

RED II – A Revised Directive Looking to the Future of Renewable Energy

The EU has long championed renewable energy, with the bloc being one of, if not the global leader in the sector. Chief among the reasons behind this success has been the European Commission's 2009 Renewable Energy Directive (RED), which has laid the groundwork for the majority of EU renewable energy policy since. By setting ambitious, legally binding targets, the RED framework has provided a mechanism for a swift and successful uptake of renewables across the continent and in the vast majority of all member states. Back in 2007, 10.4% of the EU's energy mix came from renewable sources; the original RED set a target for this figure to be 20% by 2020, and the Union is well on course to reach this target, surpassing 17.5% in 2017.

As with all large policies that effect multiple sectors, they need a refresh after a few years in operation to gauge what was successful what was not, which sectors must continue to be pushed, and what can now be left to the markets. With the RED targets not extending beyond 2020, the Commission has spent the past few years working to update the Directive, both to better reflect the modern renewables landscape, and to provide meaningful targets for the next decade or beyond. The new Directive, dubbed RED II, was published in mid-December 2018– though amendments may still be made – and expands on the precedent set by the original Directive.

One of the most eagerly awaited outcomes of RED II is, of course, the updated targets. According to the Directive, if the current trajectory of EU renewables development and deployment is maintained, the EU will have 24.3% renewables in its energy mix by 2030, which is “well below” where the Union wishes to be. The new legally binding target is 32% by 2030. Member states are, of course, free to set themselves more ambitious targets, but 32% is set to be the minimum. If, however, the Commission deems that the EU is set to comfortably meet this 32% renewables target by 2030, it reserves the right to adjust this target upwards in 2023, if it sees fit.

The Directive acknowledges that this 32% target will require significant investment from both the public and private sectors – analysis anticipates that the figure will be around 1 trillion euros between now and 2030, which equates to around 2.5 billion euros per member state per year. Governments (be they national or continental) simply do not have the facility to provide this level of funding, and so the private sector will have to get involved, as the Directive seeks to prioritise certainty for investors. This sits in stark contrast to the EU investment picture, which shows a decline of 60% in EU funding for renewable energy between 2011 and 2015, although around 11% of funding from the European Fund for Strategic Investment is given to renewable energy projects. No EU-level funding is promised in the Directive, but encouragement is given for member states to facilitate the private sector to take the reins, with the overall objective being to make energy as cost-effective as possible for all stakeholders, particularly consumers and taxpayers.

Updated targets, budgets, and approaches are one thing, but what does the updated Directive actually mean for the bioeconomy? As a key part of the renewable energy picture, any change to the legislation will be felt in bioeconomy, but the Directive does deal with several issues directly related to the bioeconomy. How are these set to affect the bioeconomy going forward?

The short answer is – somewhat anticlimactically – it depends. While it is true that many aspects of the proposed revised Directive exist at EU level, these are mostly standards, safeguards, and restrictions, and don't provide any indication of where the bioeconomy goes from here. Since every EU member state's energy picture is different, it has been quite rightly left up to each individual member state how they approach the meeting of RED II's new targets, and thus the bioeconomy's place in those approaches will be revealed in each country's respective bioeconomy strategy, although in the [UK's case](#) the strategy lacked any detail or clear way forward.

Thus, the significant takeaways for bioeconomy stakeholders lie within those restrictions, which define the playing field for future bioeconomy development in the context of RED II.

A Clear Preference for Advanced Biofuels

Advanced biofuels are biofuels that have not been obtained from processing primary biomass – such as that from forestry or agriculture – and are championed in RED II as being the preferred short-term solution for reducing the carbon impact of the EU's transport sector. Transport has noticeably lagged behind other sectors in terms of decarbonisation, a fact which stakeholders put down to the high cost of electric vehicles, and the continued debate over the sustainability of biofuels. The end goal is for all domestic transport to be electric, as this results in the lowest emission levels (provided the electricity itself is renewable), but the aforementioned cost to the consumer remains too high for this to be suitable in the short term.

Much of the controversy surrounding biofuels has stemmed from their feedstocks. It is oft-vaunted that growing crops for industrial purposes results in unsustainable land-use change, either from the destruction of uncultivated native land, or from the reallocation of cropland that would otherwise be used for growing food crops. Research suggests that sustainable management can minimise these effects, but this has not swayed the European Commission, whose banner remains firmly in the camp of advanced biofuels. These biofuels are technologically harder to produce, due to the heterogeneity of their feedstock (usually waste) and their 3-fold higher costs of production, but they do generally deliver much lower emissions levels over the entire life cycle of the fuel. However, they have much less of a market presence currently, a fact RED II acknowledges, but seeks to alter through targets.

Although the transport sector is considered in the wider 32% renewable energy targets, extra provisions have been made in order to ensure transport does not fall by the wayside in member states' efforts to decarbonise, as has happened previously – reflected in the transport sector's relatively trivial recent decarbonisation. RED II includes minimum requirements for fuel suppliers to include biofuel in the mix that they offer: 14% of their fuel mix must be biofuel by 2030. Within these targets sit sub-targets specifically for advanced biofuels: a minimum of 0.2% by 2022, and 3.5% in 2030. Suppliers who produce renewable electricity for vehicles, or hydrogen from the electrolysis of water that can be used to produce Renewable Fuels of Non-Biological Origin (RFNBOs) can be exempted from these advanced biofuels targets. This latter point is in-keeping with RED II's wider objective to phase out crop-based biofuels.

As far as crop-based biofuels are concerned, the Directive acknowledges that while a phase-out is necessary, some member states are more dependent on crop-based biofuels than others. The proportion of a member state's fuel mix that is crop-based must not increase by more than 1 percentage point from its 2020 level (unless its 2020 level is less than 1%) and must not exceed 7% at all. A separate upper limit is included for biofuels produced from crops considered to cause high

levels of Indirect Land Use Change: their use must not increase beyond 2019 levels, and this limit is set to procedurally decrease to 0% by 2030. Any crop-based biofuels utilised in the member state beyond these limits will not count towards the country's renewable energy contribution.

As a further incentive for member states to facilitate the development of advanced biofuels, double-counting measures can be employed to effectively reduce a country's renewable energy volume target. Any advanced biofuels produced from algae, or from waste, including food and crop waste, the organic fraction of municipal waste, or waste vegetable oils such as used cooking oils, will count double their energy value when determining a member state's renewable energy output. In the case of used cooking oils – a common feedstock for biodiesel production – this is limited up to 1.7% of a country's fuel production, to prevent this system being an incentive to generate more waste vegetable oils (in effect undermining the phase-out of crop-based biofuels). Renewable electric vehicles are incentivised further: renewable electricity produced for powering vehicles is quadruple-counted (unless it is for trains, in which case it is 1.5x counted). There is also incentive to produce renewable fuels for more difficult modes of transport, most notably aviation, which naturally has much more stringent fuel requirements than road transport, and so any non-crop-based aviation biofuels are counted an additional 20% to their energy content.

Biogas – Spoiled for choice?

This emphasis on producing transport fuel from biomass waste may be seen as a big boon to the anaerobic digestion sector, as biogas utilised as fuel is counted in the same manner, and many AD plants utilise waste feedstocks to qualify for advanced biofuel status (notably animal manures). This will be of particular interest in the UK, where it was recently announced that biogas producers are able to claim financial support on the Renewable Heat Incentive (RHI), whilst also generating (and selling) Renewable Transport Fuel Certificates as part of the Renewable Transport Fuel Obligation (RTFO). Not at the same time, of course, but suppliers can switch between RHI and RTFO tariffs when it suits.

This versatility is what allows biogas to shine as a bioenergy source, but are generators set to face a dilemma under RED II? In addition to the aforementioned support for biogas as a transport fuel, support for renewable heat – and to a lesser extent electricity – are also beneficial to biogas generators. RED II also acknowledges that heating and cooling are decarbonising at a lesser rate than electricity, and so to prevent member states from putting all their eggs in one basket by focusing on renewable electricity, all member states are “encouraged” to raise their levels of renewable heating and/or cooling by 1.3 percentage points per year, including waste heat and cold.

But it is not just its versatility that makes AD such an important technology under this Directive, but also its scale. The Directive encourages decentralisation of energy grids, encouraging the establishment of local heat networks. Due to AD's relatively small scale when compared to the capacity of other technologies, this emphasis on local generation plays into AD's hands nicely, if member states choose to go down this route with their own renewable energy strategies.

Of course, for any technology to be successful, it relies on policy support, which means AD's success will be determined on a country-by-country basis. Some may choose to pursue other technologies.

Supply Chain Sustainability Paramount

RED II makes particular provision to ensure that each member state's renewable energy is in fact renewable and sustainable. It is not just biofuels where the sustainable use of biomass is a hot-button issue: any industrial process utilising biomass will rightly be under scrutiny for the sustainability of its

biomass sourcing. RED II precipitates this scrutiny into legislation, by mandating that any biomass utilised for biofuels or bioenergy must satisfy specific sustainability requirements. These requirements apply to all biofuels, and to any biomass burning or biogas generation with a thermal input of at least 20MW or 2MW respectively (which is, functionally, most installations of each type). Underpinning these sustainability thresholds is the requirement for a guarantee of origin for all renewable energy, by which all sustainability requirements can be checked.

The requirements focus on promoting sustainable agriculture and/or forestry, by mandating that all biomass be sourced from land that was not of high carbon stock, such as peatlands or dense native forests, or resulting from the clearing of highly biodiverse land such as rainforests. Nations in which such biomass is grown, be they in the EU or not, must also have legal monitoring frameworks ensuring that the agriculture in question does not compromise soil carbon stock. In the case of forestry, the source nation must also legally ensure that effort is made to regenerate forests after harvesting.

Alongside this increase in the sustainability of the harvested biomass, the degree to which biofuels or bioenergy contribute to decarbonisation must also be ensured. To this end, minimum greenhouse gas saving thresholds are required to be met by biofuels and bioenergy plants. For bioenergy, there must be a 70% greenhouse gas saving by bioenergy sources from 2021, rising to 80% in 2026. For biofuels, these savings depend on when the production plant in question was commissioned: 50% for plants commissioned before 2015, 60% if between 2015 and 2020, and 65% for all subsequent plants. These greenhouse gas savings must be calculated through life cycle analysis, to prevent any unaccounted-for indirect emissions.

Lastly, where electricity from biomass combustion is concerned, large plants (those with a thermal input of 50MW or greater) will need to also display combined heat and power functionality, to increase the efficiency of the generation process, or must employ carbon capture and storage technology.

Conclusion: A Directive with its eyes on the future

It is no secret among bioeconomy stakeholders that bioenergy and biofuels are seen as temporary or bridging solutions to the decarbonisation problem. Renewable technologies exist with greater decarbonisation potential, and the current bioenergy and biofuels serve to begin the process of deep decarbonisation while these technologies become more widely available.

There is no doubt that many stakeholders see the strict sustainability requirements and phase-out of crop-based biofuels as a harsh measure, but it is clear that the EU has a vision of a post-2030 world where "clean" renewable technologies are at the fore, and this Directive has been produced with that world in mind. It is not fatalistic to state that the bioeconomy must focus on making the most of the opportunities it has now, because those opportunities are plenty, and there is still plenty of scope for bioenergy technology to develop.

The Directive, however, only indicates the general direction, not the specific route taken. It is now in the hands of the EU's member states how this Directive shapes the bioeconomy of the next decade, and we eagerly await their individual strategies therein.