



## Statement on the use of Recycled Carbon Fuels at Member State level

### INTRODUCTION

**Recycled carbon fuels, as defined in the revised Renewable Energy Directive (REDII)<sup>1</sup>, include fuels produced from utilization of waste processing gas and exhaust gas of non-renewable origin and produced from the fossil fraction of liquid and solid wastes by means of thermochemical conversion technologies such as, e.g., gasification, pyrolysis and liquefaction.**

Definition from Directive (EU) 2018/2001 *aka* RED II:

‘Recycled carbon fuels’ means liquid and gaseous fuels that are produced from liquid or solid waste streams of non-renewable origin, which are not suitable for material recovery in accordance with Article 4 of Directive 2008/98/EC, or from waste processing gas and exhaust gas of non-renewable origin, which are produced as an unavoidable and unintentional consequence of the production process in industrial installations.

<sup>1</sup> Directive (EU) 2018/2001

## INTRODUCTION

Such fuels, although derived from waste fossil carbon, are included in RED II because of their potential contribution to the reduction of greenhouse gases (GHG). The European Commission will by 2021 set an appropriate minimum GHG reduction target and establish a methodology for calculating the GHG reduction potential for these fuels to ensure that only those recycled carbon fuels that show sufficient reduction of emissions, as determined by any threshold, are accepted.

Support of RCFs will not increase fossil fuel use in the energy or transportation sector because of the requirement in the RED II definition of RCFs that the inputs are produced as an unavoidable and unintentional consequence of another production process. As a result, increased use of fresh fossil resources to intentionally increase liquid and solid waste streams, or exhaust gases, for the purpose of producing RCFs would result in disqualification from RED II.

RED II, when implemented in national legislation, gives the Member States the right to decide on whether any recycled carbon fuel can contribute to their decarbonization goals. Divergent Member State acceptance of RCFs when implementing RED II into their respective legislations will create a fragmented EU market for this near-term decarbonization approach that can facilitate the transition to a net zero carbon economy and reduce CO<sub>2</sub> emissions. RCFs require investment and investor certainty will only come in the form of market acceptance. Divergent Member State implementation of RED II for RCFs will create an unnecessary barrier to deployment and delay their market access in the EU. The EU and its Member States should be able to rely on all sustainable solutions available to transition to a low carbon economy. The inclusion of recycled carbon fuels in RED II will support this, enabling the deployment of innovative carbon capture and utilization (CCU)<sup>2</sup> and thermal conversion technologies such as gasification, pyrolysis and liquefaction to produce fuels from gas streams and solid waste fractions, respectively.

## RECYCLED CARBON FUELS: UTILIZATION OF WASTE PROCESS GASES

Unavoidable carbon-rich waste process gases or exhaust gases of non-renewable origin can be converted into recycled carbon fuels. Some energy-intensive manufacturing processes, such as steel production, inevitably result in gaseous CO and CO<sub>2</sub> emissions, which cannot be stored and which the holder is required to discard. CO emissions are usually combusted for heat or power<sup>3</sup> at typically very low efficiency (< 40%) and frequently at non-competitive economics relative to purchased grid power or even flared. RCFs that utilize waste process gases capture and reuse (recycle) the energy in these waste gases more efficiently (>60%) to produce fuel or other chemicals.

Producing RCFs through this form of CCU also removes power generated from such gaseous streams from the electricity grid and thereby potentially creates space for new marginal electric capacity, notably from renewable sources. If this electricity generation can be replaced with new renewable capacity, as anticipated with the EU's renewable targets for electricity, the benefits can

<sup>2</sup> A note on the terminology. CCU covers two types of fuels, first and as discussed here, recycled carbon fuels where the energy is derived from the material treated, and renewable fuel of non-biological origin where a non-energy containing gas stream provides a carbon source and other forms of renewable energy provides the energy for the conversion.

<sup>3</sup> Defined as Best Available Technology (BAT) in the Industrial Emissions Directive, Directive 2010/75/EU

## RECYCLED CARBON FUELS: UTILIZATION OF WASTE PROCESS GASES

be maximized. As the marginal price of electricity drops, CCU provides a new, more economic and sustainable outlet for gaseous waste streams over combustion in power boilers or flaring. This gives industrial sites an alternative to investing in power plants and fosters the Energy Union goal of having a more efficient, greener grid while also producing fuels and chemicals that substitute for fresh fossil-derived products.

## RECYCLED CARBON FUELS: GASIFICATION OF SOLID WASTE STREAMS OF NON-RENEWABLE ORIGIN

Gasification allows the complete conversion of the combustible part of feedstock in solid waste streams, often mixed biogenic and fossil post-recycling wastes typically containing 30-60% biogenic carbon, or 100% fossil residual waste fractions that remain after conventional recycling operations, e.g., plastic rejects. The conversion of the biogenic “advanced biofuel” portion and fossil carbon “recycled carbon fuel” portion, and associated energy, produces a syngas that can subsequently be converted to chemicals and fuels at high efficiency that effectively substitute for their fossil equivalents.

## RECYCLED CARBON FUELS BY PYROLYSIS AND LIQUEFACTION

Another technology pathway to RCFs is liquefaction of fossil waste material by pyrolysis or by liquefaction and co-processing the liquid intermediate in a refinery. A typical example is liquefying waste plastic which is not suitable for mechanical recycling and would otherwise be incinerated (with or without energy recovery) or sent to landfill. Co-processing this material substitutes, and thus avoids fresh fossil inputs and produces typical refinery products with a recycled carbon content, including RCFs.

Thermal conversion technologies such as gasification, pyrolysis and liquefaction of residual wastes after material recovery or not suitable for material recovery, termed post-recycling wastes below, observes the waste hierarchy (avoid, re-use or recycle, recover, dispose) which is laid down in the Waste Framework Directive (WFD) . When chemicals are produced, these technologies provide material recovery as chemicals and an alternative to disposal by, e.g., landfilling under circumstances where incineration with energy recovery is not feasible or, alternatively, promotes R3 material recovery as an alternative to incineration with energy recovery, R1. Moreover, the WFD targets for recycling of MSW and the Landfill Directive set the targets for limiting of landfilling of biodegradable municipal solid waste as well as recyclable waste in the most recent amendment. Using the fossil part of MSW or other non-recyclable wastes for production of RCF will also substantially help member states to achieve these targets.

## RECYCLED CARBON FUELS: PATHWAY TO THE CIRCULAR ECONOMY

In relation to the ambitions towards the circular economy under the European Green Deal<sup>4</sup>, the formation of raw materials out of carbon containing waste should be acknowledged as a form of chemical recycling. The production of recycled carbon fuels, while a form of energy recovery, can also be an enabler for production of chemicals via the same process. Creating a market for RCFs will support deployment of facilities that can produce domestic fuel and also pivot to produce virgin chemicals without fresh fossil feedstocks.

According to the RED II<sup>Error! Bookmark not defined.</sup>, *thermal conversion technologies such as gasification, pyrolysis and liquefaction* applied to mixed (biogenic and fossil) post-recycling wastes produces an "advanced biofuel" for the biogenic part and a "recycled carbon fuel" for the fossil part. The GHG reduction of advanced biofuels is set by RED II to at least 65%, while as mentioned the Commission will by 2021 issue a delegated regulation on an appropriate GHG reduction threshold and associated estimation methodology for the "recycled carbon fuel" part.

Advanced biofuels are promoted at the EU level by potential double-counting and a separate target of 3.5%. By allowing RCFs to contribute to the objectives of energy diversification and decarbonization of transport, the feasibility of advanced biofuel projects based on post-recycling wastes is increased, as otherwise *full potential value is only derived from a fraction of the product*.

Furthermore, the drivers for material recovery to chemicals and fuels from post-recycling wastes are strengthened. It would allow wastes, that will otherwise be disposed of by, e.g., landfilling (as far as this is still accepted), incineration without energy recovery, or recovered as power and heat, to be used for production of fuels for sectors that are hard to decarbonize, such as aviation, or used for production of chemicals that would otherwise come from fresh fossil resources.

## CONCLUSION

Recycled carbon fuels, **where they fulfil appropriate greenhouse gas emissions savings criteria, can meaningfully contribute to the policy objectives of energy diversification and decarbonisation of the transport sector for Member States.**

DISCLAIMER - The above statement has been prepared by the Alternative & Renewable Transport Fuels Forum (ART Fuels Forum) after exchange of opinions and internal consultation among the Forum members. The content of the contribution does not necessarily reflect the views of all members of the ART Fuels Forum, but is a synthesis of the main positions. The positions and recommendations listed above are those of the members of the ART Fuels Forum and do not necessarily reflect either the official position of the Commission or the complete position of the members of the ART Fuels Forum.

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<sup>4</sup> The European Green Deal, COM(2019) 640 final.