TECHETHOS

FUTURE ○ TECHNOLOGY ○ ETHICS

Technology Factsheet

Climate Engineering

Focus	Interaction with the planet
Description	Climate engineering is a family of technologies that enables the modification of natural processes and human activities looking to detect, mitigate and respond to global threats due to climate change crisis, locally and globally.
Key functions and capabilities	• Modification of the chemical/physical/biological processes in the biosphere at regional and global scales (e.g., albedo modification). • Carbon remediation/CO2 sequestration and utilization/carbon prevention
Key Industrial sectors	Environment; energy; chemicals and materials; biotechnologies
Examples of technologies	Geoengineering technologies (e.g., solar geoengineering) Carbon capture, usage, and storage (CCUS) technologies; carbon dioxide splitting technologies; algae and microorganisms against climate change; artificial photosynthesis
Example of applications	Modification of the biosphere interaction with solar radiation globally (e.g., stratospheric aerosol scattering) or locally (e.g., heat reflection to protect and restore snow or glaciers). Enlargement of artificial and natural carbon sinks; large-scale carbon removal; carbon sequestration or fixing (e.g., turning carbon into construction materials); microbes for CO2 capturing as their sole carbon source
Time horizon to mass market	Short to medium for small- and regional-scale deployment; medium- to long-term for large-scale and global deployment and the most advanced application

Key ethical issues

Irreversibility ○ Responsibility and Global Scope ○ Equal access ○ Precautionary measures ○ Environment ○ Health ○ Safety ○ Inclusivity ○ Security

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Selection rationale:

Its potential to introduce transformations in the access and use of natural resources (energy and environment) by regions, industrial processes, and society at large.

Expected public impact

- High impact on the environment and climate: technologies for climate change;
- Some applications (e.g., CCUS) with limited direct impact on people's lives (e.g., business to business applications); other technologies (e.g., geoengineering) with potentially large implications for communities and individuals (e.g., by altering their environments, unequal access and opportunities);
- Related Sustainable Development Goals (SDGs): 11 - Sustainable cities and communities; 12 - Climate actions.

Expected industrial and economic impact

- Includes radical innovations and is considered enabling in some industrial sectors (e.g., energy and environmental management in the manufacturing industry);
- Priority by some industrial players in relevant industrial sectors.
- Related Sustainable Development Goals (SDGs): 9 - Industry, innovation and infrastructure; 12 - Responsible consumption and production.

Expected policy impact

- Priority for most national, EU and global policy organizations (e.g., contribute to EU climate neutrality, target for 2050 in the EU Green Deal).

Expected legal impact

- Requires adaptations in existing frameworks (e.g., impacts/changes on the Emission Trading System - ETS).

At a glance

TechEthos (Ethics for Technologies with High Socio-Economic Impact)

• Funding	Horizon 2020 Research and Innovation Programme's Science and for Society (SwafS)
• Duration	2021 – 2023 (3 years)
• EU grant	€3.99 million
• Coordinator	AIT - Austrian Institute of Technology
• Consortium	16 organisations from 13 countries
• Website	www.techethos.eu

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