

Bellona response to the consultation on the preparation of a new renewable energy directive for the period after 2020

February 2016

The Bellona Foundation is an independent non-profit organisation that aims to meet and fight the climate challenges, through identifying and implementing sustainable environmental solutions. We work towards reaching a greater ecological understanding, protection of nature, the environment and health. Bellona is engaged in a broad spectre of current national and international environmental questions and issues around the world.

Pollution knows no borders, thus Bellona works with and against anyone and everyone relevant to our work, both nationally and internationally. Bellona has a solution-oriented approach to the environmental challenges and has since 1998 had extensive cooperation with a number of companies in different industries and businesses. Our approach is that to achieve results one must jointly work out the best social and environmental solutions, and make these financially profitable and viable. Bellona has always been and remains an independent watch dog that investigates, scrutinises and reports any environmental crime we uncover.

The Bellona Foundation was founded in 1986. We are currently 65 employees, working at the main office in Oslo and our three international offices in Brussels (Belgium / EU) Murmansk (Russia) and St. Petersburg (Russia). Bellona has been established with an office in Brussels since 1994.

Introduction

The EU has been a central driving force in the broader adoption of renewable energy technologies worldwide. Policy landmarks such as the EU 2050 Roadmap and the initial EU Renewable Energy Directive (RED) have helped stake direction and secure cost reductions across technologies such as wind and solar power, benefiting markets also outside the EU.

Moving from RED (2012-2020) to REDII (2020-30), some significant premises are altered, that will need to influence the market design and concept choices to secure achievement of the overall target: at least 27% renewable energy in final energy consumption by 2030. **Cost-effectiveness seems to be a particular priority into the REDII period. Bellona fully acknowledges the need for this emphasis, particularly in light of the significant reductions in technology costs for several renewables – in itself a positive development. Nonetheless, support mechanisms for immature, new and innovative technologies that will not be commercially adopted through technology neutral market-based support schemes, must still remain a focus area.**

The EU' Energy Union Strategy puts strong emphasis on the consumer, and as such empowering consumers becomes a strong priority for the REDII (2020-30) period. With rapid developments in distributed/ local RES technologies such as solar, and complementary innovation in storage solutions like batteries, consumer choice and contribution to the broader RES target for the REDII period has great scope. To unleash this potential, administrative and market design barriers must be removed and the right incentives offered.

Through this consultation, the EU seeks advice on improvements to the Guarantee of Origin (GO) system. If the GO scheme is to be continued into the REDII period, Bellona strongly argues that amendments be made to its design, to address the current weaknesses. **Fundamentally, the link between the green consumption choice offered by GO and the actual physical electricity production (with particular emphasis on new renewable development), must be strengthened if the GO is to be continued.**

The RED has not been successful in attaining the 10% target for renewable energy consumption in transport by 2020. The European Commission's latest Renewable Energy Progress Report shows that progress towards this target over the past five years has been slow – a 5.4% share was achieved in 2013, which went up to only 5.7% in 2014¹. **The 'technology neutral' RED sub-target for transport has failed to incentivise renewable electricity uptake, which as a result**

¹ *Renewable Energy Progress Report* (June 2015) http://eur-lex.europa.eu/resource.html?uri=cellar:4f8722ce-1347-11e5-8817-01aa75ed71a1.0001.02/DOC_1&format=PDF

represents only a small amount of the total share (1484ktoe compared to 10.3 Mtoe of biodiesel). The quantitative, rather than qualitative focus of the RED transport sub-target means that no distinction has been made between different renewable fuel types in terms of their emission intensity. Subsequently, the easiest and cheapest options to meet the target have gotten priority, regardless of whether they bring technological innovation or deliver the most important GHG savings. **Not surprisingly, we have observed that the RED has been a big driver of crop-based (1st generation) biofuels which are expected to make up most of the 10% target.**

Bellona sees the electrification of transport as an absolute pre-condition to meeting the EU's 2020 and 2030 renewable energy targets in a sustainable way. Given the enormous benefits electric vehicle (EV) uptake would entail in terms of climate, air quality, human health and energy supply security, electrification of transport should be seen as a cornerstone of Europe's decarbonisation strategy for transport. **The RED for the post-2020 period as well as the upcoming Commission proposal on the Effort Sharing Decision and related *Communication on the Decarbonisation of Transport* offer important opportunities to highlight the key role of electro-mobility.**

In light of the non-legally binding nature of the 2030 RES target at the Member State-level, supplementary targeted policies at the EU and national level, consisting of both sticks and carrots, will be imperative to incentivise the uptake of electro-mobility. The choice of these incentives and their suitability will vary from Member State to Member State, depending on their characteristics, electricity prices, goals, and transport user trends. Consumer confidence in the EV technology will be built through the establishment of a European interoperable re-charging infrastructure featuring an adequate number of fast-charging stations to ensure smooth inter-urban and international mobility.

Green public procurement (GPP) will be instrumental in stimulating demand and market uptake of EVs. The Clean Vehicles Directive (CVD), which regulates GPP in the EU, has so far been slow at fostering the uptake of EVs, due to the directive's limited scope, and lack of stringent and user friendly criteria. **These limitations should be addressed in the currently ongoing revision process of the GPP criteria for transport.**

The recent emissions testing scandal has been crucial in highlighting the urgent need for an improved, and independent, car emission testing regime, but also in exposing the fact that emission performance standards fail to sufficiently internalise the true societal cost of the car industry. Bellona calls for the tightening of CO₂ emission performance standards for new passenger cars, set by Regulation (EC) 443/2009. **A target of 70g/km for 2025 should be the**

absolute minimum level of ambition. Reported emissions data has been used by governments not only as an indicator to set new public health policies but also to simulate future air pollution and CO₂ levels and targets. This means that in order to ensure fair and correct taxation of ICEs, hybrids and plug-in hybrids, we firstly need to ensure accurate emissions data.

To exploit the full potential of EVs and reap all benefits of transport electrification, **Bellona calls for the introduction of regulations conducive of the use of energy storage by system regulators, utilities and individuals.** Member States should, when developing their plans for RES, provide targets and requirements for balance power and system demands, highlighting the potential of energy storage. What is more, smart charging should be encouraged in order to minimise charging costs for the consumer as well as avoid grid disruptions.

When it comes to biofuels, for RED II attention should be given to furthering 2nd (lignocellulosic, i.e. woody) and especially 3rd generation (marine) biofuels, the latter of which may hold the greatest potential. **Bellona sees seaweed for fuel in particular as well suited to avoid the main challenges of land-based biofuels.** Work would need to begin now to bring costs down. This in turn would require finding best applicable pre-treatment, making hydrolysis and fermentation reactions more efficient, scaling-up the processing equipment and systems commercialisation.

Based on lessons from current biofuels policies, we may not yet be aware of what effects policies will have and it therefore **seems prudent to put in place a review, for example in 2025, to ensure that there are checks of the policy's impacts and that any measure that would not help fulfilling the EU long-term goals is reviewed in time to avoid detrimental impacts.** Building in such an expectation for a review from the start would also limit the market uncertainty caused by the U-turn on 1st generation biofuels policy.

I. General approach

Q1. To what extent has the RED been successful in helping to achieve the EU energy and climate change objectives?

| Very successful | Successful | Not very successful | Not successful | No opinion |
|-----------------|------------|---------------------|----------------|------------|
| | X | | | |

The EU has been a central driving force in the broader adoption of renewable energy technologies worldwide. The EU 2050 Roadmap generally and the initial EU RED specifically have been policy landmarks helping stake direction and secure cost reductions across technologies such as wind and solar power, benefiting markets also outside the EU. As such, the RED has been an important and successful policy scheme. The RED has also been vital in driving the EU and EU Member States towards their overall and national energy and climate change objectives.

As experience is gained from the initial period (2012-2020), there are lessons learned on potential improvements. As the RED opened for national targets and individual choices on support scheme designs, there have been examples of sub-optimal market developments within the broader scheme. In the case of Norway, part of the regional Norwegian-Swedish Certificate Market, a target was set for increased production of renewables – without strict targets set on the final energy consumption, the real trigger for decarbonisation. This has led to an increased overproduction of renewable power, in an energy mix context of 99% hydropower to start with, but only with limited conversion of final energy usage. **A stricter target on the share of renewables in actual energy end-use could have triggered further progress on electrification in fossil based sectors such as transport and the Norwegian petroleum sector.**

An important feature of transferring into the RED II phase (2020-30) must be drawing on practical lessons from the initial RED.

Q2. How should stability, transparency and predictability for investors be ensured with a view to achieving the at least 27% renewable energy target at EU level? Please indicate the importance of the following elements:

| | Very important | Important | Not very important | Not important | No opinion |
|---|----------------|-----------|--------------------|---------------|------------|
| Forward looking strategic planning of RES development is required by EU legislation | X | | | | |

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|---|---|---|---|--|--|
| Best practice is derived from the implementation of the existing Renewable Energy Directive | | X | | | |
| Regional consultations on renewable energy policy and measures are required | | | X | | |
| Member States consult on and adopt renewable energy strategies that serve as the agreed reference for national renewable energy policies and projects | X | | | | |
| The Commission provides guidance on national renewable energy strategies | | X | | | |

A long-term predictable support regime is vital to attract sufficient investment into the renewable energy industry, whose investment horizon may range up to 30 years. The following must be important features of such a regime:

1. Fixed, long-term national plans
2. Transparent support mechanisms, national or regional in scope
3. Minimum level of political intervention during the commitment period

Market-based support mechanisms might be the feasible option to aim at cost-optimal renewable energy deployment. However, aside from the mere development cost of individual RES technologies, other barriers to cost-optimal deployment remain lack of market integration; infrastructures such as storage and interconnections; and smart solutions including demand-response technology adopted at broad scale among end-users. Particularly within storage and demand-response solutions, further innovation and technology maturation will continue to be necessary. Further investments into these technologies might not be stimulated through a market-based support mechanism, but nonetheless require incentives and framework conditions that are stable, transparent and predictable too.

Q3. Please rate the importance of the following elements being included in Member States' national energy and climate plans with respect to renewable energy in ensuring that the plans contribute to reaching the objectives of at least 27% in 2030.

| | Very important | Important | Not very important | Not important | No opinion |
|--|----------------|-----------|--------------------|---------------|------------|
| Long term priorities and visions for decarbonisation and renewable energy up to 2050 | X | | | | |
| In relation to national/regional natural | | | X | | |

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|--|---|---|--|--|---|
| resources, specific technology relevant trajectories for renewable energy up to 2030 | | | | | |
| Overview of policies and measures in place and planned new ones | | X | | | |
| Overview of renewable energy trajectories and policies to 2050 to ensure that 2030 policies lie on the path to 2050 objectives | | X | | | |
| Qualitative analysis | | | | | X |
| Trajectories for electricity demand including both installed capacity (GW) and produced energy (TWh) | X | | | | |
| Measures to be taken for increasing the flexibility of the energy system with regard to renewable energy production | X | | | | |
| Plans for achieving electricity market coupling and integration, regional measures for balancing and reserves and how system adequacy is calculated in the context of renewable energy | | X | | | |

Bellona reiterates the importance of solid market governance ensuring commitment and compliance at national levels, in the context of no binding national RE targets. To ensure compliance, the new Energy Union Governance set-up must guarantee sufficient mechanisms to spur further adoption of RES across Europe’s national markets. Member States’ national energy and climate plans for the period up to 2030 will be important, but as indicated national targets will not be binding, increasing responsibility lies on the new REDII Energy Governance set-up. To ensure long-term predictability for investors, national states should be encouraged to plan for its RES growth and overall decarbonisation with a long-term 2050 perspective.

One lesson learned from the Norwegian context is the importance of well-planned trajectories for electricity demand, including both installed capacity (GW) and produced energy (TWh). National energy plans with the dual target of increased share of renewables, plus decarbonisation of energy use, must build on such trajectories. Through the original RED, Norway adopted a national renewables target primarily focusing on new production and not on final energy consumption / decarbonisation. The result has been an increasing surplus of clean power production, but lacking obligations on conversion to clean energy use in fossil-based sectors such as transport and the petroleum industry. This situation has again led to very low energy prices and challenging market conditions for Norwegian power producers.

Q4. What should be the geographical scope of support schemes, if and when needed, in order to drive the achievement of the 2030 target in a cost-effective way?

- Harmonised EU-wide level support schemes
- Regional level support schemes (group of Member States with joint support scheme)
- National support schemes fully or partially open to renewable energy producers in other Member States
- Gradual alignment of national support schemes through common EU rules
- National level support schemes that are only open to national renewable energy producers

Bellona supports the EU’s regional approach, but reiterates the importance of solid market governance ensuring commitment and compliance at national levels first, and also: solid trajectories for electricity demand and decarbonisation plans forming the basis for such joint regional schemes.

Q7. The use of cooperation mechanisms has been limited to date. Which of the below factors do you consider important in explaining the limited recourse by Member States to cooperation mechanisms so far?

| | Very important | Important | Not very important | Not important | No opinion |
|---|----------------|-----------|--------------------|---------------|------------|
| Unclear legal provisions | | | | | X |
| Administrative complexities | | | | | X |
| Lack of cost-effectiveness / uncertain benefit for individual Member States | | X | | | |
| Government driven process, not market driven | | X | | | |
| Member States reluctant to see their taxpayers/ consumers' money used for investments outside their country | | | X | | |

Q9. Please assess what kind of complementary EU measures would be most important to ensure that the EU and its Member States collectively achieve the binding at least 27% EU renewable energy target by 2030:

| | Very important | Important | Not very important | Not important | No opinion |
|--|----------------|-----------|--------------------|---------------|------------|
| EU-level incentives such as EU-level or regional auctioning of renewable | | X | | | |

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|---|--|---|---|--|--|
| energy capacities | | | | | |
| EU-level requirements on market players to include a certain share of renewables in production, supply or consumption | | X | | | |
| EU-level financial support (e.g. a guarantee fund in support of renewable projects) | | X | | | |
| EU-level support to research, innovation and industrialisation of novel renewable energy technologies | | | X | | |
| Enhanced EU level regulatory measures | | X | | | |

Whether the EU adopts a market-based framework of regional capacity allocation or other solution, the emphasis on actual RE project implementation must be the key aim. **Bellona sees EU-level support to innovation and particularly industrialisation of new renewable and related technologies (storage, demand-response) as an important feature for further renewables adoption and industrial growth in this industry at the EU-level** (please see Q10). Nonetheless, technologies have now matured to the point where the main emphasis must be on concrete RE project implementation, and strategically planned decarbonisation of energy use. Much of the innovation related to RE is happening in the scale up and wide-spread application of technologies, new services and finance instruments related to this. A policy focusing on large scale implementation will only strengthen this point. R&D in new RE should have a longer perspective than 2030. Rather, **more R&D should focus on handling the regulation issues and need for innovation and improvement in energy storage.**

If broader regional capacity allocation schemes are adopted as the preferred mechanism, sufficient obligations on actual project development and clean final energy consumption must

be ensured at the national level. Intended contributions must be reported on by the Member States themselves, and there should be clear caps as to how much excess and particularly shortcomings that can be quantified and sold to/bought from another Member State.

Q10. The Energy Union Framework Strategy sets the ambition of making the European Union the global "number one in renewables". What legislative and non-legislative measures could be introduced to make/strengthen the EU as the number one in renewables? Has the RED been effective and efficient in improving renewable energy industrial development and EU competitiveness in this sector?

The EU has been pioneering the support and adoption of RES technologies through the first RED period. Embarking on the REDII (2020-30), the global context is altered, with COP21 mobilising a joint and increased emphasis on global decarbonisation with particular view to adoption of RES as a key path. Other markets like China and the US see record installation of renewable energy capacity in their energy mixes. Furthermore, the drop in technology costs for options like solar spurs the uptake of RES power in developing and emerging markets, a positive development.

If the EU is to retain the global "number one in renewables" ambition through to the REDII period, **emphasis will need to be on creating strong home markets and thereby enhancing industrial clusters and export industries around technologies relevant to the individual EU markets.** As already mentioned, **Bellona suggests particular R&D-emphasis and support for industrialisation of particularly new storage solutions.** The increasing share of renewables, both at the distributed end-user level and in the central energy systems, will require new and improved storage technologies of various scales. The most likely future scenario will be a patchwork of different solutions for energy generation and for energy storage, in an increasingly complex energy system.

II. Empowering Consumers

Q11. How would you rate the importance of the following barriers for consumers to produce and self-consume their own renewable energy?

| | Very important barrier | Important barrier | Not very important barrier | Not important barrier | No opinion |
|--|------------------------|-------------------|----------------------------|-----------------------|------------|
| Self-consumption or storage of renewable electricity produced onsite is forbidden | X | | | | |
| Surplus electricity that is not self-consumed onsite cannot be sold to the grid | | X | | | |
| Surplus electricity that is not self-consumed onsite is not valued fairly | | | X | | |
| Appliances or enabler for thermal and electrical storage onsite are too expensive | | X | | | |
| Complex and/or lengthy administrative procedures, particularly penalising small self-consumption systems | | | | | X |
| Lack of smart grids and smart metering | | X | | | |

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|-------------------------------------|--|---|--|--|---|
| systems at the consumer's premises | | | | | |
| The design of local network tariffs | | | | | X |
| The design of electricity tariffs | | X | | | |

See Bellona’s comments under Q12 below.

Q12. In general, do you think that renewable energy potential at local level is:

| |
|---|
| <input checked="" type="checkbox"/> Highly under-exploited <input type="checkbox"/> Under-exploited <input type="checkbox"/> Efficiently / fully exploited <input type="checkbox"/> Over-exploited (i.e. beyond cost-effectiveness) <input type="checkbox"/> No opinion |
|---|

The renewable energy potential at local level is clearly highly underestimated. The first RED opened for various national interpretations of how to spur RES deployment. Particularly Germany opted for a feed-in-tariff design that has been vital in bringing cost down for the most broadly adopted local RE solution: solar. The scope for incentivising local / distributed RES production is much more promising under REDII, as technologies have matured and technology costs have come down. It is therefore essential for the REDII Energy Governance Set-up to a) foster regulations down towards end-user-level that removes barriers (please see Q11) and fosters increased adoption of local solutions, which again will be an important contributor to increasing the overall RES share; and b) set focus on bringing down costs for local energy storage solutions (battery, hydrogen).

Arguably, facilitating end-users informed choice of local RES production and storage solutions might be the most efficient way of ensuring consumer empowerment under the REDII regime. Such facilitation will enable the end-user / consumer to make choices that directly influence the broader climate efforts.

Q13. How would you rate the importance of the following barriers that may be specifically hampering the further deployment of renewable energy projects at the local level (municipalities and energy cooperatives):

| | | | | | |
|--|----------------|-------------------|--------------------|---------------|------------|
| | Very important | Important barrier | Not very important | Not important | No opinion |
|--|----------------|-------------------|--------------------|---------------|------------|

| | barrier | | barrier | barrier | |
|---|---------|---|---------|---------|---|
| Lack of support from Member State authorities | X | | | | |
| Lack of administrative capacity and/or expertise/knowledge/information at the local level | | X | | | |
| Lack of energy strategy and planning at local level | | X | | | |
| Lack of eligible land for projects and private property conflicts | | | | | X |
| Difficulties in clustering projects to reach a critical mass at local level | | | | | X |
| Lack of targeted financial resources (including support schemes) | X | | | | |
| Negative public perception | | X | | | |

Q14. Please rate the appropriateness of stronger EU rules in the following areas to remove barriers that may be specifically hampering the further deployment of renewable energy projects at the local level:

| | Very appropriate | Appropriate | Not very appropriate | Not appropriate | No opinion |
|---|------------------|-------------|----------------------|-----------------|------------|
| Promoting the integration of renewable energy in local infrastructure and public services | X | | | | |
| Supporting local authorities in preparing strategies and plans for the promotion of renewable | | | X | | |

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|---|---|---|---|--|--|
| energy | | | | | |
| Facilitating cooperation between relevant actors at the local or municipal level | | | X | | |
| Facilitating access to targeted financing | X | | | | |
| EU-wide right to generate, self-consume and store renewable electricity | X | | | | |
| Measures to ensure that surplus self-generated electricity is fairly valued | | | X | | |
| Harmonized principles for network tariffs that promote consumers' flexibility and minimise system costs | | X | | | |

Particularly efforts at the high and general EU level, such as an EU-wide right to generate, self-consume and store renewable energy, would provide clarity and predictability across the national markets for increased deployment of local renewable solutions. A common and transparent solution for financing solutions would also be beneficial. The EU could furthermore capitalise on its own consumer power through targeted acquisitions.

Q15. Should the current system for providing consumers with information on the sources of electricity that they consume be further developed and improved?

Bellona is strongly concerned about the greenwashing effect of the current Guarantees of Origin (GO) scheme. **In its current form, it misleads rather than provides consumers with information on the sources of electricity that they consume.** This is because current GO does not trigger incentives for new RE production, but rather lets consumers pay extra for incumbent

renewable production that would be produced anyway: GOs only demonstrate that a corresponding amount of renewable energy has been produced somewhere in Europe. As such, the GO-regime of today fails to “empower consumers” to contribute to the electricity sources they consume to be further developed and improved. An additional weaknesses of the current GO scheme is that carbon footprint reporting of industrial actors becomes erroneous, and large industry actors lose the incentive to establish new activity in regions with high RE shares.

If the scheme is to be continued into the REDII period, Bellona strongly argues that amendments be made to its design, to address these weaknesses. **Fundamentally, the link between the green consumption choice offered by GO and the actual physical electricity production (with particular emphasis on new renewable development), must be strengthened if the GO is to be continued.**

Further elaboration is required on how to improve the mechanism. One solution could be to restrict access to GOs to new renewable deployments only. Alternatively, from a Norwegian perspective, the amount of Norwegian GOs available to the European market could be restricted to Norway’s net export of electricity, which would improve the link between physical production and consumption, and reduce the scope for greenwash – however this solution would not incentivise new RE development.

A third alternative, expanding on alternative two, could be to target the origin of all power produced and consumed (e.g. green, black or grey). In other words, **to extend the GO regime to the whole energy system to also include non-renewable sources, and to make the GO system a mandatory form of information disclosure to consumers.** If energy suppliers were not allowed to sell out more green guarantees than the actual renewable production they had purchased, **the end user would be guaranteed an actual link to green power production, and the demand for renewable energy production (/interconnector capacity) or cleaning existing fossil energy production with CCS would increase.**

III. Increase the use of renewable energy use in the transport sector

Q28. To what extent has the RED been successful in addressing the following EU transport policy objectives?

| | Very successful | Successful | Not very successful | Not successful | No opinion |
|---|-----------------|------------|---------------------|----------------|------------|
| Contribute towards the EU's decarbonisation objectives | | | | X | |
| Reduce dependency on oil imports | | | | X | |
| Increase diversification of transport fuels | | | X | | |
| Increase energy recovery from wastes | | | | X | |
| Reduce air pollution, particularly in urban areas | | | | X | |
| Strengthen the EU industry and economy competitiveness | | | | X | |
| Stimulate development and growth of innovative technologies | | | | X | |
| Reduce production costs of renewable fuels by lowering the level of investment risk | | | | X | |
| Facilitate fuel cost reduction by integration of the EU market for renewable fuels | | | | X | |

The RED has not been successful in attaining the 10% target for renewable energy consumption in transport by 2020. The European Commission's latest Renewable Energy Progress Report shows that progress towards this target over the past five years has been slow – a 5.4% share was achieved in 2013, which went up to only 5.7% in 2014.² The 'technology neutral' RED sub-target for transport has failed to incentivise renewable electricity uptake, which as a result represents only a small amount of the total share (1484ktoe compared to 10.3 Mtoe of biodiesel). **The RED target being quantitative, rather than a qualitative one, means that no distinction has been made between different renewable fuel types in terms of their emission intensity.**

Electro-mobility

Bellona sees the electrification of transport as an absolute pre-condition to meeting the EU's 2020 and 2030 renewable energy targets in a sustainable way. Currently, passenger cars alone are responsible for over 15% of total CO₂ emissions in the EU. The global car fleet is predicted to double from 800 million to 1.6 billion vehicles by 2030. According to an International Energy Agency report, three-fourths of global car sales will need to be in EVs or plug-in hybrids by 2050 if the transportation sector is to do its part in **avoiding an increase in global average temperatures of more than 2 °C and in particular 1.5 °C** as agreed upon in the recently adopted Paris agreement.³ What is more, the latest report of the European Environment Agency estimates that air pollution continues to be responsible for more than 430 000 premature deaths in Europe, making it the single largest environmental health risk on the continent.⁴ If the transport sector is to make a serious **contribution to a pollution free society**, urgent commitment is needed to making the transition towards an electro-mobile transport. Furthermore, electrifying transport will have important repercussions for **boosting Europe's energy supply security**; urgently needed to cut the EU's external energy bill of more than €1 billion per day and more than a fifth of total EU imports.⁵ Last but not least, re-using EV batteries to store and manage wind and solar-based electricity will **optimise the use of renewables and increase the predictability of our electricity sector**. In fact, a Bellona report finds that when used battery packs of the current stock of 4 million EVs sold from 2010 to 2015 are given a second life in the energy sector, the result would be a storage capacity of 128 GWh.

² Renewable Energy Progress Report (June 2015) http://eur-lex.europa.eu/resource.html?uri=cellar:4f8722ce-1347-11e5-8817-01aa75ed71a1.0001.02/DOC_1&format=PDF

³ Global EV Outlook- Understanding the Electric Vehicle Landscape to 2020 (April 2013) http://www.iea.org/topics/transport/subtopics/electricvehiclesinitiative/EVI_GEO_2013_FullReport.pdf

⁴ Air Quality in Europe – 2015 Report (November 2015) <http://www.eea.europa.eu/media/newsreleases/many-europeans-still-exposed-to-air-pollution-2015>

⁵ European Energy Security Strategy (May 2014) <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52014DC0330&from=EN>

With the 20 million EVs that are anticipated to be sold globally by 2020, the storage capacity will exceed 640 GWh, and continue to grow thereafter.⁶

Given the enormous benefits EV uptake would entail, it is essential that electrification of transport is seen as a cornerstone of Europe’s decarbonisation strategy for transport. The RED for the post-2020 period as well as the upcoming Commission proposal on the Effort Sharing Decision and related *Communication on the Decarbonisation of Transport* offer important opportunities to highlight the key role of electro-mobility.

Biofuels

The RED target for transport has been a big driver of crop-based (1st generation) biofuels which are expected to make up most of the 10% target. There are GHG savings thresholds that biofuels have to meet in order to be counted toward the RED target, but there has been no differentiation between different renewable fuels. Thus, the easiest and cheapest options to meet the target have gotten priority, regardless of whether they bring technological innovation or deliver the most important GHG savings. Furthermore, incentivising mostly crop-based biofuels has not helped to diversify transport fuels. While there has been some use of waste to biofuels, this has not been at very high levels and (again) not enhanced the diversity of the fuel mix (comprising mainly used cooking oil and animal fat). As a result, the RED didn’t incentivise the best solutions for the climate in the transport sector.

For RED II and the period 2020-2030 attention should be given to furthering 2nd (lignocellulosic, i.e. woody) and especially 3rd generation (marine) biofuels, the latter of which may hold the greatest potential. The sea counts for 50% of the world’s biomass production, yet on a global basis only 2% of our energy comes from the sea. With very low lignin and high carbohydrate content, macro algae (seaweed) are highly suitable for biofuels processing such as anaerobic digestion or fermentation without costly pre-treatment.

Seaweed for fuel avoids the main challenges of land-based biofuels. These are outlined below. Considering this potential, national and EU level climate and environmental guidelines for evaluating the consequences of industrial scale seaweed farming are needed for mapping of the potential cultivation area.

⁶ *The Disruptive world of large scale energy storage*, Bellona Europa (October 2014): http://bellona.org/assets/sites/4/Bellona-Brief_Energy-Storage_and_Electric_Vehicles_30_10_14.pdf

Land-use and related emissions

As seaweed grows in saltwater, this eliminates any need for external water sourcing (or fertilisation). Cultivated in the ocean and grown on straight or circular ropes, horizontally and/or vertically, seaweed thus multiplies its growing area manifold over land-based biomass. Alga has incredibly rapid growth rates, which means the carbon released from its combustion is quickly reabsorbed in new growth.

Scalability

Currently less than 1% of available seaweed is utilised. Compared to Asia seaweed cultivation is in the developmental phase in Europe. But the temperate waters that stretch from Portugal to Norway are perfect for brown species such as sugar kelp.

Resource use

Seaweed is very efficient in utilising the nutrients from waste water, including nitrogen and phosphorus and its rapid growth rate means these nutrients can be quickly recycled back to the soil or water.

Environmental impact

This is yet well-enough understood and must therefore be an R&D priority. Potential issues include reduced nutrient content in the surrounding ocean, affecting the chemical and ecological state of open waters, changes in structure and function of planktonic ecosystems, which in turn could reduce other marine productivity and cross-breeding between domesticated and wild species.

Q29. Please name the most important barriers to the development of sustainable renewable fuels and renewable electricity use in transport?

Electro-mobility

Despite the significant benefits for climate, air quality, human health and energy security entailed by the wider uptake of EVs, they still account for just 0.3% of the total market of around 12.55 million passenger cars sold during 2014 in the EU. This has been due to a number of important barriers in the way of the development of renewable electricity use in transport. These can be grouped into the following areas:

Higher costs of ownership vs. revenue loss for public authorities

Firstly, EVs' higher costs of ownership have meant they have so far been affordable only to the higher income segment of a population. In countries, such as Norway, the purchase of an EV has been rendered a cost-saving opportunity as a result of the introduction by the government of a

generous package of fiscal and practical incentives. Noteworthy, however, is that costs of rendering EVs affordable have been incurred by Norway's public authorities in the form of revenue loss from forgone tax income and parking fee collection for instance.

The need for a European inter-operable re-charging infrastructure

Perceived or actual shortage of charging points, as well as the lack of compatibility between these, is an important factor undermining consumer confidence in the EV technology. It is crucial to address these barriers via the build-up of an inter-operable European re-charging infrastructure featuring an adequate number of fast-charging stations in strategic points to enable smooth inter-urban mobility. While the Alternative Fuels Infrastructure (AFI) Directive aims to achieve this, it is important that its implementation does not act to prohibit competing, and more advanced fast charging standards, and thus act to slow down the uptake of electro-mobility as a whole. Experience has shown that the standardisation process has lagged behind market and technological innovations. It is important that these processes go hand in hand.

Biofuels

The transport sector is currently highly dependent on biofuels for decarbonisation. The 10% target in the transport sector will be 90% met by biofuels and has almost exclusively incentivised the unsustainable use of 1st generation (crop-based) biofuels. These biofuels cause negative environmental impacts and undermine GHG emissions reductions with large amounts of CO₂ emissions, for instance from direct and indirect land-use change (ILUC).

Thus a transport target based only on volumes of biofuels has not been a successful tool to drive real decarbonisation. There has since been established a limit to 1st generation biofuels as well as a sub-target and double-counting for 2nd (lignocellulosic, i.e. wood-based) and 3rd generation (marine) biofuels. This is a step in the right direction, but **more direct action is needed to further the development of an advanced biofuels market.**

Since 2nd generation feedstock are limited by the high costs associated with lignin removal, interest in 3rd generation biofuels produced from marine sources like micro and macro algae (seaweed) is growing. **Below are Bellona's recommendations specifically for biofuels from seaweed.**

Cost

For 3rd generation high-potential biofuels like seaweed work needs to begin now to bring costs down. The cost of energy production from seaweed ranges from \$5-60/G and is well over that of coal, oil and liquid natural gas. With bioethanol as an example, the estimated cost of seaweed

is \$0.50/kg (dry weight) compared to \$0.16 for corn. Currently fermentation for bioethanol and hydrothermal refinement from wet seaweed are the most competitive pathways. **Decreasing the cost would require finding best applicable pre-treatment, making hydrolysis and fermentation reactions more efficient, scaling-up the processing equipment and systems commercialisation.**

Emissions accounting

Potential negative effects of 1st generation biofuels were known at the time when the RED was adopted, yet the time was not taken to ensure a more solid and predictable set of rules, leading to incentivising the wrong solutions and then reverting to correct these later by placing a limit on 1st generation biofuels. Such a process should be avoided for RED II and there is ample time to do so.

Q30. Please rate the most effective means of promoting the consumption of sustainable renewable fuels in the EU transport sector and increasing the uptake of electric vehicles.

| | Very effective | Effective | Not very effective | Not effective | No opinion |
|--|----------------|-----------|--------------------|---------------|------------|
| Increased use of certain market players' obligations at Member State level | | X | | | |
| More harmonised promotion measures at Member States level | | X | | | |
| The introduction of certain market players' obligations at the EU level | | X | | | |
| Targeted financial support for deployment of innovative low-carbon technologies (in particular to the heavy duty transport and | X | | | | |

| | | | | | |
|---|---|--|--|--|--|
| aviation industry) | | | | | |
| Increased access to energy system services (such as balancing and voltage and frequency support when using electric vehicles) | X | | | | |
| Increased access to alternative fuel infrastructure (such as electric vehicle charging points) | X | | | | |

Need to focus on incentivising quality rather than quantity of renewable energy fuels

Bellona sees the multiple choice questions above as very difficult to answer if there is no clear indication of what kind of renewable fuels are concerned. In the case of electricity, market players’ obligations would help a lot to ensure that car manufacturers have to offer a certain % of zero-emissions vehicles for example. But for biofuels, it could lead to blending mandates – a volume approach again - and therefore it wouldn’t solve the current problem, as it would still be a quantity approach and not a quality one. Again, what matters here the most is the quality of what the EU wants to incentivise.

Electro-mobility

Given the fact that there is no continuation of the 2020 RES targets at the Member State level or in the Fuel Quality Directive, targeted policies consisting of both sticks and carrots should be put in place to incentivise electro-mobility. Rendering EVs competitive vis-à-vis ICE vehicles and therefore boosting their demand would necessitate long-term government support in the form of fiscal and practical benefits to consumers, and preferential treatment.

Need for strong ‘carrots’ in the form of fiscal and practical EV incentives

41% of EV buyers in Norway have considered cost savings as the primary reason for buying an EV. This has been made possible due to the generous package of fiscal incentives and practical benefits the Norwegian government has granted to EV buyers. These have included exemptions

from purchase tax and VAT; more affordable insurance; exemptions from road and ferry tolls; free parking and re-charging in public charging spots; and the ability to drive in bus lanes.⁷

The choice of fiscal incentives package will largely depend on the characteristics of each EU Member State in mind, such as for instance, the level of car ownership tax burden, the VAT rates, the cost of electricity, and gas prices among others. Furthermore, the choice of incentives will vary depending on the goals of each Member State in mind, which could include the goal of industrial growth (via EV production) or the goal of balancing electricity generation (via EV batteries' storage of electricity). Therefore, a **bottom-up approach to the adoption of EV incentives is necessary**, whereby national or local authorities select the combination of EV incentives best suited to them and to local user trends. While fiscal incentives are crucial, experience shows that there are limits to how much they can achieve on their own, and thus highlighting the necessity for these to be accompanied by practical benefits to EVs, such as access to bus lanes (where this does not entail negative interference with public transportation) and parking benefits, along with public awareness campaigns.⁸

This table provides a list of EV incentives and the pre-conditions, in terms of Member State characteristics, for their effectiveness to foster EV uptake⁹:

| EV incentive | Justification | Best applicability in MS with following characteristics |
|---|--|--|
| CO₂ taxation at registration VAT exemptions | <i>A bonus-malus</i> system should be introduced, whereby heavier polluters are taxed more heavily. This measure is budget-neutral as EVs are granted tax reductions. | These measures are most effective in countries with heavier tax burdens as they have more freedom in incentivising EVs by reducing tax burdens/VAT rates (e.g. Norway) |
| Fuel taxation | Consumers are price sensitive, so a rise in the fuel taxation would result in greater purchase of less polluting cars and EVs. This measure would affect both the choice of car and the driving behaviour. | The estimated fuel cost savings, and therefore the incentive to switch to an EV, would be greater in countries with relatively high gas prices and relatively low electricity tariffs (e.g. Norway). |
| Access restriction schemes | The discrimination of ICE cars always fosters EV uptake. The growing concerns for public health | Strict emission criteria (coupled with accurate emission testing ¹⁰) should be ensured to |

⁷ *Electric Vehicles – The Norwegian Experience in Overcoming Barriers* (March 2015),

http://network.bellona.org/content/uploads/sites/3/Bellona-EV-Brief_The-Norwegian-Success-Story1.pdf

⁸ *Why an electrified transport sector needs to form a core component of the Energy Union* (December 2015),

http://network.bellona.org/content/uploads/sites/3/2015/12/EV-Brief_Why-an-electrified-transport-sector-should-form-a-core-component-of-the-Energy-Union1.pdf

⁹ *Why an electrified transport sector needs to form a core component of the Energy Union* (December 2015),

http://network.bellona.org/content/uploads/sites/3/2015/12/EV-Brief_Why-an-electrified-transport-sector-should-form-a-core-component-of-the-Energy-Union1.pdf

| | | |
|--------------------------|--|---|
| Congestion charge | due to air pollution, renders their adoption more feasible. | guarantee effectiveness of the measure (e.g. UK, Italy, Netherlands, Germany, and some cities in Poland, Czech Republic, Austria and Hungary ¹¹). |
| Parking benefits | To avoid significant income deficits for city councils, the granting of free/reduced parking to EVs should be accompanied by a raise in the parking fee levels for ICE cars. | In general, since parking space is a rare commodity in many cities – any incentives for EV owners with regards to parking could foster EV uptake. |

Ensuring inter-operability and inter-modality

Significant amounts of EU and public funding should be made available for the establishment of an inter-operable EV re-charging infrastructure. In order to build consumer confidence in the technology and render EVs a viable substitute to ICE cars, it is imperative that sufficiently **long range (of ca. 400-500km) batteries are developed and fast-charging stations established at strategic spots to allow for smooth inter-urban and international mobility.** Drawing on experience with the AFI Directive, Bellona calls for enhanced coordination between European institutions, standardisation bodies and other relevant stakeholders in order to ensure that standards meet society’s electro-mobility transportation needs and do not hinder further technological innovation. Increased strategic coordination of electro-mobility standardisation at EU level is needed: for instance, standardisation of charging infrastructure as a means to ensure smooth and swift integration of e-buses, e-car sharing options and e-bikes into the public transport network is a clear need to foster a cost-effective electrification of transport.

Moreover, the insufficient public investment and EU funding in inter-modality should be addressed. Ensuring interconnections between all modes of transport will be key in rendering commutes economically and physically comfortable, as well as attaining the shift from reliance on private to public transport means.

‘Electrifying’ public procurement

Public authorities are a powerful purchaser on the market and are therefore key actors in transport decarbonisation. World-wide 557,000 cities and communities spend roughly €4 trillion per year; the equivalent of 10% of global GDP. Importantly, the COP 21 conference saw the adoption of the ‘*Paris Declaration on Electro-Mobility and Climate Change and Call to Action*’, bringing together a number of industry and public sector actors in their commitments to scale-up electro-mobility to levels compatible with a less-than 2-degree pathway. The partners to the declaration commit to broadening their efforts and call for a decisive joint effort towards

¹⁰ *The Emission Testing Gap: Why business-as-usual for the conventional car industry cannot continue*, Bellona Europa, 2015: http://network.bellona.org/content/uploads/sites/3/2015/11/Bellona-EV-Brief_The-Emission-Testing-Gap.pdf

¹¹ <http://urbanaccessregulations.eu/>

sustainable transport electrification – including that at least 20% of all road vehicles (cars, 2 and 3-wheelers, trucks, buses, and others) are to be electrically powered by 2030¹².

Green public procurement (GPP) will be instrumental in attaining this goal by helping to stimulate demand for EVs. GPP in the EU has been regulated via Directive 2009/33/EC (the Clean Vehicles Directive or ‘CVD’). The uptake of EVs and full application of the CVD by EU public authorities has remained slow, however. Importantly, the CVD fails to address an important area of potential public procurement influence: companies contracted by public authorities to provide various services – such as for instance, road maintenance, waste disposal, and elderly/disabled transport services among others. What is more, the CVD has suffered from lack of stringent and user friendly criteria.

The currently ongoing process of revising GPP criteria for transport should take the shortcomings of the CVD into account. While enacting GPP policies is of crucial importance in building confidence in EVs, the reduction of the carbon footprint of public fleets requires a **comprehensive approach to fleet management**. This necessitates looking beyond the simple purchase of new vehicles. EU Member States should therefore establish national and regional capacity building centres to provide free advice and training to public authorities. This wider mobility management approach should also encourage public authorities to rethink their mobility needs, and ensure thorough assessment of whether the purchase (or lease) of a vehicle is necessary in the first place, and the consideration of car sharing, and employee incentive schemes.

Tightening the ‘stick’ component to truly reflect the societal costs of the transport sector

To truly reflect the human health and environmental costs of the fossil car industry, Bellona calls for the tightening of CO₂ emission performance standards for new passenger cars, set by Regulation (EC) 443/2009. **A target of 70g/km for 2025 should be the absolute minimum level of ambition.** Reported emissions data has been used by governments not only as an indicator to set new public health policies but also to simulate future air pollution and CO₂ levels and targets. This means that in order to ensure fair and correct taxation of ICEs, hybrids and plug-in hybrids, we firstly need to ensure accurate emissions data.¹³

The need for a ‘smart’ integration of electric vehicles

The Energy Security Strategy notes that the large scale integration of renewable energy will require smarter energy grids and new energy storage solutions. Regulatory regimes must be

¹² Paris Declaration on Electro-Mobility and Climate Change and Call to Action (December 2015),

<http://newsroom.unfccc.int/lpaa/transport/the-paris-declaration-on-electro-mobility-and-climate-change-and-call-to-action/>

¹³ *The Emission Testing Gap: Why business-as-usual for the conventional car industry cannot continue*, Bellona Europa, 2015: http://network.bellona.org/content/uploads/sites/3/2015/11/Bellona-EV-Brief_The-Emission-Testing-Gap.pdf

adopted which enable novel and diverse business models for the deployment and use of both distributed and grid scale energy storage. Regulations are also needed to enable large industrial energy consumers and households to invest in and use smart charging and energy storage solutions. Bellona is of the view that DSOs should not be permitted to control the development and deployment of energy storage solutions, as this would reduce the emergence of new business models and emerging synergies of energy storage and electro-mobility.

In order to ensure that the deployment of EVs does not lead to additional generation capacity requirements and grid disruptions during afternoon peaks, it is important that smart EV re-charging is encouraged. Currently, no such incentives exist for consumers as prices in the spot market vary insufficiently to encourage a change in behaviour. In the absence of measures to induce smart charging (i.e. variable grid tariffs), a recent study by Cambridge Econometrics calculates that for the assumed 6.9 million EVs assumed in 2030, passive or un-managed EV charging would require 3GW of additional generation capacity in 2030.¹⁴ That same study finds that the **potential benefits of smart charging are higher than the costs of implementing smart charging, resulting in a 125 million €/year net benefit for smart charging in 2030, compared to a 150 million €/year cost for passive charging.** Member States should therefore be encouraged to incorporate smart charging measures into their National Plans, mandated by the AFI Directive, as well as in their urban mobility plans.

Exploiting EVs' full potential via energy storage

The Energy Security Strategy notes that the large scale integration of renewable energy will require smarter energy grids and new energy storage solutions. The Energy Union Strategy, on the other hand, argues that Europe needs to speed up the electrification of its car fleet and other means of transport to become a leader in electro-mobility and energy storage technologies.

Firstly, a number of legal bottlenecks and uncertainties will need to be clarified in order to foster uptake of energy storage technologies. For instance, there is no legal clarity on which actors can sell energy to private customers and to the grid. A proper definition of energy storage and energy storage services should be agreed at EU level allowing a coherent approach on energy storage. This also includes the removal of barriers to the participation of small players and energy storage aggregators to the energy and balancing trading markets, together with the development of a coherent framework with duties and rights of new players such as aggregators.

¹⁴ *En route pour un transport durable – A report for the European Climate Foundation* (November 2015)
http://www.camecon.com/Libraries/Downloadable_Files/En_route_pour_un_transport_durable_-_technical_report.sflb.ashx

Bellona calls for the introduction of regulations conducive of the widespread use of energy storage by new entrants, communities, aggregators and individuals. Member States should, when developing their plans for RES, provide targets and requirements for balance power and system demands, highlighting the potential of energy storage. Moreover, they should actively consider the utilisation of energy storage as a real alternative when planning for grid and energy distribution upgrades. Last but not least, Bellona believes that system regulators should incorporate this into their planning and regulatory tools, and allow for the creation of new business models for the use of energy storage at local, regional and national level.¹⁵

Biofuels

Research

Seaweed generally contains about 10-15% dry matter, meaning 10kg wet seaweed yields 1.5kg dry mass. The productivity of seaweed ranges from 150 to 600 tonnes per hectare per year fresh weight. There remains much uncertainty over what the potential energy yield could be as well as the CO₂ uptake. More research into this would help build the case and demand for such advanced biofuels sources.

Regular checks

Confidence amongst users that they are making an environmentally and climate friendly choice is crucial to drive market uptake. Based on lessons from current biofuels policies, we may not yet be aware of which effects policies may cause and it therefore **seems prudent to put in place a review, for example in 2025, to ensure that there are checks of the policy's impacts and that any measure that would not help fulfilling the EU long-term goals is reviewed in time to avoid detrimental impacts.** Building in such an expectation for a review from the start would also limit the market uncertainty caused by the U-turn on 1st generation biofuels policy.

¹⁵ *Where will the energy storage mega trend lead us?* (December, 2015) <http://bellona.org/publication/where-will-the-energy-storage-mega-trend-lead-us>