Press release

Renewable Carbon Initiative (RCI)
www.renewable-carbon-initiative.com
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Political Tailwind for Alternative Carbon Sources

More than 30 leading pioneers of the chemical and material sector welcome the latest political papers from Brussels, Berlin and Düsseldorf

The Renewable Carbon Initiative's (RCI) major aim is to support the smart transition from fossil to renewable carbon: utilising carbon from biomass, CO_2 and recycling instead of additional fossil carbon from the ground. This is crucial because 72% of the human-made greenhouse gas emissions are directly linked to additional fossil carbon.

For the first time, important policy papers from Brussels and Germany take into consideration that the term decarbonisation alone is not sufficient, and that there are important industrial sectors with a permanent and even growing carbon demand. Finally, the need for a sustainable coverage of this carbon demand and the realisation of sustainable carbon cycles have been identified on the political stage. They are elemental to the realisation of a sustainable chemical and derived materials industry.

The RCI supports all renewable carbon sources available, but the political support is fragmented and differs between carbon from biomass, recycling or carbon capture and utilisation (CCU). Especially CCU has so far not been a strategic objective in the Green Deal and Fit-for-55. This changed fundamentally with the European Commission's communication paper on "Sustainable Carbon Cycles" published on 15 December[1]. The position in the paper represents an essential step forward that shows embedded carbon has reached the political mainstream – supported by recent opinions from members of the European parliament[2] or also, apparently, by the upcoming IPCC assessment report 6. Now, CCU becomes a recognised and credible solution for sustainable carbon cycles and a potentially sustainable option for the chemical and material industries. The recent political papers of relevance are highlighted in the following.

Brussels: Communication paper on "Sustainable Carbon Cycles"

On 15th of December, the European Commission has published the communication paper "Sustainable Carbon Cycles"[3]. For the first time, the importance of carbon in different industrial sectors is clearly stated:

[1] https://ec.europa.eu/clima/system/files/2021-12/com_2021_800_en_0.pdf
[2] Making climate neutral Chemicals and materials a reality, opinion by Maria de Graça Carvalho (MEP), published 27. Sept. 2021: https://www.euractiv.com/section/energy-environment/opinion/making-climate-neutral-chemicals-and-materials-a-reality/
[3] Leaked version from 25 November 2021.

> "Organic chemistry exploits the uniqueness of carbon to produce highly complex molecules for the pharmaceuticals, chemicals, plastics and advanced materials of our daily life."

One of the key statements in the paper is the full recognition of CCU for the first time as a solution for the circular economy:

> "… we need to recycle carbon from waste streams, from sustainable sources of biomass or directly from the atmosphere, to use it in place of fossil carbon in the sectors of the economy that will inevitably remain carbon dependent. The circular economy and the sustainable bioeconomy sectors can address this objective and should promote technological solutions for carbon capture and use (CCU) and the production of sustainable synthetic fuels or other non-fossil based carbon products. […] The European Green Deal and related policies, therefore, aim to quickly reduce the use of fossil carbon and phase it out in the long term. The remaining carbon required for the functioning of our society will no longer come from fossil fuel extraction; it will be sustainably sourced from our ecosystems and from our industries thanks to innovative technologies. […] Beyond decarbonising its energy system to be climate neutral by 2050, the EU will also need to rethink its sourcing of carbon as feedstock for industrial production. Fossil carbon should be replaced by more sustainable streams of recycled carbon from waste, sustainable biomass and directly from the atmosphere.
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> Since natural resources are limited and the bioeconomy cannot provide all the carbon to fulfil the energy and material needs of a climate-neutral EU economy in 2050, other streams of carbon should be developed to replace fossil carbon, including capturing CO_2 directly from the atmosphere, also called Direct Air Capture (DAC)."

CCU fuels are included in the strategy as well:

> "The Commission proposal for ReFuelEU Aviation should ensure demand for synthetic fuels based on CCU and advanced biofuels and complement the proposal for a revised Renewable Energy Directive, which sets a sub-target for renewable fuels from non-biological origin."

In the Renewable Energy Directive II, all CO_2 streams are treated equally and only the energy used must be renewable for an "renewable fuel of non-biogenic origin". In contrast, the communication paper distinguishes between bio-based CO_2, fossil CO_2 and CO_2 from direct air capture when addressing carbon removal and it also announces detailed monitoring of the different CO_2 streams. In the RCI, utilising industrial fossil-based flue gases is also seen as a more sustainable raw material option for chemistry, as CO_2 emission reductions of 50% are realistic via CCU. Even higher savings of about 90% are possible with biogenic CO_2.
Not only CCU, but also carbon from the bioeconomy, which has already received political support for some time, is registered as an important pillar for the future. Here, the term carbon farming has been newly introduced:

> "Carbon farming can be defined as a green business model that rewards land managers for taking up improved land management practices, resulting in the increase of carbon sequestration in living biomass, dead organic matter and soils by enhancing carbon capture and/or reducing the release of carbon to the atmosphere, in respect of ecological principles favourable to biodiversity."
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> "As recognised in the Communication 'Clean Planet for All', the bioeconomy contributes to achieving climate neutrality by reducing fossil emissions through the replacement of GHG-intensive materials and fossil fuels with bio-based materials and bioenergy, respectively. The climate mitigation benefit of bio-based products can be optimised by increasing the

> proportion of material use (especially for long-lived products) in total biomass uses through the application of the cascading principle while ensuring that land-based removals and biodiversity are maintained or enhanced."

Surprisingly, chemical recycling, which is also an alternative carbon source that substitutes additional fossil carbon from the ground, is completely absent from the communication paper.

In the political discussions in Brussels, the term "defossilation" is appearing more and more often, complementing or replacing the term decarbonisation in those areas where carbon is indispensable, such as organic chemistry, plastics and, for the foreseeable future, aviation fuel. The RCI supports this trend towards a clear distinction between the two terms.

MEP Maria da Graça Carvahlo is among a number of politicians in Brussels who perceive CCU as an important future industry, putting it on the political map and creating momentum for CCU. This includes the integration of CCU into the new Carbon Removal Regime[4] and the Emission Trading System (ETS).

Berlin: Coalition paper of the new German Government: "Dare more progress – alliance for freedom, justice and sustainability"[5]

The whole of Europe is waiting to see how the new German government of Social Democrats, Greens and Liberals will shape the German climate policy. The new reform agenda focuses in particular on solar and wind energy as well as especially hydrogen. Solar energy is to be expanded to 200 GW by 2030 and two percent of the country's land is to be designated for onshore wind energy. A hydrogen grid infrastructure is to be created for green hydrogen, which will form the backbone of the energy system of the future – and is also needed for e-fuels and sustainable chemical industry. The coalition paper from November 2021 gives the first indications of what we can expect in terms of CCU.

> "We support the research and market ramp-up of synthetic fuels that enable climate-neutral flying. [...] We will use revenues from the aviation tax to promote the production and use of CO_2-neutral electricity-based aviation fuels as well as for research, development and fleet modernisation in aviation. [...] Outside the existing system of fleet limits, we will focus on ensuring that only vehicles that can be demonstrably fuelled with e-fuels can be newly registered."

While the bioeconomy only appears once in the coalition paper, in a subordinate clause, there is a further focus on the topic of circular economy and recycling. A higher recycling quota and a product-specific minimum quota for the use of recyclates and secondary raw materials should be established at European level. In the coalition paper, there is also a clear commitment to chemical recycling to be found.

> "We are introducing a recycling label. With an acceleration of the development of quality standards for recyclates, new high-quality material cycles will be will be created. Quality-assured waste products should be released from waste legislation and acquire product status.

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[4]State of the Union 2021 – Letter of Intent. Published September 2021. https://ec.europa.eu/info/sites/default/files/state_of_the_union_2021_letter_of_intent_en.pdf

[5] MEHR FORTSCHRITT WAGEN, BÜNDNIS FÜR FREIHEIT, GERECHTIGKEIT UND NACHHALTIGKEIT, KOALITIONSVERTRAG ZWISCHEN SPD, BÜNDNIS 90/DIE GRÜNEN UND FDP (Nov 2021)

> We prescribe higher recycling quotas and a product-specific minimum quota for the use of recyclates and secondary raw materials at European level.
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> We include chemical recycling in the Packaging Act as a recycling option. We focus on an end to the landfilling of municipal waste throughout Europe. Together with the countries we take decisive action against illegal waste exports. Under European law, the export of waste should only be possible in certified recycling facilities. We want a level playing field for plastic recyclates."

A significant change for the industry is planned to occur in regards to the so-called "plastic tax" of 80 cents per kilogram of non-recycled plastic packaging. This tax has been implemented by the EU, but most countries are not passing on this tax to the manufacturers and distributors, or only to a limited extent. The new German government now plans to fully transfer this tax over to the industry. This is a clear incentive to recycle plastic packaging wherever possible, as even small non-recycled quantities are sanctioned.

Düsseldorf: Carbon can protect the climate – Carbon Management Strategy North Rhine-Westphalia (NRW)[6]

Lastly, the RCI highly welcomes North Rhine-Westphalia (NRW, Germany) as the first region worldwide to adopt a comprehensive carbon management strategy, a foundation for the transformation from using additional fossil carbon from the ground to the utilisation of renewable carbon from biomass, CO_2 and recycling.
This is all the more remarkable as North Rhine-Westphalia is the federal state with the strongest industry in Germany, in particular the chemical industry. Most of the chemical and plastics companies are located here, with 455 chemical companies and over 97,000 employees in total. Historically, the region around the Ruhr area was the heart of European heavy industry (coal, steel). With a GDP of $800 billion, NRW as a nation of its own would rank number 19 worldwide, right behind the Netherlands and Turkey. And it is here, of all places, that a first master plan for the conversion of industry from fossil carbon to biomass, CO_2 and recycling is implemented. If successful, NRW could become a global leader in sustainable carbon management and the region could become a blueprint for many industrial regions.

> "Sustainable carbon use in North Rhine-Westphalia
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> We want to establish sustainable carbon management in North Rhine-Westphalia. This includes the adequate use of biomass as well as the targeted expansion of the secondary raw material base and the (further) development of carbon capture and use applications. The prerequisite for sustainable carbon management is a technology-open consideration of the various alternative value-added paths – both in comparison with the respective conventional process and with each other. We will address economic, regulatory and organisational conditions that currently inhibit the sustainable use of carbon as well as balance sheet-related ones in the short term in order to enable the rapid transformation to a sustainable, circular carbon economy in North Rhine-Westphalia. …

[6] Kohlenstoff kann Klimaschutz – Carbon Management Strategie Nordrhein-Westfalen. Ministerium für Wirtschaft, Innovation, Digitalisierung und Energie des Landes Nordrhein-Westfalen (October 2021).

> Carbon is the backbone of industry in North Rhine Westphalia: North Rhine-Westphalian industry cannot be completely decarbonised, i.e. "freed" of carbon. The carbon, that will be used in the future and the way in which it is used must, however, be sustainable. […]
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> Without a change in the way carbon is handled in industry, the climate protection targets can therefore not be achieved […]
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> Establishing the sustainable use of carbon represents a considerable opportunity for North Rhine-Westphalia's industry. As a pioneer in the field of low carbon industry, decisive competitive advantages can be created: By reacting early or ahead of the curve to the ever-increasing demand for green products and the growing regulatory and economic pressure to achieve climate protection goals (for example, through rising CO_2 prices or the discontinuation of free allocations in the EU ETS), as well as by developing carbon management blueprints and climate protection technologies for the whole world."

Here, too, the term defossilisation appears in distinction to decarbonisation:

> "In contrast to decarbonisation, defossilisation aims to move away from fossil raw materials, but not from carbon per se. Through defossilisation, it can be achieved that no additional amounts of CO_2 are introduced into the atmosphere despite processes and products containing carbon."

For all three alternative carbon streams, separate detailed strategies are being developed, such as for biomass:

> "The central role here is played by the use of biomass. Since the total amount of land available for cultivation is very limited, the cultivation of biomass for use as a raw material not only competes with food production, but also conflicts with biodiversity. […] Less problematic than the use of renewable raw materials is the use of biogenic residues and waste materials, preferably organic residues from industry and municipal waste disposal. This is an alternative carbon source that is largely sustainable without restrictions. Apart from the source, the sustainability of biobased value chains is often determined in particular by their cascade use."

For recycling:

> "Use of secondary raw materials as the core of industrial transformation. With regard to the extraction of secondary raw materials, so-called recyclates, mechanical recycling should be preferred to chemical recycling from an energy perspective. A design for recycling that facilitates mechanical recycling and makes downcycling more avoidable is important for this. If the mechanical options are exhausted, however, chemical recycling is a promising option to keep the hydrocarbons in the material cycle instead of valorising them for energy and thus devaluing them."

and also for the utilisation of CO_2:

> "CCX: Prerequisite for a climate-neutral industry in North Rhine-Westphalia. Without the forward-looking and holistic management of CO_2 through carbon capture and transport (CCT), carbon capture and utilisation (CCU) and carbon capture and storage (CCS), the goal of greenhouse gas neutrality in North Rhine-Westphalia will probably not be achieved. The sum of these CO_2 management activities CCT, CCU and CCS, which cannot be considered separately from each other, is also referred to here as CCX.

> While CCU primarily aims to reuse the carbon contained in CO_2, the goal of CCS is to remove the carbon dioxide from the cycle and store it permanently. CCU applications also generally have a positive climate effect."

Conclusion: The political situation for renewable carbon from biomass, CO_2 and recycling for the defossilisation of the chemical and materials industry has begun to shift fundamentally in Europe in recent months. The here cited, new policy documents show that decarbonisation alone falls short because there are large sectors of industry where decarbonisation is not possible. Here, the goal is to create sustainable carbon cycles instead. This requires comprehensive carbon management of renewable sources, which includes carbon from biomass, carbon from CCU – the industrial use of CO_2 as an integral part – as well as chemical recycling. And only the use of all alternative carbon streams enables a true decoupling of the chemical and materials sector from additional fossil carbon from the ground. Only in this way can the chemical industry stay the backbone of modern society and transform into a sustainable sector that enables the achievement of global climate goals.
As the development is fully in line with the strategy of the Renewable Carbon Initiative (RCI), the more than 30 member companies of the initiative are highly supportive of this new development and are ready to support policy-maker with data and detailed suggestions for active support and the realisation of sustainable carbon cycles and a sound carbon management.

The Renewable Carbon Initiative (RCI) was founded in September 2020 by eleven leading companies from six countries under the leadership of nova-Institute (Germany). The aim of the initiative is to support and speed up the transition from fossil carbon to renewable carbon for all organic chemicals and materials. www.renewable-carbon-initiative.com

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