CHAPTER 4: Carbon Capture Utilisation and Storage and the European Green Deal: A danger to socio-ecological transformation

With some delay, on February 6th 2024, the European Commission presented its Communication on the EU's 2040 climate target and the path to climate neutrality by 2050[1]. It suggested a 90% net CO_2 emission reduction compared to 1990 by 2040. In the view of the Commission, to this end, *'all renewable energy, zero and low carbon solutions (including energy efficiency, nuclear, storage, CCS, CCU, industrial carbon removals, and all other current and future net-zero energy technologies) are necessary …'*[2]. This approach, reflected throughout the Communication, implies a significantly watering-down of the aim of a rapid phasing-out of fossil energy. Rather, and invoking 'strong geostrategic interest' and the 'global technology race', the Commission is shifting its focus to Carbon Capture Storage (CCS) and Carbon Capture and Utilisation (CCU) to enable continued fossil energy use with CCS and CCU.[3] Green Deal Commissioner, Maros Šefčovič, announced a forthcoming Communication on carbon storage technologies for the first quarter of 2024.

4.1. The issue of CCS and CCU technologies

The EU established a Carbon Capture, Utilisation and Storage Forum (CCUS Forum) in 2021. Taking place annually, it brings together representatives from the EU institutions, EU member states and third countries, NGOs, business leaders and academics to facilitate the development and deployment of CCUS technologies. At the 2022 Annual Meeting, Energy Commissioner Kadri Simson praised and honoured CCS and CCU technologies for their potential to limit global warming to the Paris 1.5° C target. The scenario-modelling chosen by the Commission indicates a necessity to capture and utilise or store 300 - 640 million tonnes of CO_2 annually by 2050 for the EU to meet its climate goals.[4] Reports from governments and agencies, the European Commission the economists' group of the IPCC (WG III), and the IEA, as well as industry and academics, all based on similar economic models, permanently insist that, without large-scale

[1] European Commission (2024, February 6). *Securing our future. Europe's 2040 climate target and path to climate neutrality by 2050 building a sustainable, just and prosperous society*, Strasbourg, 6.2.2024 COM(2024) 63 final.

[2] Ibid., p. 9.

[3] Ibid. Carbon Capture and Storage (CCS) is a process in which a relatively pure stream of carbon dioxide is extracted from industrial sources, and transported to a purportedly safe long-term dump site, reducing the carbon content of industrial emissions by 75-90%. Carbon Capture and Utilisation (CCU) starts with further purifying captured CO2, and transport it to production plants where hydrocarbons are produced from CO2 and hydrogen H2

[4] Simson, K. (2022). *Speech by Commissioner Simson at the Carbon Capture, Use and Storage Forum* [Press release], available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_6424

carbon capture, utilisation and storage (CCUS), the European Union will fall significantly short of its Green Deal objective to be 'climate-neutral' by 2050.

However, scientists, NGOs, environmental movements and the natural and social science groups within the IPCC have disagreed with these economic scenarios and have repeatedly drawn attention to three significant problems:

1. Climate neutrality describes the state where emissions of human-made carbon dioxide gases and the removal of these gases are in balance over a given period. However, since greenhouse gas (GHG) concentrations now exceed 1.5 times the pre-industrial level (the last time such concentrations occurred some 3-5 million years ago, with temperatures 2-3° and the sea level 10-20 metres higher than now), this is clearly not to a state that will solve the climate change problem. Secondly, this target is fraught with disputed assumptions and omissions. Notably, the military is responsible for about 5% of global CO_2 emissions. This is a highly unreliable figure, as states do not have to disclose military emissions under the UN Framework Convention on Climate Change (UNFCCC). Hence, data are *'incomplete, unclear and inconsistent'*[5].
2. CCS and CCU technologies are high risk technologies. High pressure during CO_2 injection has already led to contamination of ground- and drinking water, and explosions and earthquakes have also occurred. There is no guarantee that the gas can be safely stored underground for thousands of years. Even the best explored seabed disposal sites (e.g. the Norwegian sites under the North Sea) have reacted in unexpected ways, with their development still very much unpredictable, and requiring € billions to salvage them.
3. The climate crisis demands immediate action. According to calculations by the Intergovernmental Panel on Climate Change (IPCC) the peak in global emissions must be reached by 2025 at the latest and emissions must fall rapidly thereafter. Even according to optimistic estimates, CCS and CCU technology cannot significantly contribute to such rapid reductions in emissions. Rather CCS and CCU serve the function of deception, intended to prevent the required transition of energy supply and demand, and radical socio-ecological transformation. This legitimates a strategy that instead prioritises the securing of maximum profits for 'carbon major' corporations and financial institutions[6].

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[5] Rajaeifar, M. A., Belcher, O., Parkinson, S., Neimark, B., Weir, D., Ashworth, K., ... & Heidrich, O. (2022). Decarbonize the military—mandate emissions reporting. *Nature*, *611(7934),* 29-32.

[6] Greenpeace (2011). *CO2-Endlager: Risiko statt Lösung*. Available at: https://www.greenpeace.de/publikationen/co2-endlager-loesung-risiko; Bund (2023). Standpunkt 16, *CCS: Falsche Weichenstellung verhindern!*. Available at: https://www.bund.net/fileadmin/user_upload_bund/bilder/klimawandel/falsche-weichenstellung-vermeiden-standpunkt-ccs.pdf; see also Euromemorandum 2023 chapter 3.

Notwithstanding these critiques, the institutions of the European Union have been circulating the results of the lobby group Vision CCUS, which in turn has significantly shaped the February 6th Commission Communication. It prescribes

- the deployment of CCUS at scale to capture and store at least 150 Mt/year of CO_2 of atmospheric or biogenic origin by 2050;
- making CCUS a key means of mitigating emissions from currently carbon-dependent processes: cement, steel, chemical production, and waste incineration;
- permitting the continued use of fossil or biomass-fired power plants in regions with significant existing and recently built fossil power capacity, equipped with CCUS to decarbonise the grid;
- following market signals: when natural gas prices fall, CCUS offers a potentially highly competitive option for low-carbon hydrogen supply. As it is improbable that the EU will be able to produce all the 'green hydrogen' (that is GHG emission-free), 'low-carbon' hydrogen from natural gas – today the dominant source of hydrogen – may give fossil gas a significant role in EU's decarbonisation strategy;
- recognising conversion of CO_2 from atmospheric or biogenic waste to products like chemicals and fuels as a form of storage if it becomes permanently chemically bound in the material[7].

EU institutions are deliberately talking about 'decarbonisation' rather than de-fossilisation. By focussing on CCS, CCU and hydrogen, it is possible to hold on to previous industrial structures, using fossil energy, and the associated corporate and power structures, while claiming to be decarbonising until the illusion collapses, confronted by reality.

4.2. Recent developments

In early February 2023, the Commission launched a Communication on the Green Deal Industrial Plan[8] – with the objective of enhancing the competitiveness of the EU's net-zero industry and supporting the fast transition to climate neutrality. Four pillars constitute the plan:

1. a predictable and simplified regulatory environment;
2. faster access to funding;
3. enhancing skills

[7] Carbon Capture, Utilisation and Storage Forum (2023, May 31). *Vision for Carbon Capture, Utilisation and Storage in the EU*, p. 2-3. Available at: https://cdn.catf.us/wp-content/uploads/2023/05/31163741/ccus-europe-vision-report.pdf

[8] European Commission (2023). *A Green Deal Industrial Plan For The Net-Zero Age, Brussels*, COM(2023) 62 final, COM(2023).

4. open trade for resilient supply chains[9]

Furthermore, the Commission's proposal for a Net-Zero Industry Act from March 2023[10] intends to simplify the regulatory framework, *'improving the investment environment for the Union's manufacturing capacity of technologies that are key to … ensure that our decarbonised energy system is resilient whilst contributing to reducing pollution, to the benefit of public health and planetary environmental wellbeing.'*[11]

The technology is, however, not primarily aimed at public health and planetary environmental wellbeing. The proposal contains a target to deploy 50 million tonnes of CO_2 storage capacity in the EU by 2030 in what should be an opportunity for EU oil and gas producers 'to create a new market'. The latter appears to be a crucial intention, as 50 million tonnes of captured CO_{2eq} is marginal compared to the 3.6 billion tonnes of GHG emissions generated by the economic activities of EU residents.[12]

At the CCUS Forum 2023, Commissioner Simson also underlined the Commission's efforts to strengthen financial support for research, innovation, and development for CCUS' long-term success, highlighting that the Commission had already funded three CCUS projects from the Innovation Fund. Based on the 2023's record € 3 billion call from the Innovation Fund, it invited an additional 11 large-scale CCUS projects to negotiate grant agreements. To support the development of CCS infrastructure, the Commission has six cross-border CO_2 networks and 14 CO_2 transport and storage projects as part of developing a CO_2 infrastructure network from the North Sea to the Mediterranean to the Baltics, in its list of 'Projects of Common Interest'[13]. Nearly €480 million are being awarded to four CO_2 transport and storage projects[14].

4.3. The case of Germany

The German government's carbon management strategy is due to be published soon. In the federal budget, a significant proportion of the 'Decarbonisation of Industry and

[9] Ibid., p. 1.

[10] European Commission (2023). Regulation of the European Parliament and of the Council on establishing a framework of measures for strengthening Europe's net-zero technology products manufacturing ecosystem (Net Zero Industry Act), COM(2023). Available at: https://eur-lex.europa.eu/legal-content/EN/TXT/DOC/?uri=CELEX:52023PC0161

[11] Ibid., p. 1.

[12] Eurostat (2023). *EU economy emissions in 2022: down 22% since 2008*. Available at: https://ec.europa.eu/eurostat/web/products-eurostat-news/w/ddn-20231221-3

[13] Simson, K. (2023). *Keynote speech by Commissioner Simson at the Carbon Capture, utilisation and storage Forum*, [Press release], available at: https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_23_6086

[14] Industry Intelligence inc. (2023). *Northern Lights to receive €131M from European Commission via Connecting Europe Facility; of eight cross-border energy infrastructure projects being awarded €594M of EU funds, nearly €480 million to be awarded to four CO2 transport, storage projects*. Available at: https://www.industryintel.com/government-and-public-policy/news/northern-lights-to-receive-131m-from-european-commission-via-connecting-europe-facility-of-eight-cross-border-energy-infrastructure-projects-being-awarded-594m-of-eu-funds-nearly-480-million-to-be-awarded-to-four-co2-transport-storage-projects-160199792712.

Carbon Management' funding programme is earmarked for CCUS projects. A recent joint position paper by the Confederation of German Industry (BDI), the German Confederation of Trade Unions (DGB), the World Wildlife Fund (WWF) and the environmental organization NABU/Birdlife[15] has called for a clear course to be set in favour of CCS and CCU. This 'Alliance' is urging the German government to present the requisite 'adequate economic and legal framework conditions'[16]. The central thesis of this Alliance reads*: 'It is right to prioritise the use of CCS and CCU where CO2 emissions cannot be avoided according to the current state of technology.'*[17]

However, if the current state of technology is made the benchmark for unavoidable 'residual emissions', the transformation pressure to innovate is significantly reduced for industrial and other enterprises and ceases thereby to decisively influence the direction that technological innovation processes will take. Under competitive conditions, profit-orientated companies focus all their efforts and creative energy on the search for solutions to problems – even far beyond technology. This brings new visions and business models into focus (building without – conventional – cement; creating living space without building; zero-waste vision without 'residual waste incineration', etc.). Where established companies are unable to make progress, there are opportunities for creative newcomers and start-ups, especially if the state provides the right 'support' in this area.

CCS and CCU depend on public subsidies, not on mobilising private capital through regulatory law, particularly for the construction of a pipeline infrastructure and distribution hubs. These are planned to be oversized in order to prevent user charges from rising excessively when pipeline capacities are scarce. However, once public authorities have financed an oversized infrastructure, the financial risk of under-utilisation lies with the public sector, which has to pay for the long-term deficits while it should be politically committed to minimising CO_2 generation.

Worldwide, fossil fuel states and the oil/gas companies are working hard to 'rehabilitate' fossil fuels – and their 'climate neutralisation' through capture and storage plays a central role in this, as could also be observed at COP28 in Dubai. This is where the interests of the fossil fuel industry coincide with those of some (naïve) environmentalists who see 'negative emission technologies' as having the potential to save the planet – provided that the use of fossil fuels is further reduced. Global CO_2 landfills are being built up. German industry is joining in – for energy policy reasons, but

[15] Bundesverband der Deutschen Industrie, Deutsche Gewerkschaftsbund, Naturschutzbund Deutschland & WWF (2024). *Industrietransformation aus einem Guss. Gemeinsames Thesenpapier zur Einordnung von Carbon Management als Teil einer umfassenden Klimastrategie*, available at: https://bdi.eu/artikel/news/industrietransformation-aus-einem-guss-carbon-management.

[16] Ibid.

[17] Ibid, p. 1.

also because manufacturers (and trade unions) see a huge business emerging (with a correspondingly large number of jobs). It is therefore clear that CO2 landfills would be created worldwide – despite full awareness of the risks.

4.4. Policy Alternatives

CCUS and watered-down climate change targets are currently taking the EU down a dangerous path towards climate catastrophe. Instead, we argue that:

- The hierarchy of prevention, recycling and disposal mandatorily laid down in EU Directives and the laws of member states must cover all areas of waste management, including CO_2.
- A 'target architecture' is required, both for the EU and for member states: if emissions reduction is to remain the priority, and CCS or CCU instruments are restricted to treating technically unavoidable 'residual emissions', quantified targets (for 2030, 2040, 2050) must be set for permitted emissions and required technical sequestration.
- A democratic debate on the carbon management strategies of the EU and its member states is required. It must clearly separate emissions reduction and capture, set ambitious targets for residual quantities, largely avoid CCS and its offshoots and promote ecological climate protection strategies.
- The EU must comply with its obligations under the Kunming-Montreal Global Biodiversity Framework of December 2023. This includes 'strengthening of natural sinks' as a central measure, on the condition of drastically reduced emissions while opposing burning (cultivated) wood or other biomass with CCS. Large-scale monocultures, economically profitable but accelerating the loss of biodiversity, and justified with fake environmental arguments, must become history.
- Responsible policies for ecological climate protection must include reforestation of what is now agricultural land, and the rewetting of fens – processes that are not only costly, but above all conflict-ridden, because the current owners and users have to be convinced of the need to change land use. But these conflicts must be dealt with, with the aim of revitalising ecosystems –thus overcoming the trends that are already leading to a steadily increasing loss of species[18] and undermining the resilience of natural systems, food and feed production.

[18] Ibid.