will be needed to reach the EU's legally binding target of climate neutrality by 2050. The target is enshrined in the European Climate Law (Regulation (EU) 2021 /1119), which requires that GHG emissions and carbon removals are balanced within the Union by 2050 at the latest, and that the EU shall aim to achieve net negative emissions thereafter.

- * 1. Have you heard about CCS technology?
 - No, I have never heard of it.
 - Yes, but I don't really know what it is.
 - Yes, I have heard of it and know what it is.

- * 2. Have you heard about CCU technology?
 - No, I have never heard of it.
 - Yes, but I don't really know what it is.
 - Yes, I have heard of it and know what it is.

- * 3. Have you heard about Industrial Carbon Removals?
 - No, I have never heard of it.
 - Yes, but I don't really know what it is.
 - Yes, I have heard of it and know what it is.

4. Do you think that the European Commission should:

	Yes	Yes, but only to a limited extent	No	No opinion
* Do more to communicate the advantages and risks of CCS	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Do more to communicate the advantages and risks of CCU	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Do more to communicate the advantages and risks of Industrial Carbon Removals	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

5. Do you think that the European Commission should:

	Yes	Yes, but only to a limited extent	No	No opinion
* Support the deployment of CCS	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Support the deployment of CCU	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Support the deployment of Industrial Carbon Removals	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Part 2 - Expert questions (in English only)

Overarching questions

1. Considering the [sixth assessment report of the Intergovernmental Panel on Climate Change \(IPCC\)](#) and the European energy and climate objectives do you think that the EU should do more to facilitate deployment of: (multiple answers possible)

- Carbon capture and storage.
- Carbon capture and utilisation.
- Industrial carbon removals (negative carbon emissions via technological solutions).
- Natural carbon removals (negative carbon emissions via nature-based solutions).
- It shouldn't facilitate deployment of either of any of these options other GHG emissions reduction measures should be prioritised.
- I have no opinion.

Please explain your choice

500 character(s) maximum

TotalEnergies regards a technology open and market-based approach for Europe to achieve European Carbon Neutrality objective by 2050. Considering the IPCC AR6 WGIII report, the deployment of CCS for power infrastructures should be facilitated.

2. Why should CO2 capture in Europe be applied? (multiple answers possible)

- To reduce carbon emissions from hard-to abate industrial sectors like steel or cement.
- To reduce carbon emissions from gas based hydrogen production.
- To reduce carbon emissions from power generation.
- To reduce carbon emissions from heat and power plants.
- To generate negative emissions (e.g. DACCS).
- To use CO2 use as carbon feedstock for production (to substitute the use of fossil carbon).
- No CO2 capture is needed.
- I have no opinion.

Please explain your choice

500 character(s) maximum

Europe and industrials need a solution portfolio to their carbon neutrality and Energy security objectives. It requires a comprehensive and technology-neutral approach with a rigorous approach on impact assessment. CCUS could be deployed in various energy and industrial sectors. BECCS should be deployed before DACS as a Carbon removal solution according to sustainable biomass availability.

3. Which power generation technology with added CCS should play a role in a decarbonised EU power market? (multiple answers possible)

- Power production based on sustainable biomass.
- Coal fired power plants.
- Gas fired power plants.
- Waste incineration.
- None.
- I have no opinion.

4. In line with the objectives of the EU circular economy and the [cascading principle](#), should it be mandatory to equip large-scale installations where municipal household waste is incinerated to provide heating and electricity (or both) with CO2 capture?

- Yes.

- No.
- I have no opinion.

5. In order to transport captured CO₂ emissions to areas where they can be safely and permanently stored underground or used in products, new infrastructure is needed. Are public funds necessary to stimulate the deployment of such infrastructure to facilitate emitting industries to transport their CO₂ for permanent storage or sustainable use?

- Yes.
- Yes, but only for a limited period of time, to kick-start the market.
- No, the market alone is able to deliver on those investments.
- No, other measures such as regulatory or market-based instruments are sufficient and more appropriate to create the necessary incentives.
- I have no opinion.

6. The Commission has encouraged Member States to include in their updated National Energy and Climate Plans (NECP) actions enabling capture and permanent storage of CO₂ in accordance with Directive 2009/31/EC. Are you satisfied with the way stakeholders are involved in the NECPs in identifying hard-to-abate emissions and developing decarbonisation roadmaps with assigned roles to CCS, CCU and carbon removals?

- Yes.
- No.
- I have no opinion.

7. Do you expect the deployment of CCS, CCU or Industrial Carbon Removals to have any of the following negative effects? (multiple answers possible)

- Discourage investments in research and development of renewable energy technologies and/or energy efficient production processes.
- Discourage investments in the deployment of renewables.
- Discourage investments in decarbonised industrial processes not based on CCS or CCU.
- Stimulate new investments in fossil energy generation or industrial production based on fossil fuels.
- None of the above.
- I have no opinion.

8. At the EU level, do you think we need the following: (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* A comprehensive Action Plan on CCS, CCU and industrial carbon removals with quantifiable and verifiable milestones looking towards 2050 (with 2030-2040 intermediate goals)	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* New regulations in addition to third-party access to CO2 transport networks and storage sites, as guaranteed by Articles 21 and 22 of Directive 2009/31/EC	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* The establishment of a dedicated EU level regulatory authority responsible for CO2 transport and storage infrastructure	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* An integrated network planning at the EU level (including e.g. cross-border backbone pipelines and 10-year network development plans)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Guidelines to streamline infrastructure planning and/or permitting with respect to CO2 transport and storage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

9. Who do you think should finance investment in the CO2 transport infrastructure?

	No	Maybe	Neutral	Yes	Very much	No opinion
* Private energy infrastructure companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* State controlled energy infrastructure companies	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Member States	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Installations capturing CO2	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* CO2 storage operators	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you have suggestions for other options please explain

500 character(s) maximum

TotalEnergies suggests differentiating onshore transport in backbone pipelines, flexible transportation modes (barge, train) and offshore pipelines. The financing of CO2 transport infrastructure requires public-private involvement, coordinating efforts to secure funds and scale up CCS. Member States play a role by allocating public funds, providing subsidies and implementing de-risking mechanisms. Private companies finance and develop infrastructures, but risk-balancing mechanisms are necessary.

10. How should investment in the CO2 transport infrastructure be recovered?
(please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Tariffs set at EU level	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Tariffs set at national level	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Negotiated fees for infrastructure use	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Long-term ship-or-pay contracts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>

If you have suggestions for other options please explain

500 character(s) maximum

To enable financial viability of transportation infrastructure, shipping contracts between emitters or aggregators and transportation operators are needed to underpin the investments. The market build up phase needs to be supported by public guarantees. There is no obvious case for establishing tariffs at an EU level given the highly variability of CO2 transport infrastructure archetypes. CO2 transport companies rely on long term contracts to invest in infrastructures, regulated or not.

11. If you think common CO2 standards are needed in the EU to ensure compatibility of EU-wide CO2 transport infrastructure, which elements should be considered? (multiple answers possible)

- Pressure.
- Purity.
- Temperature.
- Other.
- No common EU standards are necessary.
- I have no opinion.

If you chose 'other'; please list the other options.

500 character(s) maximum

It is important to take a flexible and careful approach when developing standards: provide guidance and minimum requirements, recommendations. The standard shall not limit nor provide unproven limits. The standard should provide minimum requirements and recommendations for metering CO2 spec, acknowledging that CO2 monitoring, and off-spec management plan, depend on the complexity of the system. The standard should provide guidelines on the main impurities and downside effect of each impurity.

CCS specific

12. What are the main barriers for CCS development? (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Lack of geological storage capacity	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Lack of geological storage capacity available before 2030	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Lack of CO2 transport infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Lack of viable business models	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Lack of public awareness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose 'other'; please list the other options.

500 character(s) maximum

The main barriers for the development of carbon management solutions include mainly the lack of business model to support CO2 emitters to capture their CO2 and CO2 transportation infrastructure. There is no lack of geological CO2 capacity, including sites in Norway and the UK which should be made accessible under a future EU CCS framework.

13. Which type of policies should support the development and deployment of CCS?

	No	Maybe	Neutral	Yes	Very much	No opinion
* Promoting voluntary markets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* EU-level funding for research and innovation	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* EU-level funding for full CCS value chain	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* EU-level funding for capture	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* EU-level funding for transport & storage	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* National-level support measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Carbon Contract for Difference	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* Regulating the price of CO2 for transport and storage	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Tax measures	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Addressing societal and political acceptance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose 'other'; please list the other options.

500 character(s) maximum

TotalEnergies believes that public funds should be made available as long as necessary to build the backbone infrastructure before a potential transition towards market-driven mechanisms. We suggest differentiating onshore transport in backbone pipelines to have 3rd party access and tariff regulation but flexibility for individual tailored onshore solutions and no regulation of non-monopolistic transportation modes (train, barges); no additional regulation for offshore transportation and storage

14. Do you consider that the Commission should define storage availability targets as part of the climate targets for 2040 and 2050?

- Yes.
- No.
- I have no opinion.

15. In order to speed up storage site permitting, should governments be obliged to provide pre-competitive exploration and assessment of CO2 storage facilities? (as described in the IEA report: [Exploring Clean Energy pathways - The role of CO2 storage](#))?

- Yes.
- No.
- I have no opinion.

CCU specific

16. Carbon as feedstock:

Captured CO2 could play a role as a new feedstock for industry replacing the fossil carbon inputs from current production (e.g. for chemicals/plastics). If this is overall good for the climate depends on the source of the carbon, how long the carbon is contained in the products and the overall energy penalty. From which sources do you think this CO2 could best be captured? (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
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* Fossil CO2 captured from oil and gas combustion	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Biogenic CO2 captured from bioenergy combustion	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* CO2 capture from process emissions	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* CO2 capture directly from the atmosphere	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
I disagree with the reuse of captured CO2 for new products	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

17. Which applications of CO2 utilisation should the Communication support as priority and why? (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Long-term binding of CO2 in products (e.g. cement)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
* Production of plastics	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Production of chemicals (solvent, detergent, additives, etc.)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Production of synthetic fuels	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Agriculture and food industry (e.g. to stimulate growth of plants in Greenhouses or in carbonated drinks)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

If you chose 'other'; please list the other options.

500 character(s) maximum

Industrial carbon removals specific

18. A consensus has emerged in the scientific community on the importance of removing carbon from the atmosphere to meet the objectives of the Paris Agreement: Carbon removals are required first to neutralize hard-to-abate emissions that with current technologies cannot be captured or avoided to reach net-zero GHG emissions and then to clean up the atmosphere and bring the CO2 to concentrations compatible with 1.5° C or even 2° C objectives.

How would you describe the role that industrial solutions have to play to capture CO2 from the atmosphere, or biogenic sources, transport and store it, in order to

achieve the goals of the Paris Agreement and the objectives of the EU Climate Law?

- They are essential to remove carbon at the scale needed.
- They have an important role to play but are not essential.
- They might have a certain role to play although not important compared to other technologies.
- They have a role to play but nature-based solutions should be prioritised to remove sufficient amounts of carbon from atmosphere.
- They have no role to play.
- I have no opinion.

19. Which type of industrial carbon removal should be prioritized: (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Bioenergy with CCS (BECCS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Direct air carbon capture and storage (DACCS)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Enhancement of mineralisation processes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Biochar	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other types of carbon removals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>
None	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

20. Some stakeholders have voiced their concerns on the potential environmental risks of the use of BECCS and its high costs. Do you think that these risks outweigh the climate benefits?

- No, addressing those risks is important but they do not impede supporting BECCS.
- Yes, those risks might have an important role to play on whether to promote BECCS and they might be a significant barrier for its implementation.
- Yes, those risks might have a certain role to play on whether to promote BECCS and could to some extent limit BECCS implementation.
- Yes, these risks cannot be neglected and nature-based solutions should be prioritized to remove sufficient amounts of carbon from the atmosphere.
- I have no opinion.

21. What are the main barriers to the development of industrial carbon removals?
(please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Lack of long-term policies on carbon removals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Lack of market for carbon removals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Lack of CO2 transport infrastructure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Lack of available CO2 storage sites	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Lack of public awareness	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* High capital expenditure	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* High operating costs	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Lack of common standards	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose 'other'; please list the other barriers.

500 character(s) maximum

TotalEnergies suggests differentiating BECCS and others industrial carbon management solution; BECCS generates revenues with energy production, is a mature technology at large scale in comparison with mineralisation, biochar and DACS and has lower operating costs than DACS and mineralisation.

22. Which type of policies should support the development and deployment of industrial carbon removals? (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Stimulating demand for carbon removals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Promoting voluntary markets for carbon removals	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Establishing a compliance market for regulated Carbon Removal Certificates	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Linking industrial carbon removals to the EU ETS	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* EU-level funding (grants or financial instruments)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
* National-level support measures	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

* De-risking measures such as Contracts for Difference	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Tax measures	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Addressing societal and political acceptance	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>

If you chose 'other'; please list the other policies.

500 character(s) maximum

Business involvement

23. Where could private investors and governments work closer together to better stimulate deployment of technologies covered above: (please rank your answers)

	No	Maybe	Neutral	Yes	Very much	No opinion
* Share long-term CO2 storage risks	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>
* Co-invest in developing storage sites	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
* Co-invest in the CO2 transport network	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>
They should not work closer	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Other	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>

If you chose 'other'; please list the other areas.

500 character(s) maximum

Governments / public authorities have a role in de-risking the business case for CCS in the market build up phase

24. In some sectors like hydrogen or biomethane, industrial initiatives (like European Clean Hydrogen Alliance) have been created to advance the technology development and speed up project deployment. Such initiatives foresee a close co-operation of business and the European Commission. Do you think that such an initiative is needed for industrial CCS, CCU and Carbon Removals?

- Yes.
- No.
- I have no opinion.

If you chose 'Yes', please indicate the objective that such an initiative should pursue in your opinion.

500 character(s) maximum

It has the value to bring together all players along the CCUS and the industrial carbon removal complex value chain and useful for exchanging more easily with the European Commission, particularly on regulatory barriers on the model of the Hydrogen Alliance

International co-operation

25. Is it desirable to create international coalitions for developing cross-border CO2 transport infrastructure and storage infrastructure?

- Yes.
- No.
- I have no opinion.

If you chose 'Yes', please indicate the most relevant regions to be involved in your opinion.

500 character(s) maximum

TotalEnergies supports the creation of international coalitions for cross-border CO2 transport and storage infrastructure including UK and Norway. Such collaborations can facilitate cost-sharing, knowledge exchange, standardized regulations, and efficient utilization of storage sites, enabling a coordinated approach to carbon reduction efforts.

26. Is it desirable that the European Commission contributes to the deployment of CCS, CCU and industrial carbon removals globally?

- Yes.
- No.
- I have no opinion.

Public awareness

27. Do you think the European Commission should take a role in improving the quantity and quality of public information available on the three topics: industrial CCS, CCU and Carbon Removals?

- Yes, active support for centralized information is required.
- Yes, but via Member States and other existing fora.
- No, regional and local authorities should do this.
- No, there is already enough information available.
- No, there is no role for EC in this.

- I have no opinion.

28. Do you think the European Commission should take a role in the support of societal engagement and participation for the three topics: industrial CCS, CCU and Carbon Removals?

- Yes, societal engagement and participation are critical, and EC should support this.
- No, societal engagement and participation are very important but it is not the role of the European Commission to support this.
- I have no opinion.

29. Is there anything else you want to share with us that we have not (sufficiently) addressed in previous questions?

1000 character(s) maximum

TotalEnergies supports an open-technology and market-based approach for decarbonation and believes that the deployment of CCUS will not hamper investment in renewables. The main barriers for the development of carbon management solutions are the lack of business model and of CO2 transportation infrastructure. Establishing too strict and too early prescriptions, ahead of market development, could also hamper scale up and investment. To accelerate carbon management solutions deployment, TotalEnergies recommends: to strengthen support for the EILs; to help the reduction of technical costs by developing a master plan for CO2 collection infrastructures (Hub) and massive long-distance transport; to facilitate transborder shipping of CO2; to keep the ability to develop new CO2 storage service on market terms, to balance the risks taken by investors (commercial, technical or legal); to support the obligation for Member states to provide pre-competitive exploration of CO2 storage sites.

Useful links

[Carbon capture, use and storage \(https://climate.ec.europa.eu/eu-action/carbon-capture-use-and-storage_en\)](https://climate.ec.europa.eu/eu-action/carbon-capture-use-and-storage_en)

[CCUS Forum \(https://energy.ec.europa.eu/topics/oil-gas-and-coal/carbon-capture-storage-and-utilisation/ccus-forum_en\)](https://energy.ec.europa.eu/topics/oil-gas-and-coal/carbon-capture-storage-and-utilisation/ccus-forum_en)

[Study \(May 2023\) EU regulation for the development of the market for CO2 transport and storage \(https://op.europa.eu/en/publication-detail/-/publication/bb3264da-f2ce-11ed-a05c-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=37085&WT.ria_f=3608&WT.ria_ev=search&WT.URL=https%3A%2F%2Fenergy.europa.eu%2F\)](https://op.europa.eu/en/publication-detail/-/publication/bb3264da-f2ce-11ed-a05c-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=37085&WT.ria_f=3608&WT.ria_ev=search&WT.URL=https%3A%2F%2Fenergy.europa.eu%2F)

Background Documents

[Study \(May 2023\) EU regulation for the development of the market for CO2 transport and storage](https://op.europa.eu/en/publication-detail/-/publication/bb3264da-f2ce-11ed-a05c-01aa75ed71a1/language-en?WT.mc_id=Searchresult&WT.ria_c=37085&WT.ria_f=3608&WT.ria_ev=search&WT.URL=https%3A%2F%2Fenergy.europa.eu%2F)

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