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COMMISSION STAFF WORKING DOCUMENT

EXECUTIVE SUMMARY OF THE IMPACT ASSESSMENT

Accompanying the document

COMMUNICATION FROM THE COMMISSION TO THE EUROPEAN PARLIAMENT, THE COUNCIL, THE EUROPEAN ECONOMIC AND SOCIAL COMMITTEE AND THE COMMITEE OF THE REGIONS

Renewable Energy: a major player in the European energy market

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Renewable Energy: a major player in the European energy market

1. WHAT IS THE PROBLEM?

Over the last few years, driven by economies of scale and technology improvement, renewable energy sources (RES) has deployed at faster rate than previously foreseen. This is welcome, showing the positive effects of the EU renewable energy policy. In response to these trends, Member States have increasingly reformed support schemes for renewables to ensure cost-effectiveness and market integration. Sometimes the manner in which such reforms have been undertaken has failed to follow European best practice, creating investor uncertainty across Europe. In addition, the current financial and economic crisis has made investors more cautious about investing in capital intensive energy markets, and in particular in the policy-dependent renewable energy sector.

Against this context, it is increasingly clear that the EU 2020 renewable energy target may not in itself be sufficient to promote the necessary long-term investments that will allow for further cost reduction and a greater share of renewable energy post-2020. Clarity about the future direction of EU policy has thus become more important for investors and the business community in order to make long-term investment decisions in the renewables sector today.

Directive 2009/28/EC on renewable energy (the Directive) requires the Commission to present a post-2020 Renewable Energy Roadmap only in 2018, taking into account technological development and the experience gained from the Directive implementation. In addition, it contains a requirement for the Commission to review certain specific provisions of the Directive (notably regarding the greenhouse gas (GHG) saving thresholds for biofuels and bioliquids, the measures and the impact of biofuels and bioliquids and the so-called cooperation mechanisms) by 2014. However, considering the investment uncertainity described above, the Commission sense a growing belief amongst stakeholders that planning for the post-2020 period requires consideration already today.

More specifically, the following six challenges need to be addressed in order to facilitate a greater share of renewable energy the EU energy mix in the coming decades:

- *Uncertainty of future policy framework*. As currently framed, the EU renewable energy policy framework effectively ends in 2020, a mere eight years away. Post-2020, there are no renewable energy objectives and no decarbonisation targets other than those under the ETS and a political, rather than legal, EU Council objective to achieve 80-95% greenhouse gas reductions by 2050 if other developed countries take similar action.

- *Viability of financial incentives*. Member States have introduced a number of different support scheme that raise concerns from the perspective of the single market. In addition, a rise in expenditure (partly caused by a boom in installations resulting from falling photovoltaic per unit costs) is generating doubts about their financial viability.
- *Consistency with market arrangements*. Concerns have arisen about the ability of current internal market arrangements to effectively address the investment characteristics of renewables and to allow for renewable generators to effectively respond to market price signals, thus creating inefficiencies in market operation.
- *The adequacy of energy infrastructure.* The majority of the existing power grid was built in an era in which electricity systems were predominately national, power generation was sited relatively close to the points of consumption and power flows and supplies were relatively controlled. With the rising proportion of electricity from renewable energy, these conditions are unlikely to hold and may lead to suboptimal integration of renewables.
- *Uncertainty about future technologies.* A wide range of innovative renewable energy technologies will be needed to achieve the transition to a sustainable and secure energy sector, together with major changes to modernise infrastructure management and development. However, bringing such renewables technologies to the commercial market-place is challenging and cannot be achieved by the market alone.
- *Public acceptance and sustainability*. Generally, renewables enjoy widespread public support because of their distributed nature and environmental and socio-economic benefits. However, growing concerns about land-use and other environmental impacts of large-scale renewable energy projects could potentially become a barrier to future growth.

The Communication that this Impact Assessment accompanies looks at both the challenges and possible solutions with the view to facilitate the integration of renewable energy into the single market. It also sets the framework for determining what policy regime is necessary post-2020 to enable greater share of renewable energy in the EU's energy mix.

2. ANALYSIS OF SUBSIDIARITY AND EU ADDED VALUE

The EU's competence in the area of renewable energy is set out in the Treaty on the Functioning of European Union, Article 192 (environment), Articles 114 (internal market) and Article 194 (energy). From an economic perspective, many energy system developments can be achieved on an EU-wide basis, encompassing both EU and Member State action while duly considering the respective competences.

3. POLICY OBJECTIVES

The general objective of this intervention is to ensure that renewable energy contributes significantly to security and diversity of energy supply, competitiveness, and environment and climate protection, but also supports economic growth, employment creation, regional development and innovation in the EU. To achieve this, the following specific objectives are proposed: i) reduce uncertainty for investors and the business community, ii) improve viability and cost-effectiveness of support schemes, iii) facilitate consistency with market arrangements, iv) provide adequacy of energy infrastructure, v) foster technology innovation and development, and vi) ensure wider public acceptance and address sustainability.

4. POLICY OPTIONS

The aim of this IA is to analyse the environmental, economic and social impacts of selected policy options compared to the current situation. Taking into consideration stakeholders views, the following four policy options were identified and analysed:

- Business as usual (BAU). This option implies no new EU policy promoting renewable energy after 2020. Renewables would continue to benefit from to the current ETS legislation.
- Decarbonisation without renewable energy targets post-2020. This option implies a strengthened GHG reduction target and/or policies fully compatible with the long-term EU decarbonisation goals, without setting specific a post-2020 renewables target.
- Binding renewable energy targets post-2020 and coordinated support. This option would update the 2008 Climate and Energy Package, by setting EU and national renewables targets for 2030, along with EU objectives on GHG emissions and energy efficiency.
- EU renewable energy target and harmonised measures. This option sees the establishment of an EU-wide renewable energy target backed-up by a harmonised support scheme and electricity system management.

5. ASSESSMENT OF IMPACTS

Economic impacts

The overall economic impact of increasing the share of renewable energy in the energy mix is the outcome of multiple interlinked and counterbalancing mechanisms. First, the deployment of renewables creates economic activity. Second, increased consumption of indigenous renewable sources reduces fossil fuel imports, thus increasing energy security. Third, it promotes energy innovation, which is key for ensuring the development of sufficient different technologies enabling the long-term cost-effective decarbonisation of the energy sector. Energy innovation is also important in economic terms, as it create competitive advantages on international markets with associated growth and export opportunities. On the other hand, renewable energy expansion can also displace investment (and employment) in the conventional sector with the associated negative impacts. In addition, the cost of financial support for renewables can result in higher energy prices, which may impact on energy users' bills and affect the competitiveness of energy-intensive industries.

The analysis shows that options 2, 3 and 4 are likely to lead to positive economic impacts, as they will promote (to a varying degree) significant investments in renewables technologies which have the potential to generate new industries, jobs and economic growth. In addition, they will help lowering expenditure on imported fuels which may also protect the EU economy against external energy price shocks, although options 3 and 4 may result in higher import savings than option 2. Meanwhile, financial incentives for renewables under options 3 and 4 may increase costs for consumers, although this is likely to be at least partially compensated by the merit order effect that reduces wholesale electricity prices. On the contrary, option 1 has higher fuel costs which do not generate much economic growth; it will however require fewer public investments in developing and deploying renewable energy.

Environmental impacts

Renewable energy deployment has the potential to reduce significantly greenhouse emissions. Past analysis shows that all policy options explored but the BAU scenario achieve 80% GHG

reduction and close to 85% energy related CO2 reductions in 2050 compared to 1990. Options 2, 3 and 4, combined with effective adaptation measures, have also the potential to improve the climate resilience of the EU energy system. In particular, decentralisation of electricity generation plays an important role in decreasing overall network and system vulnerability to climate-related disasters. Local biodiversity is likely to be impacted directly and indirectly by renewable energy infrastructure. Option 2 and 4 may results in higher impacts, as more construction of overhead power lines will be needed to connect the best sites (including in 3rd countries) with consumption centres. However, these potentially negative consequences can be avoided if the infrastructure development follows well established environmental rules.

Growing renewable energy shares post-2020 will require increased production of biomass feedstock, which may lead to higher risks of direct and indirect land use change impacts. However, the analysis indicates that potentially there is enough availability of sustainable biomass to meet energy and other uses by 2030. Option 2, 3 and 4 could reduce such risks, by introducing robust sustainability criteria for all bioenergy uses, building on (and further strengthening) the mandatory criteria currently applying to biofuels and bioliquids. In addition, risks can be further decreased by facilitating significant and sustainable improvements in agriculture and forest productivity, as well as promoting international action to reduce deforestation and forest degradation (REDD).

Social impacts

The transition to higher shares of renewables has the potential to create many new and better jobs. By the end of 2010, the EU renewable energy industry employed over 1.1 million people. While renewable energy growth also triggers sectoral restructuring, research shows that net employment impacts of renewables policies are still positive. In particular, it is crucial to uphold and improve the competitive position of European manufactures of renewable energy technologies by ensuring both sustained domestic demand and access to foreign markets.

Given the above, by actively promoting innovative renewable energy technologies, option 3 may have higher employment benefits that option 2, which through its cost-based approach is likely to incentivise only mature technologies. To the extent that option 3 would imply smoothing of renewable investment over time, it could also provide more stable employment for workers, helping to avoid periods of serious labour shortages for employers. Option 4, where a share of renewable energy will be developed in third countries, may have lower (although still sizable) employment benefits.

6. COMPARISON OF OPTIONS

The policy options were compared based on their **effectiveness, efficiency and coherence**.

As regards **effectiveness**, all options but the BAU scenario help addressing both investors' uncertainty as well as concerns about cost-effectiveness of support schemes and market integration of renewables. While all these options would enhance technology innovation through research & development measures, only option 3 would facilitate MS applying more technology specific initiatives and so spur "market pull" innovation that is key to promote mass-scale deployment of renewables. All options but 1 would result in higher energy security and effectively address sustainability considerations.

In terms of **efficiency**, the analysis indicates that broadly similar levels of total system costs for all options but the BAU scenario. While the efficiency of option 3 depends on the progress in removing the existing inconsistencies between national support schemes, the cost-

effectiveness focus of option 2 may help reducing the overall cost of the policy, as well as lowering the administrative burden associated with managing multiple targets. The analysis shows that in practice option 4 could have a lower efficiency than theoretically expected.

All policy options are **coherent** with the other EU long-term policy objectives (on climate, environment, transport etc.). There is not a clear preferred option scoring the best in all criteria. More detailed analysis of policy instrument interactions is appropriate and it will be carried out in the context of possible future specific policy proposals.

The above comparative analysis of the impacts of the four policy options assessed can be summarised as follows:

- *Business as usual.* This option would not address the current investors' uncertainty about the EU renewable energy policy post-2020. As this scenario assumes a phase out of incentives, issues of cost-effectiveness and market integration of renewables will be addressed by the end of the decade. Similarly, already planned energy infrastructure development would be sufficient to integrate the expected low deployment rates. Finally this option does nothing to enhance economic growth, employment creation and technology innovation, and to address sustainability and public acceptance issues.
- *Decarbonisation without renewable energy targets post-2020*. This option would facilitate more visibility regarding market developments post-2020, assuming that policy tools addressing ETS and non-ETS sectors would be able to provide effective market signals in favour of renewables, through appropriate carbon pricing. By applying a EU market integrated approach, it could help improving support schemes' cost-effectiveness, facilitate market integration and provide adequate infrastructure. The technology-neutral nature of the policy instruments included in this option could also have a weaker impact on technology innovation compared to other options that include specific energy technology measures. This option would effectively address sustainability and public acceptance.
- *Binding renewable energy targets post-2020 and coordinated support.* Depending on their ambition, targets could help provide investors and the business community with greater certainty on future market volumes for renewable energy technologies. They would also promote further cost-effectiveness and convergence of national support schemes and foster greater research and development of innovative technologies. This option would also effectively address sustainability and public acceptance issues, by promoting a more balanced and regionally equilibrated deployment of renewables.
- *EU renewable energy target and harmonised measures.* This option would also positively address both post-2020 policy uncertainties, while promoting reinforced internal market integration. It would provide technology-neutral support combined with producers' market exposure and it is likely to promote more concentrated renewable energy deployment, rather than distributed generation nearer centres of consumption. As a result, this option could risks raising support scheme and infrastructure costs, as well as public acceptance issues. As in option 3, potential risks of unwanted side effects of bioenergy uses would be addressed by a strengthen sustainability framework.

Table 1: Comparison of analysed options against the baseline

Criteria	Options	1: No new EU action	2: GHG targets/ no RES target	3: post 2020 national RES targets	4: EU RES target and harmonised measures
Effectiveness	Policy certainty	=	+	++	++
	Support viability	=	++	+	+
	Infrastructure adequacy	=	++	++	+
	Internal market	=	++	+	++
	Technology innovation	=	+	++	+
	Sust./public acceptance	=	+	+	+
Efficiency	System costs	=	=	=	=
Coherence	with other EU policies	=	+	+	+

Legend = equivalent; + improvement; - deterioration.

7. MONITORING AND EVALUATION

For the monitoring and evaluation it is proposed that the Commission closely monitors the following indicators to ensure that the EU stays on track to achieve its 2020 objectives and so is capable of building on that framework to achieve its post 2020 objectives. Relevant reporting and monitoring systems are available at EU level, including through the biannual Commission reporting obligation under the renewable energy Directive.

Indicator	Relevance
Share of renewable energy sources in EU final energy consumption	Renewable energy development
Reduction of GHG gas emissions in the EU	GHG emissions reductions
Level of ETS carbon prices	Effectiveness of carbon markets
Origin of biofuels and bioliquids consumed in the EU	Sustainability
Biofuels impacts on land use, food availability and biomass prices	Sustainability
The amount of MS financial support for renewable energy	Efficiency, cost minimising
The use of the cooperation mechanisms laid down in the RES Directive	Efficiency, cost minimising
The production costs of various renewable energy technologies	Efficiency, cost minimising
The economic availability of sustainable biomass	Renewable energy development
The rate of market coupling	Efficiency, market integration
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