



Co-funded by the Intelligent Energy Europe
Programme of the European Union



Keep on Track! Project

National Report: United Kingdom

02.02.2015

Contract No: IEE/11/842

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Interviewed Experts

We would like to thank all interviewed experts for their very valuable input and their support for this study. We highly appreciate their expert knowledge and their availability in the framework of the Keep on Track Project on behalf of the European Commission.

For this country study, the following experts were interviewed at the end of 2014:

- Clare Wenner, Renewable Energy Association (REA)
- Frank Aaskov, Renewable Energy Association (REA)
- Frank Gordon, Renewable Energy Association (REA)

Common Barriers to the Electricity, Heat and Transport Sector

Political and economic framework

At the end of 2014, **policy risk and uncertainty in the market** remain the key barriers affecting all renewable technologies across all sectors and directly or indirectly impact all project development steps. This stems from continually changing policies and financial support schemes (National profile of UK, Barrier Ref. No. 1UKEHCT, re-frame.eu).

For example **in the RES-E sector**, the Feed-in Tariff (FIT) scheme, the main financial mechanism for small-scale renewable electricity generating technologies, has recently undergone a number of significant changes. New FIT rates and energy efficiency standards were introduced for PV installations in 2012, and the tariff support period reduced from 25 to 20 years. FIT rates have been revised for anaerobic digestion (AD), wind and hydro power, and micro-CHP. A degression mechanism has been introduced for PV from November 2012. From April 2014, degression is applicable to non-PV technologies (DECC 2013a). As indicated by REA during the last survey, the degression mechanism for AD was not well designed. The Government was aware of this problem and tried to fix it, however the proposed measures were not effective (Gordon, REA). As a result, quite severe reductions in tariffs (- 20%) were produced for AD with the capacity of up to 500 kW. This is an issue of great concern for the industry (Thompson, REA, 2014; Regen SW 2014). According to REA, a full review of the FIT scheme is planned in 2015 which creates uncertainty (Gordon, REA).

Also the main financial mechanism for large-scale (over 5 MW) renewable power generation, the Renewables Obligation (RO), was reviewed in 2012 and new bands have been introduced in 2013 for technologies for the period from 1 April 2013 to 31 March 2017, prior to the scheme being replaced (DECC 2012). The 12 months grace period introduced by the Renewables Obligation Closure Order 2014¹ (in effect since 9 September 2014) provided the generating stations with the opportunity in certain clearly defined cases (e.g. to address radar and grid connection delays or for some projects that are able to demonstrate that substantial financial decisions and investments have been taken prior to 31 July 2014) to apply for and gain accreditation under the RO scheme after the closure date, i.e. after 31 March 2017 (DECC 2014a; Gordon, REA). These regulations are seen as an improvement by some in the renewable industry (Gordon, REA).

The UK power sector is currently in transition between the RO and a new mechanism as part of Electricity Market Reform (EMR). The legal framework for EMR is contained in the Energy Act 2013, which became law in December 2013². Part of the transition includes the introduction of Contracts for Difference (CfD)³ which is open to applicants as of October 2014. The RO will run alongside this until 31 March 2017, after which it will no longer accept new applications. Large-scale renewable

¹ www.legislation.gov.uk

² The information on the law passing process can be found at <http://services.parliament.uk/bills/2013-14/energy.html>

³ The CfD is a long-term, private law contract that pays the generator the difference between an estimate of the market price for electricity ("reference price") and an estimate of the long term price needed to bring forward investment in a given technology ("strike price").

projects (above 5MW) are now able to choose between the RO and CfDs. From 2017 onwards, however, the CfD will be the only choice for large-scale projects (DECC 2013b). Moreover, the UK Government introduced auctions for CfD renewable power contracts, aimed at reducing the cost of renewable technologies and rationing the available funding (Thompson, REA, 2014; Gordon, REA). The CfD budget for allocation rounds is divided into two pots. Pot 1 is allocated between the established technologies, covering onshore wind (>5 MW), solar PV (>5 MW), energy from waste with CHP, hydro (>5 MW and <50 MW) and landfill gas and sewage gas. Pot 2 is allocated between the less established technologies such as offshore wind, wave and tidal stream, advanced conversion technologies, AD, dedicated biomass with CHP and geothermal (Budget Notice 2014). According to the REA, CfD auction is a big concern, especially for the more expensive renewable technologies in competition against the cheapest ones within the pot (e.g. solar against onshore wind within Pot 1 and emerging technologies against offshore wind within Pot 2) (Gordon, REA).

Uncertainty surrounding the details of future policies create further risks for investors, and if this is not addressed there will be “a huge hole” in renewable power policy (Thompson, REA, 2014; Edge, RenewableUK). This will tend to undermine investment, as project developers and funders lack clarity on the effects of changing policies in the medium and long run. Much of it comes down to guess work (National profile of UK, Barrier Ref. No. 1UKEHCT, re-frame.eu; Wenner, REA, 2014a; Thompson, REA, 2014). The lack of clear commitment by the Government to either guarantee a comparable regime beyond 2017 (when the RO is closed) for at least the first marine technologies or to take them out of the fully competitive auction process in EMR will result in uncertainty and frustration in the industry. Currently there are no commercial marine sites operating in the UK because developers have difficulties in attracting investment in spite of a real interest in investing in marine technologies (National profile of UK, Barrier Ref. No. 15UKE, re-frame.eu).

In both the power and heat sectors, industry further remains concerned over sustainability criteria for the use of biomass within the RO and the Renewable Heat Incentive (RHI). Sustainability criteria were supposed to be in place from April 2014⁴. However, in the power sector the criteria have not been completely implemented so far. Introduction of some criteria, e.g. land criteria, have been delayed (National profile of UK, Barrier Ref. No. 6UKE and 20UKHC, re-frame.eu; DECC 2013c; Gordon, REA). Thus the industry continues to be worried about the implementation details and related potential administrative burdens which are not yet clear. A big concern in the power sector in this context is support for new stand-alone biomass power generation. Support in the RO is effectively capped at 400MW, while this technology is excluded from the CfDs entirely. This sets March 2017 as a hard deadline, and there is therefore a risk that delays will hold-up new projects and potentially see them abandoned, although the new grace periods help lessen this concern as such projects have an extra 18 months to commission. At the end of 2014, the renewable power industry highlighted that the regulations for biomass sustainability as they stand now will be especially hard for smaller electricity generators to meet (re-frame.eu database).

⁴ For more information on RHI improvements see <https://www.gov.uk/government/news/government-confirms-way-forward-on-renewable-heat-scheme-improvements>

The implementation of the sustainability regulation for renewable heat under the RHI scheme has also caused the industry some grievances. The Government now intends to implement the regulation in Autumn 2015 (instead of April 2014), but has delayed the final guidance for how to comply with the land-use criteria (issued in late December 2014). This has caused fuel suppliers some problems, as they often have some fuel in stock, which may not pass the new regulations, and have been forced to contract for future fuel delivery without knowing if the fuel passes the requirements. This will potentially cause major losses to fuel companies, and the uncertainty itself is creating a poor investment climate (National profile of UK, Barrier Ref. No. 20UKHC, re-frame.eu).

The industry has pointed out that since users are typically smaller-scale, non-energy professionals, they cannot be expected to manage complex supply chains and demonstrate compliance with the sustainability regulations (National profile of UK, Barrier Ref. No. 20UKHC, re-frame.eu). The Government has addressed this by setting up the Biomass Suppliers List (a list of approved woody biomass fuels). As reported at the end of 2014, the Biomass Suppliers List was initially poorly implemented with lots of website issues and potential consumer issues as well, which later have been resolved (National profile of UK, Barrier Ref. No. 20UKHC, re-frame.eu).

Beyond that, the recently-published land-use criteria are not being implemented on a practical timescale. Regulations are due to take effect in Autumn 2015. Plenty of biomass fuel supply has already been contracted for next year, at a time when the rules were not known and could not be followed. It will require verification and alignment of a producer's and a supplier's certification before contracting supply. Supplies need to be contracted now to avoid the risk of a shortfall or price-spike next year, but putting the necessary certification into place will take several months (National profile of UK, Barrier Ref. No. 20UKHC, re-frame.eu).

At the beginning of 2014, the uncertainty was even greater because the European Commission (EC) intended to update requirements on sustainability criteria for solid biomass and biogas used for electricity, heating and cooling (Thompson, REA, 2014). The industry was concerned that even if sustainability criteria are not decisive in themselves, the cumulative effect with other environmental regulations (e.g. air quality) might discourage consumers / investors from choosing biomass heat (National profile of UK, Barrier Ref. No. 6UKE, re-frame.eu). However, in July 2014, the EC confirmed that it does not plan to introduce any sustainability criteria for biomass prior to 2020 in order to provide Member States with a stable framework and allow them to achieve their 2020 climate and energy targets. As a result, the EU-wide sustainability criteria for biomass are not perceived as a barrier at the end of 2014 (ENDSwaste&bioenergy 2014; Aaskov, REA).

Policy risk and uncertainty especially hits AD because banks have greater reluctance to lend to AD projects. Should funding be available, the loan is required to be secured against other assets, making funding one of the biggest barriers for AD. In addition, very few waste companies are willing to agree a contract of sufficient duration that is acceptable to secure the funding (National profile of UK, Barrier Ref. No. 24UKHC and 27UKHC, re-frame.eu).

Uncertainty in UK renewable transport sector is largely created by two interlinked barriers – uncertainty over UK targets to 2020 and the lack of targets and indication of support for biofuels

beyond 2020 at the EU level. The UK has refused to set targets beyond 2014, citing concerns around indirect land use change. The European biofuels market is driven exclusively by mandatory targets so the absence of targets after 2020 represents a significant risk for investors for both 1st and 2nd generation biofuels. As suggested by the REA, the Renewable Energy Directive (RED)⁵ started to create investor confidence. The EU seemed to be committed to reducing its dependency on fossil fuels and to combating climate change. However, the absence of RES-T targets beyond 2020 means that the Member States will be able to decide on their own how they will reach their targets. From past experience it can be expected that the Government will try to increase the share of renewable energy sources without setting indicators for transport, because it sees electrification as a sole answer to all problems (REA, Wenner, 2014b).

In addition, in October 2012 the EC proposed to effectively reduce the target for 2020 through a cap of 5% on crop based biofuels⁶. In June 2014, the EU Council reached a political agreement on the draft directive on indirect land-use change (ILUC) amending the fuel quality (98/70/EC) and renewable energy (2009/28/EC) directives. Currently, a 7% cap is suggested, which is better than the initial cap proposed by the EC (BiofuelsDigest 2014; Wenner, REA, 2014b). Nevertheless, given the UK's position, the failure to achieve agreement on the Commission's proposal and the lack of a clear direction beyond 2020 are badly undermining investor confidence in the European biofuels sector, especially now when potential investors look very closely at market certainty. Given the high capital costs of biofuel facilities, banks will unlikely be willing to commit funds until this is resolved. Without this clarity, hardly any additional facilities will be constructed (National profile of UK, Barrier Ref. No. 1UKEHCT and 29UKT, re-frame.eu; Wenner, REA, 2014a). At the end of 2014, the REA indicated that the UK is currently conducting an analysis of national decarbonisation pathways to 2020 and 2030. To this end a Task Force was created that is working on the suggestions to the responsible Ministries which then in turn will draft proposals to the UK Parliament. Although this is a slight improvement, no decision is expected earlier than 2015 Q3 or Q4 (after the general elections in May 2015). It is therefore not yet clear what the final decision will be, and as a consequence the uncertainties in the UK transport sector are currently greater than a year ago (Wenner, REA, 2014b).

The environment for renewable energy investment is further destabilised by the upcoming general elections in May 2015 and the Conservative Party's discussions about renegotiating the UK's relationship with the EU. All these political events are not yet a barrier but might become one in the near future (Edge, RenewableUK, 2014; Wenner, REA, 2014a; Thompson, REA, 2014).

Last but not least, in the beginning of 2014 the industry reported that the **existing policies are very complex** in the UK which makes it difficult, especially for small-scale renewable generators, to understand them (Thompson, REA, 2014). After almost a year, the complexity of the existing policies is still perceived as a barrier (Gordon, REA).

To maintain at least some sort of certainty for the renewables industry, the REA highlighted the importance of mandatory renewable energy targets at EU level beyond 2020. In their view, setting

⁵ OJ L140, 5.6.2009, p. 16.

⁶ European Commission proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, COM(2012) 595 final

ambitious targets at the national level is by far the best way of encouraging deployment of renewables because it provides the market with a level of certainty that something at least will be done even if the policy itself is far from being perfect. GHG targets by themselves are not sufficient as there is low confidence that these cannot be gamed – especially when looking at the experience of EU ETS to date. In addition, the UK might rely on optimistic assumptions on the availability of new nuclear and CCS. The Government is unlikely to design policies to stimulate renewables until the outcome of these political uncertainties were resolved (Thompson, REA, 2014).

Common Barriers to the Electricity and Heat Sector

Political and economic framework

The **UK Government's primary focus on short term costs** still continues to constitute a barrier to renewable electricity and heat in the UK in late 2014. As reported by stakeholders, cost reductions can often result in compromises whereby corners are cut and errors made. This can result in project failure and in turn damage industry reputation. A specific example of this concerns the gasification and pyrolysis industry whereby the technologies' reputation has been damaged due to plant failure. However, this barrier can also affect marine technologies (tidal and wave energy) and PV. According to the REA, it has to be acknowledged that successful cost-related compromises cannot always be made with these complex technologies (National profile of UK, Barrier Ref. No. 8UKE and 26UKHC, re-frame.eu).

In addition, at the end of 2014 the industry reported that the **incentives based on banded costing create perverse incentives**. The RHI scheme is banded into <200kW, 200-1000kW & >1000kW. This has created a gold-rush of installations at 199kW. Counter-intuitively, policy based on attempts to judge the cost of technologies end up being expensive and ineffective. In the long term, one solution could be to move towards national carbon and energy taxes, which would penalise high-carbon energy sources and thereby indirectly support renewable energy. This would be a more cost-effective policy option compared to misdrawn system boundaries of support. Another option would be to base subsidy level on carbon savings (National profile of UK, Barrier Ref. No. 26UKHC, re-frame.eu).

Some improvements could be observed with regards to **unbalanced financial support schemes** for renewable electricity and heat, a barrier communicated by the industry in the beginning of 2014. At that time it was indicated that unbalanced financial support schemes lead to a situation where some technologies are adequately supported and others are not, creating an unbalanced market for renewables (National profile of UK, Barrier Ref. No. 9UKE and 25UKHC, re-frame.eu). For example, whilst there were adequate FiT rates for PV installations, the FiT rates for other renewable technologies were not supportive enough in order to encourage similar investment (National profile of UK, Barrier Ref. No. 9UKE, re-frame.eu). A number of limitations have also been indicated by the REA with regard to the non-domestic RHI scheme. Some were obvious when the policy was introduced in November 2011, others emerged since the start of its operation. Firstly, various technologies were still not covered by the non-domestic RHI such as air-water heat pumps or energy from commercial and industrial waste. Biogas was eligible only if it is below 200 kWth capacity. Some tariffs turned out to be simply too low, particularly for ground source heat pumps. As a result, a number of changes have been proposed over the course of the past two years. The final set of decisions was announced in December 2013⁷. Some of the key changes were; new support for air-water heat pumps and energy from commercial and industrial waste. Support was planned to be increased for renewable CHP, large biomass boilers (over 1MW), deep geothermal, ground source heat pumps, solar-thermal and biogas combustion. Taken together, these were seen as positive developments by the renewable industry. However, there have been serious concerns about the

⁷ For more information on the proposed changes see <https://www.gov.uk/government/policies/increasing-the-use-of-low-carbon-technologies/supporting-pages/renewable-heat-incentive-rhi>

degression mechanism under the scheme. A concern was that large funds were allocated to underperforming technologies which were unlikely to need such a large budget, while others such as biomass heat were unduly constrained. Part of the set of decisions announced in December 2013 was to readjust those trigger points for degression so that it is much more closely linked to market reality (Thompson, REA, 2014). At the end of 2014, the REA communicated that due to smooth implementation of the above given amendments, the non-domestic RHI scheme is currently functioning fairly well. In addition, domestic RHI was launched in Great Britain in April 2014. High rate of applications (around 5,000 in the last few months) shows the success of the domestic scheme in place (Aaskov, REA).

Other

At the end of 2014, **lack of a skilled workforce** for the installation of all renewable microgeneration technologies is still one of the main barriers to the electricity and heat sector in the UK. If this problem is not addressed, there will not be enough suitably trained individuals to install at the required rate to meet the UK objectives under the RED and growth in the UK renewables market might be slowed (National profile of UK, Barrier Ref. No. 2UKE and 18UKHC, re-frame.eu).

Limited positive changes could be observed with regard to Microgeneration Certification Scheme (MCS)⁸. The **cost and complexity of the MCS** is still perceived by many as a barrier to the widespread implementation of small-scale renewable technologies within the UK. The MCS is currently the only recognised scheme for the certification of renewable energy installers wishing to access governmental fiscal and financial incentives. The scheme therefore has an extremely important role to play in protecting those who wish to invest in the industry. There are concerns that the scheme does not consistently ensure compliance with its requirements, with consumer protection risks increasing with the introduction of the domestic RHI. For many within the industry the high cost and complexity of the MCS are perceived as significant barriers, acting as a dis-incentive for many small installation companies or sole traders willing to enter the UK renewables market and may ultimately prevent the scheme from working effectively and achieving its aim. This barrier affects all small-scale renewable technologies in the UK aiming to access government incentives. It also affects installations going into public buildings since compliance with MCS is usually a minimum requirement (National profile of UK, Barrier Ref. No. 7UKE and 22UKHC, re-frame.eu).

⁸ MCS is an industry-led quality assurance scheme, supported by DECC. The Scheme was launched in 2008. It certifies microgeneration products used to produce renewable electricity and heat. MCS also certifies installation companies to ensure the microgeneration products have been installed and commissioned to the highest standard for the consumer. The scheme covers electricity generating technologies with a capacity of up to 50kW, and heat generating technologies with a capacity of up to 45kW. For more information on MCS see <http://www.microgenerationcertification.org>

The United Kingdom RES-E Sector

Support schemes

In the UK, the generation of electricity from renewable energy sources (RES-E) is supported through Feed-in Tariffs, a new Feed-in Tariff Contracts for Difference (CfD) scheme and the Renewables Obligation (RO) - a quota system based on certificates. Under the Feed-in Tariff, accredited producers, whose plants have a capacity of up to 5 MW, can sell their electricity at fixed tariff rates established by DECC; the scheme is managed by the Office of Gas and Electricity Markets (Ofgem). Under the quota system, licensed electricity suppliers are obliged under the Renewables Obligation Orders⁹ (ROO) to present a certain number of Renewable Obligation Certificates (ROCs) obtained from renewable generation or pay a forfeit (the “buy out price”). In 2014, the UK introduced the Contracts for Difference mechanism. Under this scheme, a RES-E generator and a CfD Counterparty (Low Carbon Contracts Company) enter into a contract, which is based on a difference between the market price and an agreed “strike price”. Currently, the scheme is applicable in England, Wales and Scotland. In Northern Ireland it is expected to be introduced in 2016. From April 2017 (when the RO is closed) the CfD scheme will be the only support scheme for all new RES-E plants exceeding 5 MW. (RES LEGAL Europe Database)

Barriers to the electricity sector

Political and economic framework

Overall, insufficient total budget for large scale renewables support is seen as a barrier for renewable technologies in the RES-E sector. The budget for power support will be exceeded by demand in the near future, which constitutes a major problem (National profile of UK, Barrier Ref. No. 32UKE, re-frame.eu).

In the beginning of 2014, stakeholders expressed the view that **Ofgem's objectives are not aligned with national and European renewable energy and green economic objectives**, which translates into a major barrier for the electricity sector. Ofgem, the independent national energy regulator in the UK, has not been tasked with responsibility for creating a sustainable low carbon industry. Attempts to ensure that Ofgem promotes the decarbonisation of the electricity supply system have been ineffective to date, leading to a dis-jointed approach. No positive changes have been observed by late 2014. This barrier affects all renewable technologies in the RES-E sector (National profile of UK, Barrier Ref. No. 21UKE, re-frame.eu).

A number of barriers hindering deployment of marine (tidal and wave energy) technologies have been reported by stakeholders in the beginning of 2014. None of these barriers have been addressed. A key highlighted barrier was the incapability of the **rules set to accommodate several**

⁹ www.legislation.gov.uk

scenarios for testing, which was also a barrier in 2012. Ofgem treats larger companies and small research the same and require the same level of certainty in terms of energy output. However, as the research centre does not know which installation will be tested or which size, this is a big problem, even though they in some ways behave like a generator (i.e. provides cable). Stakeholders have indicated that at the moment there is no apparent interest in addressing these restrictions (National profile of UK, Barrier Ref. No. 16UKE, re-frame.eu).

Access to finance is a further barrier that has been communicated by stakeholders. This barrier in particular is relevant to wave and tidal projects as well as other emerging technologies, which are high risk and high cost. Private investment is discouraged by the short term goals and risk aversion of major investors, the latter being partially driven by uncertainty created by inconsistent messages from the Government. Stakeholders pointed out that public funding is difficult to obtain because Government mechanisms are overly complex and time-consuming. It has been further indicated that the Green Investment Bank (GIB) has not been tasked with providing loans to wave and tidal energy projects because they are considered too risky. In the view of industry, support to renewable projects that conventional banks are not willing to support should be the responsibility of the GIB (National profile of UK, Barrier Ref. No. 22UKE, re-frame.eu).

Further, marine technologies in the UK are facing **inconsistent project underwriting costs**. The approach to insurance and decommissioning requirements (such as decommissioning plans) for new strategically important energy systems should be the same, however, at present marine technologies seem to be facing burdens that have been removed from nuclear (National profile of UK, Barrier Ref. No. 23UKE, re-frame.eu).

The upcoming **phasing out of the Renewables Obligation** in 2017 was indicated at the beginning of 2014 as an additional barrier affecting all renewable technologies in the power sector (National profile of UK, Barrier Ref. No. 24UKE, re-frame.eu). The abolishment of the financial mechanism, which has existed since 2002, means that electricity suppliers will no longer be obliged to source a certain percentage of their electricity from renewable energy sources. The industry indicated that without the RO, there will be no direct financial incentives for electricity suppliers, which will in turn lead to greater risks with regard to project funding (Thompson, REA, 2014). To support generators who are unable to obtain a fair market price for their power, the UK Government proposed the “Offtaker of Last Resort”¹⁰ mechanism. However, the renewable industry was quite unsure of this mechanism at the beginning of 2014 (National profile of UK, Barrier Ref. No. 31UKE, re-frame.eu). The situation has not changed much since then. The only improvement that has been communicated by late 2014 is that the “Offtaker of Last Resort” mechanism was extended and covers now all renewable technologies. However, the access to the funds needs to be accelerated. According to the REA, all payments under this scheme need to start earlier than planned in 2015 (Gordon, REA).

At the beginning of 2014, the industry also expressed the need for **State Aid Guidelines that would ensure effective interaction with the existing financial support schemes** for renewable electricity (National profile of UK, Barrier Ref. No. 29UKE, re-frame.eu). This barrier has not yet been removed.

¹⁰ For more information on the “Offtaker of Last Resort” see <https://www.gov.uk/government/policy-advisory-groups/electricity-market-reform-off-taker-of-last-resort-advisory-group>

In addition, several barriers relating to the new mechanism under the EMR – the Contract for Difference (CfD), have been reported by stakeholders in early 2014. It was initially indicated that **proposals by the UK Government risk no support for emerging and therefore currently costlier technologies** (National profile of UK, Barrier Ref. No. 30UKE, re-frame.eu). As indicated above, the CfD budget is divided into two pots, which leads to a situation where the more expensive technologies may lose out in competition against the cheapest ones (e.g. solar against onshore wind within Pot 1 and wave and tidal against offshore wind within Pot 2) (Gordon, REA). Moreover, logistical issues such as the **length of required generator CfD payment timescales** have also been highlighted as of concern to generators beginning of 2014. It was indicated that if the timescales are missed, it would result in the termination of support, risking “hair-trigger” termination for generators (National profile of UK, Barrier Ref. No. 34UKE, re-frame.eu). This barrier still exists in as of the end of 2014.

At the beginning of 2014, several barriers related to electricity storage have been communicated by the industry. The first barrier in this context is **lack of incentive or strategy for electricity storage**. Industry indicated that electricity storage is technically ready to be implemented; however implementation requires high initial costs. Electricity storage is similar to some renewable technologies, which in contrast, are able to receive support under diverse financial mechanisms. Limited research and innovation funding has been provided to electricity storage in the UK, without any idea of developing a route to market. Furthermore, despite electricity storage enabling the connection of renewable electricity to the grid, there is no strategy, pathway or target in the UK that would send a signal to the industry that electricity storage is necessary (National profile of UK, Barrier Ref. No. 18UKE, re-frame.eu). The second barrier related to electricity storage that has been reported by the UK renewables industry is, **lacking clarity in definition of electricity storage**. Historically, electricity storage has been classified as generation, however electricity storage is not defined in UK legislation. Due to the lack of clarity, it is not clear who may own and operate electricity storage (National profile of UK, Barrier Ref. No. 19UKE, re-frame.eu). No improvements on both of these barriers have been observed by the end of 2014.

Market structure

Like almost a year ago, also by the end of 2014 the **ability of small/independent generators to access CfDs support under EMR** is perceived as a barrier by stakeholders (National profile of UK, Barrier Ref. No. 25UKE, re-frame.eu). The CfD scheme is very complex and requires administrative capabilities, and possibly auction bidding strategies that small companies may not possess (Landy, REA, 2014).

At the end of 2014, a new barrier was communicated that concerns **Ofgem’s operating rules**. It was indicated that Ofgem is tasked with protecting the interests of consumers. To date this has focussed simply upon cost and security of supply. Additional guidance now includes the cost of not mitigating the carbon emissions of the sector. The guidance has before struggled to articulate the risks for future consumers (who are also tax-payers) of failing to create a sustainable industry as the fossil industries decline. As a result the barriers to entry of new technologies have not been lowered and

there is a strong status quo bias. This is particularly an issue when the renewable sector is small and understaffed compared with entrenched interests. The industry believes that Ofgem must be tasked with playing its full part in bringing forward future energy supplies, and not just protecting the interests of fossil fuel industry (re-frame.eu database).

Grid related issues

At the beginning of 2014, the majority of the grid related barriers concerned costs rather than technical aspects of the grid connection or operation. All barriers (except the proposed increase in grid usage charges for generators on the distribution network (see below)) also existed in late 2014. It has been reported that renewable project developers in the UK are faced with **costly administrative procedures**. Industry representatives indicated that when making a connection application to the Distribution Network Operator (DNO), a few issues arose in relation to obtaining G83 and G59 connection standards (G83 is for generating units up to 16 A per Phase; otherwise G59). Initially there is a charge for obtaining copies of the G59 and G83 (approx. £100-£200). Greater costs are then incurred (approx. £1000) for witnessing of the operation of G59 sets. Whilst this cost is not huge for large G59 sets, it can be a significant deterrent for small G59 sets. Furthermore, it has been reported that **delays** of up to three months can occur **in response to a G59 application**. Such delays can have serious knock-on effects for projects, e.g. projects receive a lower energy tariff, which can undermine project viability (National profile of UK, Barrier Ref. No. 17UKE, re-frame.eu).

In addition to costly administrative procedures, the **high cost of grid access and transmission charging in remote islands** in particular hit ocean (tidal and wave energy) and wind (onshore and offshore) technologies in the UK. This barrier was also communicated in 2012 and there have been no positive changes in this regard. Stakeholders continue to report the lack of strategic imperative to grid reconfiguration and the lack of encouragement to harvest resources at the most efficient locations. They highlight the need for a grid that transports electricity from resource rich areas, such as the remote areas of Scotland. This is a particular barrier in remote islands because the capital cost required to build the interconnecting cables is extremely high and the timescales for building are continually postponed (National profile of UK, Barrier Ref. No. 26UKE, re-frame.eu; Edge, RenewableUK).

Generators of renewable electricity from technologies other than wind and marine are faced with **high and uncertain costs and unclear timeframes in connecting to the grid**, in particular when connecting to the distribution grid (National profile of UK, Barrier Ref. No. 33UKE, re-frame.eu). Due to delays to the project “TransmiT”¹¹, uncertainty in the charging system continues to remain in 2014. Stakeholders pointed out that “piecemeal changes to grid layout are inefficient and will not deliver the scale and pace of change needed to build a sustainable energy system” (National profile of UK, Barrier Ref. No. 26UKE, re-frame.eu).

¹¹ Project “TransmiT” is Ofgem’s independent review of the charging arrangements for gas and electricity transmission networks, and the connection arrangements. The outcomes of the project are expected to be implemented in April 2015. For more information see <https://www.ofgem.gov.uk/publications-and-updates/project-transmit-update-progress-and-next-steps>

At the beginning of 2014, renewable generators were concerned with the **proposed increase in grid usage charges for generators on the distribution network**. It was indicated that the review of so-called “embedded benefits” might lead to a £24/MWh increase in costs to renewable generators connected to the distribution network and might jeopardise overall viability of projects in many cases (National profile of UK, Barrier Ref. No. 35UKE, re-frame.eu). According to the REA, this is not seen as a barrier anymore, as the proposal was successfully opposed and withdrawn (Gordon, REA).

With regard to the technical aspects of grid connection and operation, no positive changes could be observed since the last “Keep on Track!” report. Differing network technical practices, over-voltage and the lack of on-line availability of high voltage (HV) network data continue to be perceived as barriers hindering renewables deployment in the UK RES-E sector. Stakeholders reported differing incurred costs in grid connection due to **different network technical practices among DNOs** as a severe technical barrier affecting all renewable technologies. Since these issues are not under open governance, it is difficult to engage with DNOs on such technical practices. Specific examples include reluctance by some DNOs to utilise full reactive capability of generators, reluctance by some DNOs to allow “deep” non-firm generator connections, or the insistence on two physically close circuit breakers in series, etc. (National profile of UK, Barrier Ref. No. 4UKE, re-frame.eu).

Over-voltage is a PV-specific barrier, which still apply in late 2014. According to industry, over-voltage inverters frequently cut out, particularly in small-scale PV generation. The inverters may be connected to the grid at up to 300v. However, G83 and G59 generation connections constrain the connection from reaching this voltage and thus when the voltage in the grid exceeds the set parameters on the inverters, they simply cut out. The owner of a PV installation can ask the DNO for the parameters to be reset; however the owners are often not aware that the inverters are cutting out. As suggested by the stakeholders, grid over-voltage results in lost revenue to the PV installation owners. Moreover, more power has to be generated from elsewhere to compensate for the loss of power from PV generation (National profile of UK, Barrier Ref. No. 4UKE, re-frame.eu).

Finally, the **DNOs** are still **reluctant to publish HV network data on-line and free of charge**. Although perceived as being of moderate severity, this barrier affects all technologies below a few MW capacity that may connect at HV, i.e. projects in the 500KW to 3MW band. As a result developers of such projects have difficulties in quickly assessing the likely ease and cost of connecting to the grid at a particular location (National profile of UK, Barrier Ref. No. 10UKE, re-frame.eu).

The developing wave and tidal machines are by definition in places where marine grid is missing. In addition, there is often no, or barely any, terrestrial grid down to the water. Operators of these new technologies therefore need to fund the grid capacity needed. There are questions regarding how big the grid should be for these experimental machines, as they need enough capacity to use for the initial plans, but cannot justify the cost of the final scale of grid needed. This leads to a situation where on the one hand the investors are reluctant to invest in a small cable as it will be disproportionately expensive and risky, and on the other hand they are not certain a big cable will pay back. Thus according to the industry, **developers are stranded in Catch 22**, i.e. they cannot prove their technology without a cable, but they cannot have a cable until they prove the technology. There is also no strategic plan to extend grid to areas with potential for wave and tidal energy. As a result, no one is currently planning and financing these technologies (re-frame.eu database).

Administrative processes

No positive developments in overcoming barriers could be observed with regard to planning procedures since all barriers communicated in 2012 are still present at the end of 2014.

Planning permission is often cited as one of the key barriers to RES-E deployment in the UK. For large projects (>50MW) applications are made to central Government. Projects below 50 MW have to apply to the Local Authority (LA). There have been significant changes to the planning requirements for RES-E projects lately; some of them being helpful, and others not. There is now a National Policy Statement for Renewable Energy Infrastructure¹² (EN-3) providing useful guidance for projects above 50MW. The guidance below 50MW should in principle reflect this document, but a comprehensive renewable energy Planning Policy Statement has recently been replaced by a much shorter National Planning Policy Framework¹³ providing only very general guidance for renewables (National profile of UK, Barrier Ref. No. 3UKE, re-frame.eu).

As indicated by RenewableUK (2014), planning procedures are time consuming and costly. Planning procedures in the UK often cause **long administrative delays due to a wide range of issues** (AEON 2010, Wind Barriers 2010, RES-Integration 2011; Edge, RenewableUK). These issues are relevant both in terms of connection and of grid development (RES-Integration 2011).

In addition, whilst renewable energy is quite popular in general in the UK, many individual proposals are strongly opposed by a very vocal and active minority (**NIMBY – Not In My Back Yard¹⁴**). The Localism Act¹⁵ introduced in November 2011 emphasises the localism agenda, although the overall picture is confused, with some measures tending to facilitate development and others potentially holding it back (National profile of UK, Barrier Ref. No. 3UKE, re-frame.eu). As indicated by RenewableUK, at least for onshore wind energy projects this barrier is still present and causes problems for certain project developers (Edge, RenewableUK).

A further problem is that planning consent for wind power is sometimes refused due to **competing public interests**. As indicated by the stakeholders, “airports are generally unwilling to consider new technology to enable their radar to cope with turbines” (National profile of UK, Barrier Ref. No. 11UKE, re-frame.eu). According to DECC, wind power plants can potentially have an impact upon the radar. Such impacts cover physical obstructions, the generation of undesirable returns on Primary Surveillance Radar (PSR), as well as effects on the overall performance of communication, navigation and surveillance equipment and turbulence. The problem is that despite available technological solutions, each area of aviation demands its own solutions. DECC indicated that Government, the aviation and wind power industries are working together in order to resolve these issues (DECC 2013d).

¹² www.official-documents.gov.uk

¹³ www.official-documents.gov.uk

¹⁴ NIMBY describes a situation where community opposes renewable power plants (especially wind, biogas) which are too close to their homes, due to concerns about their negative consequences.

¹⁵ www.legislation.gov.uk

In addition, since LAs are meant to develop policies on renewable energy deployment in their area as part of their development plan, this can be very politically contentious and result in deployment being heavily restricted. There is currently **no way to ensure that the UK 15% national renewable energy target is reflected in local planning policies** (National profile of UK, Barrier Ref. No. 3UKE, re-frame.eu).

Renewable electricity generation is further hindered by **planning consent being treated differently** in Scotland, England, Wales and Northern Ireland. Planning consent falls under different pieces of legislation which in itself constitutes a barrier (RES-Integration 2011; Edge, RenewableUK).

At the beginning of 2014, a number of marine renewables (tidal and wave energy) related barriers have been reported by the industry. No changes could be observed here since the last “Keep on Track!” report.

It has been indicated that **marine renewables suffer from over-regulation and overly-strict interpretation of EU directives** as well as perceived risks rather than evidence-based environmental risks, e.g. there is a lack of knowledge and understanding in avoidance and evasion behaviour by marine mammals. Further, it is difficult for marine energy technologies to establish a clear presence in marine spatial planning due to their novelty (National profile of UK, Barrier Ref. No. 28UKE, re-frame.eu). As a developing technology, marine projects have not established their presence in the marine space, like offshore oil and gas for example. This makes it difficult to argue that marine projects should be taken in consideration in marine spatial planning processes that are currently underway (National profile of UK, Barrier Ref. No. 27UKE, re-frame.eu).

Marine projects face additional financial challenges because of **non-equivalence of EMR strike prices with ROC support above the first 30MW of installed capacity**, i.e. EMR strike prices for marine energy are equivalent to the 5 ROCs support for RO projects for the first 30MW installed capacity of any project, and then fall to an equivalent of 2 ROCs for the capacity above this level (National profile of UK, Barrier Ref. No. 20UKE, re-frame.eu; Landy, REA).

Other

No changes could be observed with regard to the barriers to biomass in the UK RES-E sector. All barriers that have been communicated in the beginning of 2014 are still present.

One major barrier to biomass electricity is the **lack of support for projects other than the conversion of existing coal-fired power stations under the CfD scheme**. There is no tariff for dedicated biomass plants which do not have CHP fitted, and logistical problems with the biomass CHP tariff proposals which may make it impossible to finance such projects (Gordon, REA).

Biomass project developers and funders continue to be concerned about the **future security of biomass fuel supply**, i.e. that the necessary quantity and quality of sustainable biomass fuel may not

be available, at least at an affordable price, over the life of a biomass power plant project (National profile of UK, Barrier Ref. No. 5UKE, re-frame.eu).

Biomass projects are further hindered by **insufficient focus and commitment from potential on-site power users**. The biomass power project does not receive the required commitment, as biomass power isn't necessarily the main area of business of many on-site developers (National profile of UK, Barrier Ref. No. 14UKE, re-frame.eu).

Additionally, **contractor related problems** have been reported by some stakeholders. Insufficient projects have been implemented in the UK for a significant contractor supply base to be established. Large, experienced and international contractors are too expensive and inflexible for biomass power plant projects in the range of 2-15 MWe. Small evolving contractors on the other hand have too little experience in biomass power project development. There is no clear plan to create a suitably skilled workforce (National profile of UK, Barrier Ref. No. 13UKE, re-frame.eu).

New barrier for ocean energy has been reported in late 2014. The industry indicated that the **Government is too much focused on the 2020 and 2030 targets**. If an ocean energy project cannot contribute towards them, they are not valued and not taken into consideration. The long-term carbon mitigation through ocean energy project is thus ignored (re-frame.eu database).

In addition, a few new barriers for farm based energy production have been communicated. The industry highlighted the **lack of financial models for the farm based industry** as a severe barrier. Currently, there is no fixed model for funding farm based energy (biogas, onshore wind, solar etc.) in the UK and banks do not always see the potential of this kind of investments. According to the industry, community funding is not well known as a funding option (re-frame.eu database). In addition, there is **no policy vision for farm based energy**. It has been reported that the Government is too much focused on large scale generation and is biased against the small scale projects. Moreover, the government is focused on the energy outcome and ignores other benefits of renewables, such as slurry and water management for AD (re-frame.eu database). Finally, **farms** have no relationship with the Distribution Network Operators (DNOs), and **struggle to find out if there is grid capacity for their projects**. The low supply of grid capacity is obstructing farm based energy projects, as the Government is not interested in investing in additional grid capacity. When grid capacity is used up, new neighbouring farms will have to fund the cost of expanding grid capacity in that area (re-frame.eu database).

The United Kingdom RES-H&C Sector

Support schemes

In the heat sector the main instrument for funding heat from renewable energy sources (RES-H) is the RHI (Renewable Heat Incentive), supporting RES-H installations with a fixed amount per kWth produced. While the Non-Domestic RHI (in place since November 2011) provides payments to industry, businesses and public sector organisations, the Domestic RHI (launched in April 2014) is open to homeowners, private landlords, social landlords and self-builders (RES LEGAL Europe Database).

Barriers to the heating and cooling sector

Political and economic framework

For the AD sector, **proposed EU end-of waste criteria for biodegradable waste** continue to be of great concern for the industry also at the end of 2014. The PAS110¹⁶ and the Certification Quality Protocol¹⁷ are industry specification, which producers can use to verify that the digestate derived from the AD of source-segregated biodegradable materials is of consistent quality and fit for purpose (i.e. ceased to be a waste and can be termed “bio-fertiliser”). These specifications work well in the UK, but the EC is considering plans to harmonise the end-of-waste criteria at the EU level. Since the requirements for this standard differ across Member States, the biggest fear of the industry is that the current criteria may change significantly. This would likely result in operators having to carry out numerous and unnecessary tests, using complicated machinery and consecutively increasing the costs related to AD end-of-waste. Furthermore, if this EU standard is not fairly achievable, the operators will not be able to meet the end-of-waste criteria. On the other hand, if the standard is too lax, there will be no market for digestate and the disposal of it will become an issue. Although this is not yet a barrier, it is highly likely that it would act as one in future if EU end-of-waste criteria were introduced (National profile of UK, Barrier Ref. No. 23UKHC, re-frame.eu).

Several new barriers concerning the RHI scheme have been communicated by the industry this time. A central barrier is the **unclear funding of RHI scheme beyond 2016**. The main subsidy scheme (RHI) for renewable heating technologies (biomass, biogas, heat pumps, solar thermal, geothermal, biomethane) is not funded over the energy bill, but via Government spending. Currently, the RHI is funded until 2016. The Government has in all its policy documents and statements given a clear support for the RHI also beyond 2016; however no funding has been dedicated so far. According to the industry, this creates some uncertainty for investment, particularly over larger schemes that

¹⁶ PAS 110:Specification for whole digestate, separated liquor and separated fibre derived from the anaerobic digestion of source-segregated - <http://www.biofertiliser.org.uk/pdf/PAS-110.pdf>

¹⁷ Quality Protocol. Anaerobic digestate - <http://www.environment-agency.gov.uk/static/documents/Business/W524AnaerobicDigestatev4%281%29.pdf>

require 12 months or longer development. Revenue for existing participants is reasonably secure, but investment to support the growth of the market requires reasonable confidence in that growth (National profile of UK, Barrier Ref. No. 29UKHC, re-frame.eu; Aaskov, REA).

Furthermore, the industry complained that the **attempts to manage the RHI** to deliver a pre-defined balance between technologies, uses and scales **bears no resemblance to experience in countries with more renewable heat experience, nor to the opportunities that exist in the UK** (National profile of UK, Barrier Ref. No. 1UKEHCT, re-frame.eu). The Government have allocated funding for the RHI scheme and as part of their budget mechanism have sub-allocated funding for each technology. Although this might seem fair, as to secure funding for each technology, it does constitute a barrier to overall deployment of renewable heating. Even 99.08% of heat generated under the RHI comes from bioenergy, with 95.3% from biomass boilers and 3.73% from biomethane (as of 18/12/2014)¹⁸, and very low deployment of heat pumps and solar thermal. As neither heat pumps nor solar are using their budgets, the money is unspent. Somewhat similarly, budgets for medium (200kW-1MW) and large biomass (1MW+) are also slightly underspent, whereas small biomass (0-199kW) is overspent. As a result, the subsidy is reduced for small biomass boilers as it has spent its budget (National profile of UK, Barrier Ref. No. 1UKEHCT, re-frame.eu; Aaskov, REA). According to the industry, balance should be technology-neutral support (e.g. internalising the social cost of carbon), to encourage the most cost-effective solutions, not an "all shall have prizes" approach where support is provided to whatever level is required to deliver a technology that the Government thinks ought to be delivered (National profile of UK, Barrier Ref. No. 1UKEHCT, re-frame.eu).

Grid regulation and infrastructure

Very well developed gas infrastructure still remains one of the main grid related barriers to renewable heat in the UK in late 2014. Since a very large part of the country has access to gas, renewable energy sources have difficulties in competing with natural gas (Thompson, REA, 2012). In spite of a significant potential of **district heating** to deliver renewable heat, it is still **very poorly developed** in the UK. The progress of the renewable industry is inhibited by lacking regulatory support and a wide range of legal as well as regulatory issues such as the set-up of the scheme, access to land, continuity of supply and consumer repayment, etc. (National profile of UK, Barrier Ref. No. 19UKHC, re-frame.eu).

Capacity issues with regard to biomethane injection have not been resolved so far and continue to constitute a severe barrier for project developers. Since the capacity of a gas network to accept biomethane depends on consumer demand, during the times of low demand, there may be an issue as to what to do with the excess gas production. According to industry, the ideal solution is to inject the biomethane into the medium pressure gas grid which has the capacity to accommodate the output from the biomethane. However, where there is only a low pressure connection available, a compression facility to transfer gas from low to medium pressure gas grid has to be installed (for the

¹⁸ Ofgem, <https://rhi.ofgem.gov.uk/Public/ExternalReportDetail.aspx?RP=RHIPublicReport>

demand-supply balance). Since the compression facility is always remote from the plant, it can be difficult to reach an agreement between the grid operators and project developers as to who is responsible for paying and running the compressor, therefore posing a barrier to the implementation of this solution (National profile of UK, Barrier Ref. No. 21UKHC, re-frame.eu).

Other

No changes could be observed with regard to the **poor understanding of the benefits and potential of certain renewable technologies**, which continues to inhibit the deployment of renewable heat. For example it is often claimed that there is not enough solar resource in the UK in order to make it a worthwhile investment (this applies to solar thermal and PV). Although this is not the case, such statements and beliefs may adversely affect deployment of renewable technologies (National profile of UK, Barrier Ref. No. 28UKHC, re-frame.eu).

A new barrier has been reported in late 2014 with regard to the Energy Performance Certificates (EPCs). The industry communicated that the EPCs are performed for houses when built, sold or rented. Among other things, an EPC contains information about a property's energy use and typical energy costs. However, the database used to assess the energy costs and efficiency of biomass boilers rates the fuel cost too high and the boiler efficiency much lower than industry average. **Energy costs and energy efficiency are therefore not correctly reflected in the EPCs, causing a lower EPC and thereby lower house price.** The true economic benefits of biomass boilers are in the end ignored (re-frame.eu database).

The United Kingdom RES-T Sector

Support schemes

An obligation system for biofuels has been in place in the UK since 2008 (DfT 2009). Fuel suppliers for transport are obliged to supply a volume of biofuels based on a percentage of the volume of fossil fuel they supply onto the market. This percentage is set annually. There is a certificate system for providing proof of compliance (RES LEGAL Europe Database).

Barriers to the transport sector

Political and economic framework

In the RES-T sector, also at the end of 2014 the EC's proposals of 17 October 2012¹⁹ remain to be of great concern to the industry. Of these the most significant barriers are:

A cap on the amount of crop-based biofuels that can count towards the RED target. In its proposal of 17 October 2012, the EC proposed a 5% cap on the amount of crop-based biofuels because in its opinion indirect land use caused by the use of all crop-based biofuels decreases the potential CO₂ savings and takes land away from food production. In 2012, the REA indicated that by effectively reducing the target for 2020 through the cap of 5% on crop-based biofuels, virtually all current producers and investors are impacted, and market stability would be severely damaged to the extent that the RED renewable transport target could be threatened if this were implemented (National profile of UK, Barrier Ref. No. 29UKT, re-frame.eu; Wenner, REA, 2014a). On 13 June 2014 EU Council reached a political agreement on the draft directive on indirect land-use change (ILUC) amending the fuel quality (98/70/EC) and renewable energy (2009/28/EC) directives. The draft directive sets a 7% cap now (BiofuelsDigest 2014). As indicated by the REA, the cap proposed by the EU Council is better than the one initially suggested by the EC. However, final decision is not yet taken and therefore it needs time to see what happens (Wenner, REA, 2014b).

Introduction of ILUC factors. The industry was already concerned in 2012 about the EC's proposal to introduce ILUC factors to be applied to the carbon intensity calculations of biofuels. It was suggested that the ILUC factors were not based on comprehensive and agreed science and therefore if fuel suppliers would be required to report against the factors as they were proposed, they would be seen to be producing a product that is against the aims of the RED which in turn will cause significant damage to the public perception of biofuels in the EU (National profile of UK, Barrier Ref. No. 32UKT, re-frame.eu). As indicated by the REA at the end of 2014, according to the draft directive (as amended by the EU Council), ILUC factors will be used for reporting and not counting only, which is good. However, introduction of ILUC factors remains to be a concern for the industry, because final

¹⁹ European Commission Proposal for a Directive of the European Parliament and of the Council amending Directive 98/70/EC relating to the quality of petrol and diesel fuels and amending Directive 2009/28/EC on the promotion of the use of energy from renewable sources, COM(2012) 595 final.

decisions are still to be taken. In addition, the REA highlighted that the cap on crop based biofuels was intended to deal with the indirect land use change, because of the crops. Having a cap and ILUC factors the industry is penalised twice (Wenner, REA, 2014b)

Proposed double/quadruple counting. In 2012, the REA communicated that both conventional and advanced biofuel producers are struggling to obtain project finance due to perceived market and technology risks. While double or quadruple counting for advanced biofuels is generally welcomed by the industry, it can hinder projects getting financed as the mechanism is untested and the value uncertain so far (National profile of UK, Barrier Ref. No. 30UKT, re-frame.eu). At the end of 2014 also with regard to multiple counting final decisions are not yet in place. However, it seems that double/quadruple counting will be not so much complicated as initially proposed by the EC (Wenner, REA, 2014b).

The REA pointed out that all the above proposals from the EC are bad enough in themselves, but the lack of a decision by the UK Government on the trajectory towards the 2020 10% renewable transport target makes the situation even worse. The fact that the European institutions have still not been able to reach a conclusion on the above proposals has also prompted potential investors to take their business elsewhere – e.g. to the USA. The lack of a clear policy framework results in a severe lack of confidence, which affects not only crop-based biofuels. There is no significant investment in advanced biofuels either, because there is no confidence and no market (National profile of UK, Barrier Ref. No. 29UKT and 39UKT, re-frame.eu; Wenner, REA, 2014a).

The industry has indicated in the beginning of 2014 that EU's assessment of renewables and other low carbon energy sources against average emissions from different sectors instead of the marginal emissions and the use of an average for the EU instead of the country is a barrier. In their view, such an assessment underestimates the benefits of renewables. The industry therefore suggested that the correct economic parameter for electricity would be the marginal emissions compared to coal. This could be important in the transport sector as the low carbon and cost benefits of grid electricity could be over-estimated compared to sustainable liquid biofuels (National profile of UK, Barrier Ref. No. 34UKT, re-frame.eu). By now, this barrier has not been removed (Wenner, REA, 2014b).

At the beginning of 2014, stakeholders reported that new players in the RES-T sector have been **unable to access project financing** and that market players (some with investments of around £350 million) are struggling in the current policy environment which is significantly more hostile and negative than at the time when business plans and financing were approved (National profile of UK, Barrier Ref. No. 38UKT, re-frame.eu). Moreover, **lack of financial support for advanced biofuels** has been indicated as a barrier. It was reported that in the UK, there are no support mechanisms (e.g. fuel duty rebates) other than the RTFO. According to the REA, the UK Government clarified that it does not regard even advanced biofuels as suitable candidates for support under the Green Investment Bank or other financial mechanisms (National profile of UK, Barrier Ref. No. 41UKT, re-frame.eu). In late 2014 both barriers still exist. With regards to the access to project financing, no improvements could be observed so far. To address the lack of financial support for advanced biofuels, the UK Government launched the £25 million advanced biofuels demonstration competition on 10 December 2014 (DfT 2014). This is a small improvement, however the process is very slow and the confidence of the industry is therefore lower than year ago (Wenner, REA, 2014b).

Further, it has been reported in 2012 that the use of bioethanol as a diesel replacement in high ethanol blends (e.g. ED95) is prevented by **fuel duty based on volume instead of energy content**. The industry indicated that since energy density of bioethanol is lower than that of gasoline and diesel it would carry a much higher fuel duty and VAT burden than the fossil fuel it replaces. According to the REA, diesel fuel use is growing in Europe at the expense of petrol, and diesel is mainly used for heavy goods vehicles (HGVs)/fleets. ED95 can be used as a low carbon replacement for diesel in HGVs and buses. Since many bus and truck fleets have their own refuelling stations, the use of ED95 can reduce CO₂ emissions from fleets and achieve high penetration quickly (National profile of UK, Barrier Ref. No. 33UKT, re-frame.eu). From the last report, few changes with regards to this barrier could be observed (Wenner, REA, 2014b).

In 2012, it was reported that the **UK Government** appears to be **reluctant to sanction the introduction of E10** despite the European Committee for Standardization (CEN) (and the UK standards organisation, the BSI) approving the specification. According to the industry, in the absence of greater leadership towards this end, the UK will be physically unable to reach the 10% RES-T target at the current biofuel blend levels (E5 and B7). This will further lead to a lack of investor confidence in the market and consequently negatively impact the whole biofuels industry (National profile of UK, Barrier Ref. No. 31UKT, re-frame.eu). Some improvements were communicated by the REA with regard to this barrier late 2014. This issue is now being considered in the Task Force and although the results are still not clear, this is the only decision which could be implemented in 2015 (Wenner, REA, 2014b).

Inconsistent treatment of partially renewable fuels within UK legislation was perceived as a further barrier in the RES-T sector early 2014. It was indicated that UK transport legislation treats Fatty Acid Methyl Ester (FAME) as renewable although it is only partially renewable. HVO (hydro-treated vegetable oil) is also partially renewable to a similar degree as FAME and is not treated consistently (National profile of UK, Barrier Ref. No. 43UKT, re-frame.eu). According to the REA, they will be treated the same from April 2015. Although the respective legislation has not been developed and implemented so far, this can be seen as an improvement (Wenner, REA, 2014b).

Market structure

In the last “Keep on Track!” report, it has been indicated that despite Government’s financial support for Ultra Low Emission Vehicles (ULEV) (support covers various battery vehicles and hydrogen) **ULEV market development is slow** and will make very little contribution to the targets by 2020. This is due to a number of reasons such as cost, consumer resistance, technical issues, charging infrastructure etc. (National profile of UK, Barrier Ref. No. 42UKT, re-frame.eu; Wenner, REA, 2014a). The progress with regards to ULEV is still perceived as very slow in late 2014. However, £500 million have been commissioned by the Government to develop the ULEV market between 2015 and 2020. This financial support is expected to accelerate the process beyond 2015. The main support will be used for the grants to purchase electric vehicles (Wenner, REA, 20104b).

No changes could be observed with regard to the **lack of an internal EU market for biofuels**. The implementation of the RED among Member States varies greatly and this constitutes a barrier for

stakeholders because they have to learn the rules for blending biofuels into fossil fuels in every Member State in order to make progress (Wenner, REA, 2014a; Wenner, REA, 2014b).

Grid regulation and infrastructure

At the beginning of 2014, **lack of alternative fuels infrastructure** has been reported as a barrier in the RES-T sector. It was indicated that in the UK, there are very few places where vehicles that run on biomethane may fill up. For this reason, most developments in biomethane rely on dedicated re-fuelling depots for specific fleets. This barrier concerns hydrogen and hybrid fuel/electricity vehicles as well (charging points are missing) (National profile of UK, Barrier Ref. No. 35UKT, re-frame.eu; Wenner, REA, 2014a). Improvements are now expected as a result of the announced £500 million government funding for the ULEV market development beyond 2015 (see above), because part of the funding (around £4 million) will be used for the infrastructure (Wenner, REA, 20104b).

Administrative processes

Finally, the UK Department for Transport (DfT) has recently announced a **Call for Evidence** asking for views from the industry on how best to support advanced biofuels. However, according to the REA, “even if this exercise leads to some positive thinking, it **cannot be translated into legislation until 2016** at the earliest”, with the exception of introducing E10 (expected in 2015 already). The REA pointed out that combined with the uncertainties caused by the EC’s proposals of October 2012, the entire industry in the UK is currently at a standstill (National profile of UK, Barrier Ref. No. 40UKT, re-frame.eu; Wenner, REA, 2014a; Wenner, REA, 20104b).

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