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REFIT evaluation of the Directive 2009/28/EC of the European Parliament and of the Council

Accompanying the document

Proposal for a

Directive of the European Parliament and of the Council on the promotion of the use of energy from renewable sources (recast)

{COM(2016) 767 final}
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Contents

EXECUTIVE SUMMARY

The Renewable Energy Directive[1] (RES Directive), with its nationally binding energy renewable targets for 2020, is a core element of the 2009 EU climate and energy package, although the EU legal framework on renewable energy promotion, previously based on indicative targets, dates back to 2001[2]. The renewable energy targets are also part of the Europe 2020 strategy for growth, in particular of its flagship initiative for a resource-efficient Europe, given their contribution to innovation, growth, jobs and security of energy supply. Furthermore, the Directive is the central EU level instrument to "*promote the development of new and renewable forms of energy*", an aim set out in Art 194(1)(c) TFEU. Renewable energy is currently the only decarbonisation option in the power sector which is being deployed at a rate that is close to what is required under long-term scenarios of the International Energy Agency (IEA) to attain the 2°C target.[3]

The 2009 RES Directive has **effectively** ensured that all Member State but one are currently on track to achieve their 2020 targets, thus improving the pre-existing situation were only few Member States had achieved their 2010 indicative targets for renewable electricity and transport. The share of renewable energy (RES) in the EU increased by 6 percentage points between 2007 and 2015 (from 10.4% to 17%)[4]. As anticipated in the 2007 Renewable Energy Road Map[5] outlining the proposed EU renewable energy framework based on binding EU and national renewable energy targets, the Directive has triggered the development of comprehensive policies in all Member States in the electricity, heating and cooling and transport sectors. In parallel with additional national RES policies, the 2009 RES Directive has also spurred European-led global investment and technology cost reductions that were still unimaginable a few years ago. For instance, from 2010-2015, average costs for new onshore wind plants fell by 30% and average costs for new utility scale solar PV installations declined by two-thirds[6], the latter also influenced by production growth in China. This fall in prices has confirmed the volume-dependent technology learning curve. RES investments have been surpassing conventional energy investments for the first time in 2014[7]. While production volume and scale were probably the most successful elements triggered in 2009[8], the future framework for RES development will need to emphasise more market integration. As technologies mature and markets evolve, this will be the most cost-efficient way of deploying and integrating RES technologies. Market based schemes also increase investor certainty since support mechanisms are

1 Directive 2009/28/EC on the promotion of the use of energy from renewable sources (Renewable Energy Directive), OJ L 140, 5.6.2009

2 2009 Climate and energy package included the amended EU ETS Directive (Directive 2009/29/EC) Decision No 406/2009/EC on the effort of Member States to reduce their GHG emissions to meet the Community's GHG emission reduction commitments up to 2020, and Renewable Energy Directive (Directive 2009/28/EC)

3 *System Integration of Renewables – Implications for Electricity Security*. Report to the G7, OECD/IEA, 2016, available at: https://www.iea.org/media/topics/engagementworldwide/g7/IEAIRENAReporttotheG7onSystemIntegrationofRenewables.pdf

4 Reference year used in 2007 model runs for the 2008 IA for the 2009 Climate and energy package. Data: EUROSTAT and 2015 draft preliminary figure ("Draft Renewable Energy Progress Report", Öko Institute [to be published]).

5 COM(2006) 848 final

6 Renewable electricity Medium-Term Market Report 2015, (IEA, 2015)

7 World Energy Investment Outlook (IEA, 2014)

8 The lack of critical mass on the market and the failure of conventional energy prices to include the negative externalities were identified as specific problem drivers related to the renewable energy sources back in 2006 and 2008, when the Renewable Energy Road Map and proposal for a Renewable Energy Directive were initially put forward by the Commission SEC (2006) 1719/3 and SEC (2008) 85

more transparent and predictable and less exposed to unilateral government decisions (e.g. modification of support conditions for existing installations).

Results of the public consultation[9] highlighted that the RES Directive is considered successful in helping the EU reach its energy and climate objectives by 72% of respondents[10]. In particular, the evaluation study[11] published in April 2015, on which the present REFIT evaluation is based, found that its national binding targets were the most important driver for renewable energy policies and investments in many Member States, and its reporting, planning and monitoring obligations were rated as highly effective in the Fitness Check Evaluation on energy planning and reporting[12] for enabling quantitative analysis and transparency on RES planning and deployment in Member States and the EU as a whole.

The Directive has so far delivered more impact in the electricity sector than in the heating and cooling sector, which can be partly explained by late transposition deadlines (31 December 2014) for the heating and cooling and building related provisions, in addition to the fact that the Directive contains more electricity market related measures[13]. The biofuels sustainability scheme included in the Directive in 2009 failed to anticipate and address the risk of indirect land use change, and this gap was only addressed with the adoption of the ILUC Directive[14] in 2015 and the amended EU biofuel sustainability criteria. The long and technically complex inter-institutional negotiations that led to the adoption of the ILUC Directive, together with the complexity of some provisions under the sustainability schemes, gave rise to some initial challenges for its implementation in several Member States. The transport sub-target has successfully resulted in the implementation of blending mandates in the vast majority of the Member States.

With regard to **efficiency**, this evaluation found that the methodology underpinning the effort sharing for the 20% EU target struck the right balance between cost effectiveness and political acceptance. However, the flexibility and cooperation mechanisms included in the RES Directive (joint support schemes, joint projects, statistical transfers, or even third country cooperation, set out in Articles 6 to 11), which were intended to help Member States achieve their national targets and the EU overall target by making use of cost effective RES development in other Member States and third countries, have hardly been used by Member States. The Guarantees of Origin scheme (Article 15), which provides a mechanism for consumer disclosure of the sources of renewable electricity, has not yet delivered sufficient transparency with regard to the suppliers fuel mix. The unreaped cost-

9 "Public consultation on the Renewable Energy Directive for the period after 2020: Analysis of stakeholder views", European Commission, 2016, available at: https://ec.europa.eu/energy/en/consultations/preparation-new-renewable-energy-directive-period-after-2020

10 Among those 72%, 100% of Member states and public authorities consider the RED as successful or even very successful and 94% of non-RES energy industries and 90% of network operators agree.

11 "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", CE Delft , 2015

12 Fitness check of the Reporting, "Planning and Monitoring Obligations in the EU energy acquis". Reference number to be added when this REFIT is adopted.

13 Certain provisions of Art. 13(4) of the Renewable Energy Directive were only applicable from 2015, and the nearly zero-energy building requirements for new buildings only become applicable as of 2021.

14 Directive (EU) 2015/1513 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, OJ L 239, 15.9.2015

effectiveness of cooperation measures was nevertheless countered by the large decrease in technology costs, thus improving the overall production cost picture[15].

Furthermore, the Directive did not prescribe support schemes as obligatory, nor did it set out details as regards their design and management. However, most Member States have relied on support measures to incentivise RES deployment. Not all national support schemes were found to be equally efficient and responsive to market signals, which mattered even more when adjustments were not done fast enough in line with the (rather unexpected) rapid technological cost decreases. Many Member States have introduced support schemes which were not related to market signals, resulting in distortions of the electricity market and leading in some cases to high support costs. In some cases, adjustments were also made too abruptly, or even retroactively, resulting in market uncertainty and ultimately increasing the overall impact on investors. To address these issues, the Commission issued guidance on RES support schemes design and their reform in 2013[16]. The move towards more market based support mechanisms was then further complemented by the 2014 Guidelines on State aid for environmental protection and energy[17].

The national character of current support schemes finally also prevents exploring the full benefits of European market integration. However, as this evaluation could also demonstrate, political considerations (preference to keep investments in the own Member State) may prevail in such decisions, even if they were to result in less cost-effectiveness. Also, the experience of the only joint support scheme implemented so far has showed that the original expectations of cost-effectiveness have not fully materialised due to national regulatory differences that go beyond the support scheme itself. Nevertheless, it is expected that, with the increasingly ambitious trajectories post-2015, and based on currently promising signals for further joint mechanisms, these instruments will gain in importance in the second half of the decade.

Solid evidence shows the **relevance** of the Renewable Energy Directive for reaching the greenhouse gas (GHG) reduction targets, as well as for the delivery of Article 194(1c) of the Treaty. Although the renewable energy targets are expressed in relative terms (i.e. as a share of future levels of energy consumption), progressing towards them effectively displaces fossil fuels and complements the EU GHG reduction[18]. The increase in the use of renewable energy resulted in approximately 380 Mt of gross avoided CO_2 emissions at EU level in 2014. As energy efficiency improves – another key dimension of the EU's decarbonisation efforts –, the growing share of renewables results in a progressively larger displacement of non-renewable energy sources.

Moreover, the benefits of renewables go well beyond GHG reduction and include greater security of supply and more innovation, jobs and growth. For example, avoided imported fuel costs due to increasing use of renewable energy amount to around €20 billion a year for the EU as a whole[19]. This makes renewable energy a key delivery tool for several dimensions of the Energy Union Strategy and for EU commitments in the 2015 Paris Climate Agreement on climate change. In addition, since 2014, the EU's ambition to lead the world in renewable energy has been declared as one of the key policy priorities of the Juncker Commission.

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15 "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", CE Delft , 2015

16 European Commission guidance for the design of renewables support schemes", SWD(2013) 439 final

17 Communication from the Commission - Guidelines on State aid for environmental protection and energy 2014-2020", OJ 2014/C 200/01

18 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016

19 ""“Draft Renewable Energy Progress Report”, Öko Institute [to be published]. 2014 figures

With regard to **coherence** with other policies, the link with Internal Energy market provisions and the Emissions Trading System (ETS) are probably the most important, but not the only ones, as further elaborated in the evaluation.

While RES support schemes contributed to the expansion of RES electricity production and technology cost reductions, their impact on electricity wholesale market functioning also increased significantly. In the absence of clear principles for the market-compatibility of support schemes in the RES Directive, non-market-based support schemes were introduced in many Member States. Such support schemes added a regulated layer to the electricity price that did not respond to market-signals, thereby reducing the ability of the wholesale electricity price to steer trade and investment decisions effectively.

The 2009 RES Directive established priority access and dispatch for renewable energy to compensate for electricity market rules not providing renewable producers the opportunity to fully participate in the market[20]. With the parallel ongoing initiative for a new market design improving the conditions for RES suppliers, the need for continuing preferential treatment will need to be re-assessed and the role of the RES Directive in a reformed electricity market design to be re-defined.

The deployment of renewables induced by the Directive contributed to a slight reduction in demand for EU ETS allowances. However, the overall surplus of allowances[21] implies that the price-dampening effect of new renewable energy was in fact rather limited. The general deployment of renewables induced by the Directive has worked in synergy with the EU ETS by ensuring that regulatory, administrative and energy operating systems adapt to a low carbon energy future and allow the ETS price signal to feed through to suppliers.

There was an **EU-added value** in the form of a clear joint ambition underpinned by national planning that allowed investors to become active across the EU under similar framework conditions[22].The EU wide roll-out also resulted in significantly higher effects of scale and consecutively more pronounced technology cost reductions for new on-shore wind and solar photovoltaic capacity (since 2015 also for off-shore wind). This has made deployment cheaper for all the Member States involved, as it would not have otherwise been. It emerged that a minimum degree of coordination in the area of RES is necessary to avoid negative effects on other Member States stemming e.g. from insufficient grid development (loop flows[23]) or retroactive changes. It is important to note that recent stakeholder feedback (e.g. Florence Electricity Forum, June 2016[24]) called for common rules on support schemes and for more regionalised and market based approaches.

EU added value was delivered by the Concerted Action for Renewables[25], which is a structured, confidential dialogue enabled by the Commission among national authorities tasked with the

20 Due amongst other things to the lack of liquid intraday and balancing markets, the absence of rules fit for renewables, the lack of sufficiently flexible power systems

21 The surplus amounted to around 2 billion allowances at the start of phase 3 (2013-2020) and increased further to more than 2.1 billion in 2013. In 2015, it was reduced to around 1.78 billion

22 "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", CE Delft , 2015

23 If a national grid has not enough capacity to cope with its own generation infeed, this may lead to unexpected electricity flows across borders ("unscheduled flows" or "loop flows"). Such loop flows can significantly reduce the possibilities to trade electricity across borders.

24 European Commission, 31st EU Regulatory Forum, "Draft Conclusions", 13th-14th June 2016

25 CA-RES accessible at: http://www.ca-res.eu/index.php?id=2

implementation of this Directive. This initiative has delivered particular benefits as Member States started with very different levels of experience, offering wide knowledge sharing opportunities for Member States which were less advanced in implementation.

By excluding the production of biofuels in areas of high biodiversity and carbon value and by laying down a set of common biofuel sustainability criteria and methodology, the RES Directive established common EU sustainability criteria, preventing market fragmentation and potential trade barriers that could have arisen if national sustainability rules had diverged.

The RES Directive (and energy efficiency legislation) serve as a reference for Member States' low carbon investments funded by the European Structural and Investment Funds, and for the EIB group[26] lending, including in the framework of the European Fund for Structural Investments (EFSI). These priorities remain valid, as the EU prepares itself for achieving the 2030 energy and climate targets in line with its COP21 commitments and renewed commitment to foster sustainable and green investments[27].

Finally, the RES Directive (together with other parts of 2009 climate and energy package) and the EU global leadership role in renewable energy contributed to the spread of renewable energy policies around the world. By 2015, at least 173 countries had adopted renewable energy targets (not considering the intended nationally determined contributions prior to COP21), and an estimated 146 countries had renewable energy support policies in place[28].

I. INTRODUCTION

1.1. Purpose of the REFIT evaluation

As part of the Commission's Better Regulation agenda, the Renewable Energy Directive was included in the Commission's 2013 REFIT programme[29] in order to provide a comprehensive policy and regulatory fitness evaluation of the 2009 RES Directive. Building on the conclusions drawn from the present REFIT evaluation, the Commission intends to revise the regulatory framework on the promotion of the use of energy from renewable sources by the end of 2016. The present evaluation informs the Impact Assessment for this revision.

1.2. Scope of the REFIT evaluation

The evaluation covers all aspects of the RES Directive[30], but it should be noted that there is a parallel on-going Fitness Check evaluation on the reporting, planning and monitoring obligations in the EU

26 The EIB group consists of the European Investment Bank and the European Investment Fund

27 "Europe investing again: Taking stock of the Investment Plan for Europe and next steps", COM (2016) 359 final

28 Renewables 2016 - Global Status Report, REN21, 2016.

29 Communication on Regulatory Fitness and Performance (REFIT): Results and Next Steps, COM (2013) 685

30 Roadmap for the Renewable Energy Package is available here: http://ec.europa.eu/smart-regulation/roadmaps/docs/2016_ener_025_cwp_renewable _energy_package_en.pdf

energy legislation, including those set out in the RES Directive (Articles 22 and 23)[31]. Those are therefore fully assessed in the referred parallel evaluation exercise[32].

The RES REFIT evaluation covers 28 Member States and the period from 2010 (i.e. the legal implementation date of the Directive) to 2015 (i.e. date of latest statistical and other data evidence available), except where specified otherwise.

2. BACKGROUND TO THE INITIATIVE

2.1. Description of the initiative and its intervention logic

The RES Directive forms part of the EU Energy and Climate policy package mandated by the European Council in 2006 and 2007[33] and was adopted in 2009[34,35].

The RES Directive lays down the principles according to which Member States need to ensure that the share of renewable energy in the EU final energy consumption reaches at least 20% by 2020. It establishes non-uniform national mandatory targets for the share of renewables in final energy consumption for each Member State (as opposed to pure indicative national targets of the previous legislation). The RES Directive also includes biennial indicative target trajectories[36].

The effort sharing amongst Member States for achieving the overall EU level 20% target was based on a flat-rate increase in each Member State weighted by gross domestic product (GDP) and modulated to take account of earlier development of renewable energy resources in that Member State. Three sectors were covered, electricity, heating and cooling and transport, but the split of the share between the sectors was left to the discretion of the Member States. However, a separate mandatory 10% target for the 2020 share of renewable energy in transport was provided.

The following list summarises key EU and national measures, resulting from the 2009 RES Directive:

- In view of reducing the overall cost of renewable energy target achievement, the RES Directive created the legal framework for Member States' cooperation in the form of **statistical transfers, agreements on joint support schemes and joint projects**, with other Member States, or third countries (Art. 6-11);

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31 Roadmap to the Fitness check of Reporting, Planning and Monitoring Obligations is available here: http://ec.europa.eu/smart-regulation/roadmaps/docs/2016_ener_024_cwp_refit_reporting_planning_obligations_en.pdf

32 Preparatory study for the Fitness Check Evaluation of Planning and Reporting Obligations in the EU Energy *Acquis*, Intermediate report, (Trinomics, April, 2016)

33 European Council Conclusions (23-24 March 2006), 7775/1/06 and European Council Conclusions (8-9 March 2007), 7224/1/07

34 Renewable Energy Directive (Directive 2009/28/EC), OJ L 140/16, 5.6.2009

35 Before then, two separate directives promoting renewable energy use in the electricity (Directive 2001/77/EC) and renewable energy use in transport (Directive 2003/33/EC) were in place. Among other, these two directives contained 2010 indicative targets for Member States for renewable electricity and share of renewable energy in transport. The Directive 2009/28/EC established an EU level framework based on binding targets to be achieved by 2020: an overall EU target of a 20% share of renewable energy sources in energy consumption, diferentiated national binding targets in line with this overall EU 20% target, and a universal 10% target for renewables consumption in transport..

36 Directive 2009/28/EC, Annex I Part B, OJ L 140/46, 5.6.2009

- Given the binding nature of the target, Member States were left with more flexibility as regards the measures needed to reach the targets. Accordingly, the Directive does not prescribe, but only suggests Member States to use, inter alia, **support schemes and cooperation measures** (Art. 3 a) and b));

- The Directive also required, for the first time, all Member States to prepare **National Renewable Energy Action Plans** (Art. 4) based on a binding template[37] and included provisions on national **authorisation, certification and licensing procedures**, and permit granting for RES projects (Art. 13(1));

- Provisions requiring Member State action to increase the use of **RES in buildings and district heating and cooling** were laid down in Art. 13 (3-6), Art. 16(9) and Art. 16(11);

- In order to guarantee their sustainable production and use, the Directive also required that **biofuels and bioliquids** counting towards the RES targets, or receiving public support, reach at least a minimum level of greenhouse gas (GHG) emission savings and do not lead to unintended biodiversity impacts (Art. 17-19); solid and gaseous biomass sustainability issues were left to Member States' discretion in line with national competence over forestry management.

The RES Directive was amended in 2015by the ILUC Directive[38], which introduced a cap for food based biofuels and further incentives for advanced renewable fuels with a view to reduce the risk of indirect land use change (ILUC) and to prepare the transition towards the deployment of advanced renewable fuels.

The **general objectives** of the RES Directive as stipulated in the 2006 and 2008 Impact Assessments[39] are to:

- Reduce CO_2 from energy use,

- Limit the global average temperature increase to not more than 2 degrees Celsius above the pre-industrial level;

- Make the EU economy more energy secure;

- Make the EU the most competitive economy in the world, in particular with respect to new energy technologies such as low carbon energy production technologies.

The **specific objective** of the RES Directive is to achieve a 20% share of renewable energy in EU final energy consumption and a 10% share of energy from renewable sources in the transport sector by 2020.

The **intervention logic**, setting out the rationale and approach for the Renewable Energy Directive is given in Figure 1.

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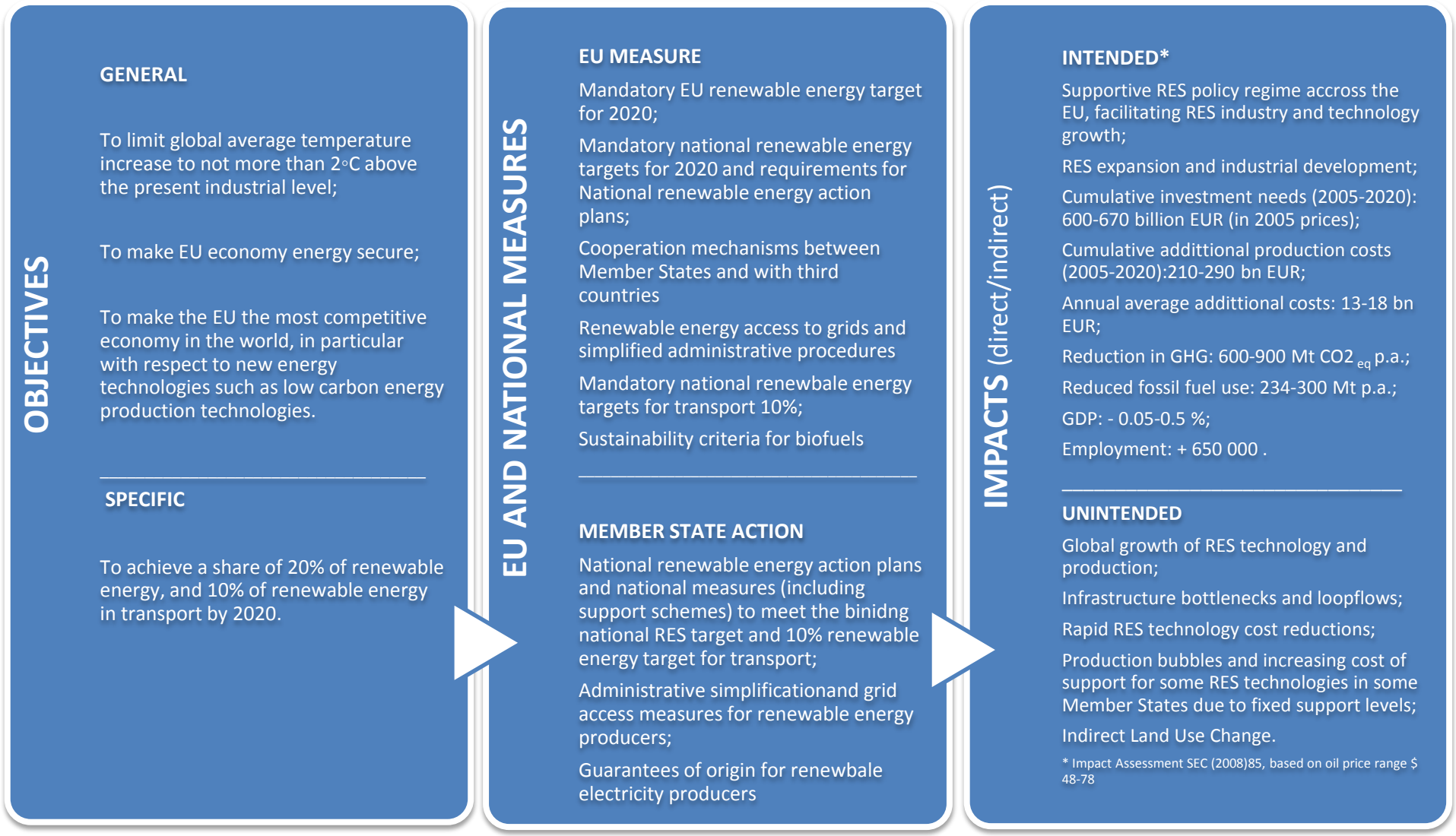
37 Commission Decision of 30 June 2009 establishing a template for National Renewable Energy Action Plans, ,C(2009) 5174

38 Directive (EU) 2015/1513 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, OJ L 239, 15.9.2015

39 SEC (2006) 1719/3 and SEC (2008) 85 Vol. II

Figure 1: Renewable Energy Directive (Directive 2009/28/EC): intervention logic and impact



Intended main quantitative impacts

The 2006 Impact Assessment for the Renewable Energy Road Map[40] summed up the estimated 2020 impacts of reaching a 20% renewable energy target, as follows:

- The additional renewable energy deployment needed to achieve the 20% target by 2020 will lead to an annual **GHG saving** in the range of 600-900 Mt CO_2 in 2020[41];

- **Replacing fossil fuels** with renewable energy sources will contribute to a reduction of polluting emissions, especially from the electricity sector;

- **Avoided EU fossil fuel consumption** was estimated in the range of 234-300 Mtoe/year from 2020 onwards, including 200 Mtoe per year of imported fuels[42]; in monetary terms, increased capacity for RES production in the period 2005-2020 was expected to account for around 50-57 bn EUR/year[43];

- Cumulative **investment needs** for renewable energy in the period 2005-2020 were estimated in the range of EUR 600-670 billion (in 2005 prices);

- Cumulative additional **production costs** in the period 2005-2020 were estimated in the range of EUR 210-290 billion (with 48$/bbl oil price); the average yearly additional **production costs** were projected to be in the range of 13-18 billion EUR/year in the period 2005-2020[44];

- As regards **GDP growth and employment**, it was expected that by 2020 the EU GDP would be 0.5% higher than under a business as usual scenario, and employment would grow by around 0.3%, resulting in about 650 000 additional jobs by 2020.

- The **biodiversity impact** was expected to be overall positive, even if some negative effects could emerge in the case of wind parks, if these were located in areas of high biodiversity value, or biofuel production, if this would occur on land with high biodiversity value.

- The 2006 Impact Assessment calculated the total estimated average cost on the basis of dynamic and varied values of **technology costs**, assuming an average wind energy production cost of 65 EUR/MWh, 650 EUR/MWh for photovoltaic electricity and a range between 20 EUR/MWh and 180 EUR/MWh for biomass.

- In terms of **administrative costs** linked to reporting and planning, the 2008 Impact Assessment[45] estimated additional cost to national authorities of ca. EUR 19 500 per Member State, and for the EU as a whole, of ca. EUR 0.5 million every two years.

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40 SEC (2006) 1719

41 Range based on Green-X and PRIMES, 2006 Impact Assessment, p.20

42 Range based on Green-X and PRIMES, 2006 Impact Assessment, p.20

43 Based on Green-X model calculations, 2006 Impact Assessment p.21

44 The annual additional cost of increasing the contribution of renewables to the proposed share by 2020 was defined as the total costs of generation of renewables minus the reference cost of conventional energy production. A balanced mix of renewable technologies, combined with low international oil prices ($48) were expected to result in additional average annual cost of achieving the proposed 20% RES share of approximately EUR 18 billion (in 2005 prices). Strong research and development efforts were expected to lower the costs of RES policies and therefore the overall cost of this policy. The exact choice of technologies could reduce this average cost by approximately 2 billion EUR per year.

The **intended and unintended direct impacts of the RES Directive and other external factors**, such as those related to technology developments, unanticipated indirect land use change risk and impacts of 2007-2010 economic crisis, are reviewed and assessed against these anticipated quantitative impacts in Section 6.

2.2. Baseline

For the purpose of the present evaluation, the 2006 Impact Assessment for the Renewable Energy Road Map and the 2008 Impact Assessments for the 2020 Energy and Climate Package are used to establish the baseline for describing the situation prior to the adoption of Renewable Energy Directive in December 2008. The overall 2020 target framework and its main anticipated quantitative impacts were assessed in the 2006 Impact Assessment, while the 2008 Impact Assessment assessed the effort sharing among Member States in view of 20% RES target achievement and other crucial provisions of the Directive such as those on Guarantees of Origin, administrative and grid barriers, national plans or biofuel sustainability criteria. No new additional modelling approaches were developed for the purposes of this evaluation. It must be noted, however, that the 2006 and 2008 Impact Assessments used 2005 and 2007 as baseline year respectively, whereas the RES Directive entered into force in 2010. The effects of this Directive will be analysed from 2010 onwards.

Differences in the (modelling) methodology used in the 2006 and 2008 Impacts Assessments make the comparison of some key impacts challenging. Furthermore, in the 2008 Impact Assessment supporting the 2020 Climate and Energy Package, some renewable energy policy aspects were analysed together with expected impacts from GHG emission reduction measures. This approach makes the distinction and comparison of certain impacts even more difficult. Nevertheless, a fair degree of comparison has been possible, by drawing on a limited number of baseline indicators included in the 2006 and 2008 Impact Assessments, such as GHG saving, fossil fuel displacement, employment and technology cost reduction impacts. For other indicators, the quantification of results of the mid-term evaluation of the Renewable Energy Directive should be read with due caution.

The 2008 Impact Assessment noted that the majority of Member States were promoting the increase in renewable energy production either by green certificate regimes (4 Member States), or by feed-in-tariff system (17 Member States). The 2008 Impact Assessment also assumed that an open market for Guarantees of Origin, combined with a continuation of national support schemes, would make the 2020 renewable energy target achievement cheaper. However, the option of Guarantees of origin being used as a form of cooperation mechanism for cost-effective target achievement was finally not retained in the adopted 2009 RES Directive.

It has to be noted that the Directive provides quantified and measurable overall and national renewable energy targets that make it relatively easy to measure progress, but does not contain any other measurable objectives. The effectiveness of the other provisions in the Directive needs to be assessed against qualitative improvements.

[45] Impact Assessment for the 2020 Energy and Climate Package SEC (2008) 85

3. EVALUATION LOGIC AND QUESTIONS

3.1. Effectiveness

- Has the RES Directive been effective in achieving the binding EU renewable energy target of 20% by 2020, and the Member State national binding renewable energy targets for 2020? Do implementation and enforcement challenges and failures exist? If yes, where and why?

- Has the RES Directive effectively led to better planning and streamlining of the approval and licensing procedures for RES producers at national and local level?

- Has the RES Directive been effective in achieving the binding 10% renewable energy target in transport by 2020?

- Has the RES Directive triggered sufficient progress in RES deployment in the heating and cooling sector, which was previously not covered by renewable energy targets?

- What effects (impacts) has the implementation of the RES Directive had at EU and individual Member State's level?

- Which factors have hindered the achievement of objectives of the RES Directive?

3.2. Efficiency

- To what extent has the RES Directive, and the binding targets included therein, been efficient means of developing the European renewable energy sector? Could the use of other policy instruments, or mechanisms, have provided better efficiency?

- Have the RES Directive and its national implementation measures, including support schemes, been cost-efficient means of achieving the RES targets at the EU and national level? Have the expected results been obtained at a reasonable cost? Are results proportionate to the administrative cost and burden on Member State administrations and businesses? Could the same results have been achieved with less funding/lower cost?

- Has the Directive effectively improved grid access conditions for renewable electricity producers? Has it done so in a cost-efficient manner?

- Has the RES Directive added administrative burden to Member States' public authorities and economic operators? Or, on the contrary, has such burden been reduced [e.g. compared to previous EU legislation in the area of renewable energy Directive 2001/77/EC and Directive 2003/30/EC]? Have Member States reporting obligation requirements become more efficient, or, on the contrary, has the reporting burden increased?

- Has the establishment of the sustainability scheme for biofuels and bioliquids led to the creation of a cost-efficient framework? Has it achieved its aim in a cost-efficient manner? What impact has such sustainability system had on the Member States administrations and the private sector?

3.3. Relevance

- To what extent were the objectives of the RES Directive relevant to the needs of the EU Energy and Climate Change policy? To what extent does the RES Directive remain relevant for the Energy Union priorities, the 2030 Energy and Climate Framework and the COP 21 Global Climate commitments?

- To what extent is the RES Directive complementary to other EU initiatives in the field and has synergies with them?

3.4. Coherence

- Is the RES Directive coherent with other EU policies in the area of energy and climate change?

3.5. Added value

- What is the EU added value of the RES Directive (can the objectives be better achieved by action at the EU level)?

- Why could the Renewable Energy Directive objectives be better achieved through EU action?

- Would it be possible to achieve the same results in the absence of the RES Directive?

4. METHODOLOGY / PROCESS FOLLOWED

A supporting mid-term REFIT evaluation study of the RES Directive was launched in May 2014 and conducted until April 2015[46]. The study was carried out by a consortium of experts led by CE Delft and Ecologic Institute, Ricardo-AEA and REKK, drawing on available literature, data and stakeholder interviews with national authorities, renewable energy industry associations, non-renewable energy industry associations, consumers' associations, NGOs, etc.[47]. Six case studies for countries representing various degrees of progress, potential and deployment (Bulgaria, Estonia, Germany, Poland, Spain and Sweden) were part of the supporting study. Furthermore, the 12 week **public online consultation** (18th November 2015 – 10th February 2016) that took place in the context of the present evaluation and Impact Assessment for the revised Directive, included the following questions relevant for this evaluation[48]:

- *To what extent has the RES Directive been successful in helping to achieve the EU energy and climate change objectives?*

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46 "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", CE Delft,2015

47 For full account of stakeholders interviewed, see "Mid-term Evaluation of the Renewable Energy Directive" study.

48 "Public consultation on the Renewable Energy Directive for the period after 2020: Analysis of stakeholder views", European Commission, 2016, available at: https://ec.europa.eu/energy/en/consultations/preparation-new-renewable-energy-directive-period-after-2020

- *To what extent has the RES Directive been successful in addressing the following EU transport policy objectives?*

- *Please name the most important barriers hampering the development of sustainable renewable fuels and renewable electricity use in transport?*

- *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?*

- *To what extent has the current GO system been successful in providing consumers with information on the sources of electricity that they consume?*

- *Please identify precise challenges with regard to grid regulation and infrastructure barriers in EU Member States that you are aware of.*

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

- *Please rate the importance of the following barriers in hampering the deployment of renewable heating and cooling in the EU.*

- *Has the RES Directive been effective and efficient in helping exploiting the renewable energy potential at local level?*

- *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)?*

- *How would you rate the administrative burden and cost of compliance with the RES Directive RED for national, regional and local authorities?*

- *Please identify precise challenges with regard to grid regulation and infrastructure barriers in EU Member States that you are aware of.*

In addition to several dedicated meetings, a Stakeholder Conference was held on 5th February 2016 to gather opinions on the current EU renewable energy policy framework and the post-2020 perspective, and to complement the public consultation with focus on three themes: renewable energy target achievement, role of consumers and communities, and renewable energy financing. A complete description of the stakeholder consultation outcome, including this and other relevant meetings in the context of the present REFIT evaluation, is provided in Annex I.

Limitations-robustness of the findings

The REFIT evaluation of the Renewable Energy Directive occurs 5 years ahead of the target year (2020), while the heating and cooling and building provisions (Art. 13 (4-6)) have only been applicable since 2015. In addition so far, only very limited experience with flexibility and cooperation mechanisms (Art. 6-11) has been gained.

Differences in the modelling methodology used in the 2006 and 2008 Impact Assessments preceding the adoption of the RES Directive, as well as differences in the studies and modelling tools used to

assess the mid-term evaluation and impacts of the 2009 RES Directive, turn the comparison of some key impacts into a challenging task. Furthermore, in the 2008 Impact Assessment, supporting the 2020 Climate and Energy Package, some renewable energy policy aspects were analysed together with expected impacts from GHG emission reduction measures. This makes the distinction and comparison of certain impacts also more demanding.

Nevertheless, a fair degree of comparison has been possible, by drawing on a limited number of baseline indicators included in the 2006 and 2008 Impact Assessments. For other indicators and quantification of results, additional research was undertaken, relying on independent studies, own research, work carried out for the European Commission and data from relevant international bodies (e.g. IEA/OECD, IRENA etc.).

5. IMPLEMENTATION, STATE OF PLAY AND RESULTS

From a legal perspective, the RES Directive appears to have raised some difficulty for Member States' transposition and application process, as 47 infringement cases were opened and 4 Member States were referred to the Court. Presently, 44 cases are closed and 3 cases are still pending. Most of the infringement cases that reached the most advanced stage were related to the biofuels and bioliquids sustainability criteria, as these provisions were a novelty for most Member States and required more complex measures of implementation.

So far, only one EU pilot case has been opened against a Member State that did not meet is 2013/2014 interim target, triggering the obligation to resubmit an amended National Renewable Energy Action Plan.

A significant number of complaints, petitions and parliamentary questions were addressed to the Commission in relation to retrospective and other changes in national support schemes occurring in various Member States, and/or discriminatory measures against renewable energy operators, claiming alleged violations of the RES Directive (due to insufficient action by Member States to achieve their national binding targets) and of general principles of EU law. In most cases there was no sufficient grounds to initiate legal action against Member States based on these allegations, as the Directive does not prescribe the use of support schemes to achieve the national renewable energy targets, nor does it give details on the design and management of such schemes.

The following section summarises the current situation in implementing the RES Directive in relation to the specific objectives set out in the intervention logic (see Figure 1). It also summarises the current status of progress towards the binding 2020 EU and national renewable energy targets based on the latest available data[49].

5.1. Progress towards 20% renewable energy EU target and national targets

With a 17%[50] estimated share in 2015 in the gross final energy consumption[51], the EU and all but one Member State are currently advancing well towards 2020 renewable energy targets.

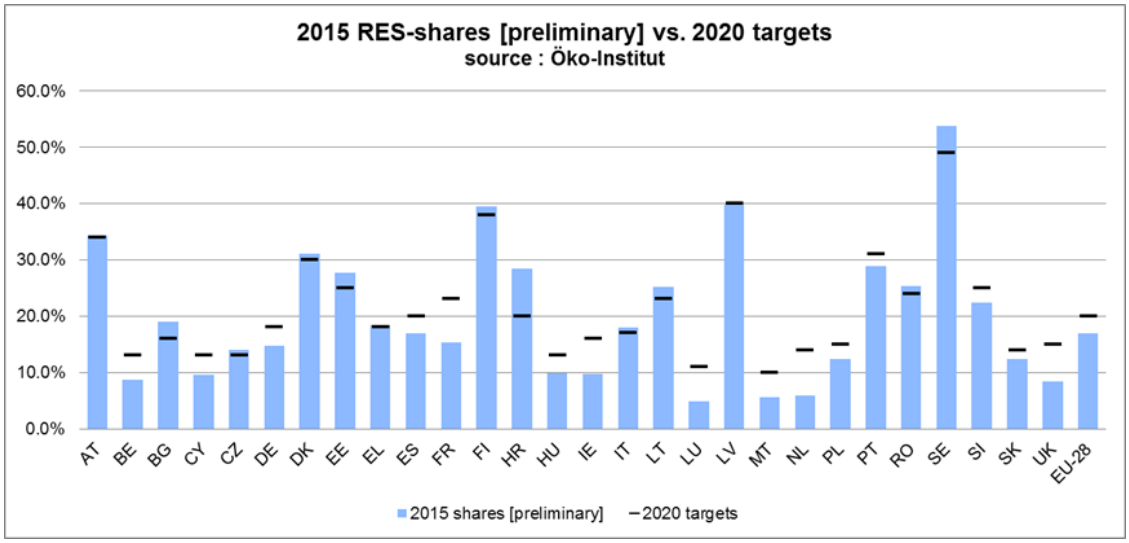
[49] Based on most recent EUROSTAT statistics for RES shares for 2014, and 2015 estimates for the forthcoming 2016 Renewable Energy progress report

[50] "Draft Renewable Energy Progress Report", Öko Institute [to be published]. draft preliminary figure

[51] EUROSTAT data

The sectorial shares of renewable energy, although not legally stipulated in the Directive, but forming part of National Renewable Energy Action plans, also offer a positive picture on renewables' deployment in the EU: the share in the heating and cooling sector was 17.7% in 2014[52] and was estimated to reach 18.5%[53] in 2015, while 27.5% and 30% of the EU's electricity was generated from renewables in 2014 and 2015 respectively and the share on renewable energy in the transport sector was 5.9% in 2014 and an estimated 6.2% in 2015[54]. About 11% of the total EU *electricity* is sourced from variable renewable electricity (such as wind and solar)[55].

Figure 2: EU and Member State progress towards 2020 renewable energy targets (2015)



Source: "Renewable Energy Progress Report", Öko Institute [to be published]

In 2015, twelve Member States had already achieved their 2020 targets (Austria, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, Greece, Italy, Lithuania, Romania and Sweden). All Member States were above their indicative trajectory in 2013/2014[56] except for the Netherlands, and majority of the Member States, as well as the EU, is well on track to 2015/2016 interim targets.

5.2. Progress towards 10% target for the 2020 share of renewable energy in the transport

With a share of 5.9% renewable energy in transport in 2014 and 6.2% estimated share in 2015, the EU is moving towards 10% RES share in transport by 2020, although at a slower rate (in percentage points) than towards the overall RES target. This rate needs to be increased if the EU is to meet its 10% renewable target in transport in 2020[57].

52 EUROSTAT data

53 "Draft Renewable Energy Progress Report", Öko Institute [to be published]. draft preliminary figure

54 "Draft Renewable Energy Progress Report", Öko Institute [to be published]. draft preliminary figure

55 Wind, PV, CSP without storage and tidal, wave, ocean as % of total final electricity demand. Data based on JRC (forthcoming) analysis of 2015 Member State renewable energy progress report.

56 Member States' compliance with their indicative trajectory is verified using Eurostat data on their renewable energy shares. This data is updated at the beginning of every year.

57 From 2010 to 2014, the EU has increased its renewable energy share in transport by 1.2 percentage points. If this rate is maintained, the EU renewable energy share in transport would only be 7, 1% in 2020.

In addition, the EU as a whole was 0.8 percentage points below its NREAP trajectory[58] for transport in 2014[59]. However, it must be taken into account that this trajectory, if met, would lead to a 11.2% renewable energy share in transport in 2020, higher thus than the 10% target.

Regarding Member States' individual progress, Sweden and Finland, with 19% and 22% RES share in transport in 2014 respectively, were the only Member States that have already achieved the 10% RES transport target, whereas a large majority of other Member States (Austria, Bulgaria, the Czech Republic, Denmark, Germany, Ireland, Finland, France, Hungary, Luxembourg, The Netherlands, Poland, Slovakia, Sweden) have achieved at least 5% or a higher share of renewable energy in transport[60].

When comparing Member States' performance against their indicative trajectory, as set out in their national renewable energy action plans (NREAP), only eight Member States[61] are estimated to have met or exceeded their trajectory in 2015 (compared to six Member States in 2014).

5.3. Main quantitative impacts associated with the Renewable Energy Directive

- **GHG:** the European Environment Agency (EEA) estimates that the large deployment of renewable energy sources resulted in approx. 380 Mt of gross avoided CO_2 emissions at EU level in 2014[62,63]. Commission's Joint Research Centre, based on a different methodology, has evaluated substantially higher CO_2 emission reductions: 767 Mt of gross avoided CO_2 emissions at EU level in 2014. More than 65% (512.5 Mt CO_2 eq) of net GHG emission savings were attributed to renewable electricity and the rest was coming from renewable heat/cold (29%) and transport (4%)[64]. The use of renewable energy in transport resulted in 137 Mt of gross avoided CO_2 emissions at EU level from 2011 to 2014[65]. Most of these savings result from the use of biofuels, while only a small fraction stemmed from the use of renewable electricity in transport, especially in the rail sector[66,67].

- **Fossil fuel displacement**: renewables' production allowed the EU to cut its demand for fossil fuels by 114 Mtoe in 2014[68] (approximately 10 % of total fossil fuel consumption)[69], thus bringing a solid contribution to the security of energy supply.

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58 Trajectory calculated as the average of the national trajectories set out by Member States in their national renewable energy action plans (NREAP).

59 The current 2014 share of renewable energy sources in transport on EU-28 level is 5.9 % of gross final energy consumption, while the aggregated EU-28 NREAP trajectory, including electricity, would indicate a target of around 6.7 %.

60 EUROSTAT data, 2014

61 Austria, Finland, France, Hungary, Luxembourg, Malta, Slovakia and Sweden

62 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016

63 This figure represents the total contribution of renewables to GHG reduction in a given year compared with the situation in 2005. This should not be compared with the 600-900 Mt CO_2 figure in 2020 from the 2006 impact assessment, which has been calculated for the whole energy system.

64 JRC, 2016 available at: http://iet.jrc.ec.europa.eu/remea/news/third-progress-reports-renewable-energy-development- eu2013-2014

65 EEA, 2016. Direct emission savings, therefore not including emissions from indirect land use change.

66 EEA, 2016

67 "Renewable energy progress and biofuels sustainability", Ecofys, 2014

68 This figure represents the total contribution of renewables to fossil fuel savings in a given year compared with the situation in 2005. This should not be compared with 234-300 Mtoe/year figure in 2020 from the 2006 impact assessment, which has been calculated for the whole energy system.

69 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016

- **Avoided imported fuel costs**: they amounted to around €20bn in 2014[70,71] due to increasing use of renewable energy.

- **GDP growth and employment**: the influence of RES-policies on GDP growth is difficult to isolate and to compare with the results of the expected impacts in the 2008 Impact Assessment, especially due to the fact that the effects of the 2007-2010 economic crisis have not been initially factored in. A first rough approximation, based on the volume of investments and the avoided imports[72], confirms that the direct influence of RES policies on GDP remains below 0.5% in 2014[73]. Employment in the RES sector has grown in the EU despite the economic crisis. The EU renewable energy industry currently employs 1.11 million workers[74], clearly surpassing the original anticipated estimates. The EU is one of the key global players with regard to net employment creation in the renewable energy sector. In 2014, it had the second highest per-capita employment in the area of renewable energy sector, behind Brazil. In the same year, the RES industry had a combined turnover of 144 billion EUR.

- **Innovation and global technology leadership:** in the 2010-2015 period, renewable energy investment[75] in Europe amounted to USD 486.1 billion (compared to USD 404.4 billion in China and USD 240 billion in the United States)[76]. However, it must be noted that investments have been decreasing in Europe since 2011, whereas they are continuously increasing in China. In 2013[77], European companies held 30% of all patents for renewable technologies[78].

- **Level of RES subsidies versus fossil fuel subsidies:** independent analysis carried out in 2014 [79] estimated that total public support to coal and natural gas amounted to EUR 16 billion in 2012 in the EU, against EUR 11 billion for solar and wind energies combined. The public support to renewable energy has been increasingly integrated in the market, especially in the light of the Commission's Guidance for the design of renewables support schemes[80], as well as the Guidelines on State Aid for Environmental Protection and Energy 2014-2020 (2014 EEAG)[81]. A recent EEA report[82] identified that, in the European Economic Area countries (28-EU Member States, 4 EFTA (European Free Trade Association) countries and Turkey), fossil fuels continue to receive 53.3% of public support, whereas renewable energy

70 "Draft Renewable Energy Progress Report", Öko Institute [to be published]

71 This figure represents the total contribution of renewables to fossil fuel import savings in a given year compared with the situation in 2005. This should not be compared with 50-57 billion EUR/annum from the 2007 impact assessment, which has been calculated for the whole energy system

72 Based on EEA, PRIMES and EUROSTAT

73 This figure has to be considered carefully and as gross effect, since it doesn't factor in the reduction of investment in conventional generation and other variables

74 EurObserv'ER, 15th Eurobserv'ER report, 2015. 2014 figure

75 Data include government and corporate R&D

76 "Renewables 2016 Global Status Report", REN21.2016

77 Latest data available

78 OECD Statistics database

79 "Subsidies and costs of EU energy", Ecofys, 2014

80 "Commission Staff Working Document - European Commission guidance for the design of renewables support schemes", SWD(2013) 439 final

81 "Guidelines on State aid for environmental protection and energy 2014-2020", OJ 2014/C 200/01

82 "Energy support measures and their impact on innovation in the renewable energy sector in Europe", EEA Technical report, No 21/2014

(including biofuels) obtains 40.5% of the public support[83]. Accordingly, the EEA report indicated that the support aimed at renewable energy did not alter the competitive position between renewables and fossil fuels.

6. ANSWERS TO EVALUATION QUESTIONS

This section summarises the main findings in relation to the analysis of each of the evaluation questions. Most questions are dealt with individually, although a few have been combined, where there are significant overlaps in the information and evidence provided.

6. 1. Effectiveness

With regard to effectiveness, there is a straightforward measurable indicator included in the 2009 RES Directive against which progress can be measured: the national binding targets. A maximum effort will be made to try to determine which elements of the Directive have probably made the largest contributions to this indicator. The Directive, however, does not include other measurable objectives with regard to more specific provisions in the Directive. Therefore, the success of other provisions such as infrastructure development (Art 16), Guarantees of Origin (Art. 15), cooperation mechanisms (Art. 6-11) is evaluated more qualitatively, drawing on studies and complemented by stakeholder feedback.

6.1.1. Has the RES Directive been effective in achieving the binding EU renewable energy target of 20% by 2020, and the Member State national binding renewable energy targets for 2020? Do implementation and enforcement challenges and failures exist? If yes, where and why?

As a key pillar of European decarbonisation policies[84], the RES Directive as a whole has been effective in ensuring that the EU and its Member States are on track towards their 2020 binding renewable energy targets. With a 17% estimated RES share in 2015, the EU is expected to reach its 20% in 2020. Only one Member State failed against its 2013/2014 interim target. This is a considerable improvement when compared to the situation prior to the adoption of the 2009 RES Directive, when only two[85] Member States were in a position for reaching both their indicative RES targets for electricity and for transport[86].

The renewable energy deployment in the EU and in the individual Member States has been considerable: the cumulative growth in the EU RES share between 2010 (when the Directive came into force) and 2015 has been almost 7%[87]. Effectiveness has been relatively higher in Member States with historically low starting points and low initial ambition levels (one could observe 50 % increases e.g. in Belgium, Luxembourg and The Netherlands, and more than doubling in the United

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83 The report indicates that the remaining 6% of public support targets electricity and/or heat production and consumption, without specifying which energy source

84 See on the complementary fucntions of the European Emissions Trading Scheme (ETS) and the RES Directive below, Section 6.4

85 Only 7 Member States were expected to achieve their 2010 targets for renewable energy in electricity generation; likewise, only 9 were expected to achieve their targets for renewable energy in transport. Only two Member States were in these two categories, "Renewable Energy: Progressing towards the 2020 target", COM/2011/31 final

86 "Renewable Energy: Progressing towards the 2020 target", COM/2011/31 final

87 From 12.8% in 2010 to 17.0% in 2015, ESTAT and “Draft Renewable Energy Progress Report”, Öko Institute [to be published], draft preliminary figure

Kingdom). On the other hand, in countries like Austria, Denmark, Finland and Sweden, where RES historically had already played an important role in the energy mix, their absolute growth[88] was more pronounced.

The fact that, so far, an overwhelming majority of Member States is on the right trajectory does not mean that target achievement by 2020 is certain and secure as e.g. the trajectories become steeper after 2015 and RES investments in the EU have slowed recently. It is important to note as well that Eurostat official data is published with a two-year delay[89]. As Member State progress assessment is based on Eurostat data, anticipating judgments based on data projections should be done with due caution.

The above trend clearly shows that the 2009 RES Directive has strengthened national action and efforts in renewable energy promotion across all Member States, in contrast to the previous EU legal framework (Directive 2001/77/EC and Directive 2003/30/EC), that was relying on indicative targets which triggered development of renewables in some Member States, whilst not preventing Member States with lower ambition to lag behind, thus also hindering target achievement at EU level.

National Renewable Energy Action Plans and progress reports

The National Renewable Energy Action Plans and the biennial monitoring exercise[90] were considered effective in increasing transparency and clarity, and allowed effective monitoring of progress towards the 2020 targets set in the RES Directive by the Commission. As of today, all Member States have national renewable energy planning policies in place, as opposed to the limited number of dedicated national level RES strategies in Member States back in 2007, when the outline for the new legally binding EU renewable energy framework was laid out in the Renewable Energy Roadmap. The standard templates for planning and reporting minimised administrative burden for national reporting authorities, ensured maximum comparability and were considered best practice by half of the NGOs and almost a third of cooperatives participating in the public consultation on the revision of the RES Directive, in addition to the vast majority of stakeholders taking part in the public consultation on streamlining of planning, reporting and monitoring obligations as part of the Energy Union Governance initiative (for more details see REFIT on energy reporting[91]). However, some NGOs pointed out that national plans would have been more effective if they had taken environmental sustainability and impacts into consideration, have had a spatial dimension and have had to be periodically updated[92]. Indeed, by 2015, the National Renewable Energy Action Plans became outdated as policies, market circumstances and other variables had changed over time. However, this limitation has been largely mitigated by the biennial Member State renewable energy progress reports that provided regular updates on Member State regulatory and support policies in the field of renewable energy and which are essentially based on the same template as the National Renewable Energy Action Plans.

Use of cooperation mechanisms

88 In Mtoe or pp

89 "Renewable energy progress report", 2015, COM(2015) 293 final and "State of the Energy Union Report", 2015

90 National Renewable Energy Action plans and biennial national renewable energy progress reports are legal requirements set out in Art. 4 and Art.22 of the Renewable Energy Directive

91 Fitness check of the Reporting, Planning and Monitoring Obligations in the EU energy acquis. Reference number to be added when this REFIT is adopted

92 "Public consultation on the Renewable Energy Directive for the period after 2020: Analysis of stakeholder views", 2016

Flexibility and cooperation mechanisms (Art. 6-11) as means to facilitate cost effective RES target achievement have so far only partially been used. An early attempt by the UK and Ireland to conclude an agreement on an ambitious wind energy joint project was shelved in 2013 amid uncertainty on its financial support[93]. The Swedish and Norwegian joint green certificate scheme (not based on Guarantees of Origin), in place since 2012, has constituted the only renewable energy cooperation mechanism (as set out in the RES Directive) in use so far.

In July 2016, Denmark and Germany signed an agreement on the mutual opening of auctions for PV installations [94]. In addition, at least two other Member States are considering partial opening of their support schemes, and at least four Member States are currently in cooperation agreement negotiations for statistical transfers, with a view of concluding such agreements in 2016 and 2017.

Such delay in the use of cooperation mechanisms is partly due to the fact that 2011/2012, 2012/2013 and 2015/2016 interim targets were set at relatively low levels and, for that reason, there was no need for Member States to make use of those tools yet. However, as the trajectory grows steeper after 2015, this is very likely to change shortly. Many of the Member States interviewed for a study on cooperation mechanisms[95] in 2013 indicated that they might consider applying cooperation mechanisms in the future.

Public consultation results reveal reluctance to see taxpayers or consumers' money used for investments abroad[96] and/or uncertain benefits for individual Member States[97] as main reasons for the limited use of cooperation mechanisms. Indeed, the majority of respondents within two thirds of the stakeholder groups, including RES industry, support such view, arguing that benefits in the form of employment, economic and industry growth, tax income and security of supply are thus not created within own country. Finally, amongst the factors that hindered their uptake, stakeholders cited the fact that RES cooperation mechanisms were government, not market driven process.[98]

Current barriers may be overcome by providing Member States with further information on long-term cost-efficiency benefits of cooperation and better guidance on design options and cost-benefits measurements methods. Stronger incentives for regional cooperation, such as financial ones, or the establishment of an obligation to partially use these mechanisms would likely be more effective.

The role of the Guarantees of Origin (GOs)

The system of **Guarantees of Origin** provides a means of guaranteeing the origin of electricity produced from renewable sources, as a means of proving to final consumers the share of renewable energy in a suppliers mix. The system as adopted in the 2009 Directive was not intended as a support scheme to promote the uptake of renewable electricity[99], nor to serve as an optional tool for Member States to enable renewable electricity capacity in another Member State to be counted for

93 The two countries signed a memorandum of understanding in January 2013. The aim was to establish an intergovernmental agreement on energy trading, to be signed in 2014

94 See: http://www.bmwi.de/DE/Themen/Energie/Erneuerbare-Energien/pilot-oeffnung-fuer-eu-staaten.html.

95 "Cooperation between EU Member States under the RES Directive", Ecofys, 2013

96 94% of public consultation respondents cite this factor as important or very important

97 90% of public consultation respondents cite this factor as important or very important

98 77% of public consultation respondents cite this factor as important or very important

99 There are no published indices of GOs prices but GOs have a relatively low value, generally trading for under a Euro for each MWh of electricity. One publically available source is the results of the auctions made by GME which sells GOs on behalf of the Italian Government. Prices achieved in the three 2016 auctions averaged between 15-29 cents per MW/h.

target compliance, both of which were the original intention set out in the Commission's proposal. Guarantees of Origin are used in some Member States as a transferable scheme to meet the legal requirements of the Electricity Market Directive (Directive 2009/72/EC) for disclosure that require electricity suppliers to inform their customers about their energy mix[100]. However, there is no obligation for Member States to make use of GOs mandatory for disclosure purposes, effectively resulting in a non-harmonised situation in the EU.

GOs are traded separately from the physical flows of renewable energy. At the EU level, the GOs systems exist for electricity produced from renewable sources under the Renewable Energy Directive and from high efficiency combined heat and power (CHP)[101] under the Energy Efficiency Directive, but do not cover other energy sources. Some Member States, notably Austria and Sweden, have gone further than EU law to implement a GO system that covers all sources of electricity generation. It is important to note that not all renewable electricity (RES-E) production comes with GOs since guarantees of origin were not issued for electricity covered by support mechanisms in order to avoid double compensation. To address this, Italy has developed a system of auctioning the GOs associated with supported production. The EU GO system also applies to the EEA-EFTA countries.

GOs have helped to bring about limited product-based innovation in the EU power market. Today one can usually see two types of offers across the EU: conventional production contracts and the so called "green offers". The latter are normally backed up by suppliers purchasing GOs on top of the separate purchase of electricity (of any source). While the guarantee of origin market is still developing in countries such as Portugal and the United Kingdom, where it approximately represents only 0.5% of the retail market, in Belgium it already covers 13.36% of electricity contracts and in Austria and The Netherlands nearly all supply contracts to households are GO based[102].

The fact that GOs are disconnected from the physical flow of electricity allows suppliers to offer "green" contracts by purchasing guarantee of origin anywhere in the EU, even if the local electricity generation mix is not renewable. This could be perceived as creating a discrepancy between the product bought by the customer and the information provided on the production mix of the electricity supplier if they own and operate generation assets. Such perception is confirmed by stakeholders in the public consultation who highlighted low consumer awareness of the guarantee of origin system, pointing to the need for more transparency and accuracy (quoted in 36% of stakeholder replies). This can be regarded as an issue that the Renewable Energy Directive did not resolve. A full mandatory disclosure system coupled with a requirement for suppliers to purchase an equal amount of guarantees of origin to match their supplied electricity could help to reinforce the guarantee of origin system and the attributes given to the various energy sources, thereby making the system more meaningful. Whilst 40% of public consultation respondents supported the idea of issuing GOs to all *electricity* sources, including non-renewable sources, 42% of respondents – notably think tanks and

[100] The legal basis for the GO system is split across a number of pieces of legislation, where the RES Directive sets out a framework for GOs for renewable electricity for the purpose of disclosure and Directive 2012/27/EC on energy efficiency creates guarantees of origin for high efficiency co-generation but does not prescribe a use for them. Use of GOs is driven in part by energy disclosure requirements set out in Article 3(9)(a) of Directive 2009/72/EC on the internal market for electricity requiring a supplier to specify to final consumers the contribution of each energy source to the overall fuel mix of the supplier. This information must be reliable. It does not specifically mention that GOs are to be used to achieve this, so it gives flexibility for other methods to be used. In addition, the Unfair Commercial Practices Directive (2005/29/EC) provides protection to consumers and prohibits traders from creating a false impression of the nature of products. It also requires that information provided is specific, accurate and unambiguous

[101] For CHP only SE has a GO scheme in place

[102] CEER "Public Consultation Paper on Advice on green electricity", 2013

the RES industry – supported the idea of extending the GO system to other energy carriers such as green gas and green district heating. Around 24% of respondents were of the opinion that information on CO_2 emissions should be added in the GO system to create more awareness of the impacts of electricity consumption.

The 2009 RES Directive helped to standardise the GO systems for electricity throughout the EU and clarified their rules, reducing risk of fraud and inaccuracies. It is required that each and every Member State recognises Guarantees of Origin issued by another Member State. A common hub, the Association of Issuing Bodies, has been developed by Member States to enable such recognition and transfers. The role of the Association of Issuing Bodies (AIB) and the use of a system compliant with the European Energy Certificate System (EECS) are important in underpinning the integrity of GOs as internationally traded commodities. However, not all Member States are yet connected to the AIB hub or apply the EECS system.

Although significant progress has been made since 2009 RES Directive came into force, there are still varying levels of implementation across Member States in terms of system coverage, system features and the extent to which Guarantees of Origin are issued and traded. Prior to the 2009 Renewable Energy Directive, some Member States used GOs for disclosure purposes, while others simply recommended such practice, or still used them to qualify for support schemes. Despite the strengthened requirements in the RES Directive, large variations in the interface between the issuance of GOs and Member State national support schemes still remain across the EU.

Self-consumption

Policies in several Member States have provided incentives for energy consumers to generate their own electricity. Although no official statistics on self-consumption in the EU and Member States is currently available, it is estimated that photovoltaic systems installed in the residential sector represented about 18% of the total PV electricity production in 2014[103]. The lack of specific provisions on self-consumption in the RES Directive gave Member States wide discretion to deal with this emerging development. This resulted in a broad range of different policies across Member States and fragmentation of the market.

Respondents to the public consultation on the RES Directive considered that the most important barriers to self-consumption were the following: surplus electricity that is not self-consumed onsite is not valued fairly[104]; complex and/or lengthy administrative procedures, particularly penalising small self-consumption systems[105]; and the design of electricity tariffs[106]. National grid charges for self-consumption applied in Member States do not often find an appropriate balance between the costs for the use of the grid and the benefits of self-consumption.

The revised RES Directive will have to assess the need for framework principles on self-consumption at the EU level.

103 DG ECFIN, Draft "Report on investments in solar panels in the residential sector in EU Member States", to be published in Q4 2016.

104 79% respondents consider this barrier important or very important

105 79% respondents consider this barrier important or very important

106 78% respondents consider this barrier important or very important

6.1.2. Has the RES Directive effectively led to better planning and streamlining of the approval and licensing procedures for RES producers at national and local level?

Long waiting times ranging from a minimum of one to a maximum of twelve years for planning, licensing and permitting procedures, also in relation to grid connections, were already noted as a clear obstacle to renewable energy investments in the 2008 Impact Assessment. Therefore the 2009 RES Directive required, in its Art. 13(1), that regulatory procedures are *"proportionate and necessary"*, but without further detailing how to accomplish/assess conformity. Member States are also required to ensure that national and local authorities in charge of permit-granting coordinate their work and ensure timely and transparent treatment of permit requests. Simplified and less burdensome approaches are encouraged for smaller projects and decentralised RES devices (conditional to national regulations allowing such simplified procedures).

The REFIT evaluation study indicated that, despite the reinforcement of provisions related to administrative simplification, compared to those that were already in place as a result of the previous Renewable Electricity Directive (Directive 2001/77/EC), these provisions were only partially effective in reducing the length of authorisation procedures for RES projects, and an important number of administrative steps had been taken by promoters to have their projects approved.

Despite existing awareness of clear benefits stemming from a one-stop authorisation point at national level, the RES Directive did not include this measure as a mandatory requirement[107], leaving its establishment in the hands of Member States. The Directive (Art. 22) only required Member States to report in their first 2011 biennial renewable energy progress reports on their intentions to establish a *"one-stop authorisation agency"* for renewable energy project approvals. In 2013 and 2015 reporting cycles, the majority of Member States noted continuous improvements with respect to simplification of administrative procedures. However, and despite visible improvements, these measures are still perceived as inadequate to the majority of RES industry and project developers. Only ten Member States in 2014 had *"one-stop shop"* for RES projects approvals in place[108].

The REFIT evaluation study confirmed that despite continuous improvements in the majority of Member States[109], lengthy administrative procedures still act as barriers to investment. This is mainly occurring due to complex licensing procedures, unclear administrative responsibilities, multiple bodies involved, municipalities involved without clear rules set for their responsibilities at national level and lack of one-stop shops[110]. With rapidly decreasing technology costs, the costs stemming from administrative procedures are proportionally gaining weight and can, in some cases, represent up to 15% of the overall development costs of projects like the wind sector[111].

Administrative barriers can also create distortions in the allocation of investments within the EU, and therefore hamper the building up of a unified market for renewable energy and reaching cost-optimal RES deployment. Despite the existing best practice sharing among Member States in the Concerted Action for the RES Directive, only practices like online application and maximum time-limits (and,

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107 SEC (2008) 85 Vol. II

108 "Draft Renewable Energy Progress Report", Öko Institute [to be published]

109 See "Renewable energy progress report", 2015, COM(2015) 293 final, and CE Delft , "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", 2015, and Öko Institute, "Report on Renewable Energy" [to be published]

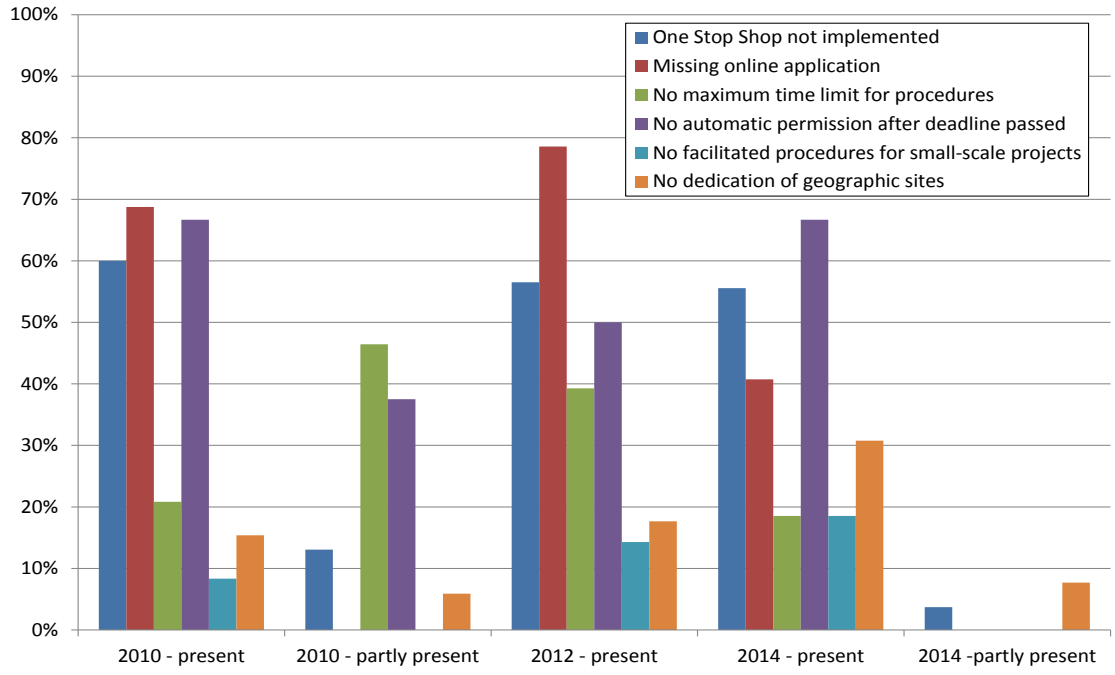
110 In some cases, administrative procedure can delay RES projects by many or even years (for example, in Italy, France and Cyprus large RES projects can take up to seven years to get permits). CE Delft , "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", 2015

111 "Draft Renewable Energy Progress Report", Öko Institute [to be published]

to a lesser extent, automatic permission after deadline passed) have seen substantial progress between 2010 and 2014. In the meantime, as shown in the graph below, other relevant barriers still remain. As a result, lead times for renewable energy project development differ significantly across Europe. For major technologies, like onshore wind, permitting processes can last from less than 5 weeks in Denmark, to 3-7 months in Germany and up to a maximum of 7 years in some southern European Member States. This creates significant barriers to internal market and investments.

The Commission has received a number of complaints on Art.13 (1), citing unclear allocation of competences between national and local levels and arbitrary permit granting practice in some Member States. However, due to the large discretion margin given in Art. 13 (1) and the lack of more detailed requirements, these cases have not resulted in legal action against any Member State.

Figure 3: Overview of administrative barriers in 2010 and 2014 (% of Member States)



Source: "Renewable Energy Progress Report", Öko Institute [to be published]

The *"one-stop-shop"* approach, including clear provisions on single administrative decision and clear rules on *"single entry point"*, is applied since 2013 to energy projects of common interest[112] and has been noted as best practice[113]. The Commission has committed to exploring the possibility of designing a single EU authorisation framework for large investment projects, while also clearly noting a need for further action to tackle investment bottlenecks, such as regulatory and administrative barriers and cumbersome and lengthy approval procedures, at national level.[114]

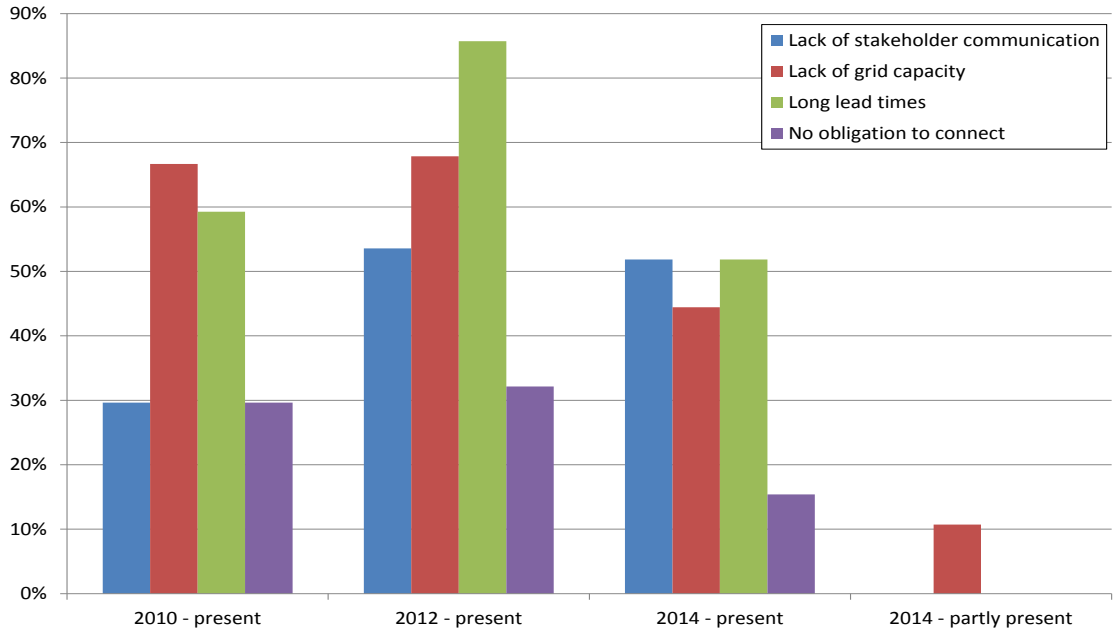
Similar to administrative barriers, concerns arise when it comes to grid access procedures for renewables (Art.16).

Figure 4: Overview of barriers for grid integration in 2010 and 2014 (% of Member States)

112 Regulation 347/2013 on guidelines for trans-European energy infrastructure

113 "Europe investing again: Taking stock of the Investment Plan for Europe and next steps", COM (2016) 359 final

114 "Europe investing again: Taking stock of the Investment Plan for Europe and next steps", COM (2016) 359 final



Source: "Renewable Energy Progress Report", Öko Institute [to be published]

It can be seen that the number of States with the barriers *"Lack of stakeholder communication"* and *"Long lead times"* increased between 2010 and 2012, while the other barriers remained on a similar level. However, in 2014, a smaller number of severe barriers can be observed. *"Long lead times"* and the *"Lack of grid capacity"* were present in a smaller number of States compared to previous years. Also, an obligation to connect was introduced in five Member States.

The REFIT evaluation study identified 'lengthy procedures or delays, lack of grid capacity, complex procedures and a weak legal position of plant operators' as the main barriers for RES integration in the electricity grids. Stakeholder interviews carried within this study equally noted concerns about the duration and complexity of the process and requirements from network operators for new RES producers and lack of grid capacity. Regarding grid access, it was indicated that there were *inter alia* no priority access, which leads to curtailment and even discrimination against RES. Most of the Member States identified a need for investment both in distribution and transmission grids.

6.1.3. Has the RES Directive been effective in achieving the binding 10% renewable energy target in transport by 2020?

The Directive established a separate RES target for transport at the same 10% level for all Member States, thus reflecting the shared need to reduce reliance on fossil fuels in the transport sector and presuming that, in the absence of a separate RES transport target, the market alone would fail to develop the sector. This required significant renewable energy deployment efforts in the transport sector in all the Member States. The Directive was successful in its encouragement of blending mandates in the vast majority of the Member States.

Nevertheless, it is too soon to assess if the RES Directive has been effective in achieving the uniform 10% renewable energy target in transport. This target must be met by 2020 and there is no binding trajectory against which Member States' current performance can be compared. Even if there are national indicative trajectories set out by Member States in their NREAPS, they cannot be used either to assess progress towards the 10% target since these trajectories, if respected, would lead to a higher share of renewable energy in transport.

As noted in Section 5, with a 6.2% estimated share of renewable energy in transport in 2015 (compared to 4.9% in 2010), it can be argued that the EU is moving towards the 10% target. However, this target will not be met unless the EU progress rate towards the 10% target is increased. The main reason for this slow progress has been, on the one hand, the regulatory uncertainty caused by several factors, such as the long political discussion on ILUC, the late adoption of the amendments on ILUC to the RES Directive and the lack of a post-2020 policy for transport, and, on the other hand, the lack of commercial availability of alternative fuels and advanced biofuels at the needed scale and pace.

By excluding the production of biofuels on areas of high biodiversity and carbon value, the EU biofuels criteria avoided some risks of direct environmental impacts of biofuel production[115] – impacts that can be measured and managed directly at project/farmers level[116]. The sustainability criteria also contributed to improving the GHG performance of biofuels (e.g. from the field to the tank) through the setting of minimum GHG saving targets (e.g. 35% savings compared to fossil fuels). As of today, biofuels achieve often more than 60% of direct GHG emission savings[117].

However, in some cases, sustainability criteria may have been misused by Member States for protectionist measures (e.g. favouring certain feedstocks to the disadvantage of imported ones). This led to complaints and legal proceedings at national and European level against some Member States.

While the Renewable Energy Directive initially anticipated potential indirect effects from increased biofuel production related to indirect land-use (ILUC) and included additional incentives to address this issue[118], it did not introduce measures that would sufficiently address the ILUC effects, which could limit the GHG reduction benefits of food-based biofuels. This regulatory failure was addressed with the adoption of the 2015 ILUC amendments[119]. Trying to address such indirect risks by including quantitative ILUC factors in the EU GHG methodology is widely considered too uncertain (mainly because ILUC is not exactly measurable since it is unobservable) and complex (e.g. factors could change depending on modelling assumptions), and would possibly cause further investors uncertainty. This was the reason behind the 7% cap on food-based biofuels introduced through the ILUC amendments to the RES Directive. Furthermore, as foreseen in the Directive, the GHG performance of biofuel production can be further improved by raising the GHG saving threshold for new installations, while protecting those installations already in operation on 1 July 2014. The long and technically complex inter-institutional discussion on ILUC amendments[120] ultimately created a considerable degree of uncertainty in the market, preventing investments in both food-based biofuels, as well as in advanced biofuels. The impact of the indicative sub-target for advanced biofuels which was introduced with the ILUC amendments will only become visible in the coming years.

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115 The Fitness Check of EU Nature Legislation mentions the sustainability criteria for biofuel production as one of the EU policies aimed at preventing biodiversity loss. Some stakeholder groups in that Fitness Check, noted, among other, the lack of similar provisions for biomass used in non-transport applications as a major gap

116 The impact of EU consumption on deforestation: Comprehensive analysis of the impact of EU consumption on deforestation, VITO, CICERO, IIASA, 2013

117 Bundesanstalt für Landwirtschaft und Ernährung, Biokraftstoffe: 60 Prozent Treibhausgasminderung und höher nachweislich erfüllt

118 Recital (85), Articles 18 (4) and 19(6) of the Directive 2009/29/EC

119 Directive (EU) 2015/1513 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. OJ L 239/1, 15.9.2015

120 The Commission presented the proposal for the Directive 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 on 17 October 2012. This Directive was adopted almost two years later, on 9 September 2015

The biennial monitoring and reporting requirements of the Member States and the Commission, as well as the voluntary certification schemes recognised by the Commission have overall effectively helped to address additional environmental, economic and social sustainability issues related to the production of biofuels and bioliquids that cannot easily be linked to individual consignments, nor be addressed in isolation from other policies and legislation.

Specific requirements on the impacts on water, air and soil protection, as well as social issues, including human rights and land use rights or food security, have increased the awareness, information and data availability in the EU Member States. This has played in favour of greater cooperation at the national and EU levels with third countries on sustainability issues.[121]

Most of the voluntary certification schemes recognised by the Commission and active in third countries address environmental and social issues, thus contributing significantly to the improvement of a global sustainability framework for the production of biofuels and bioliquids. The sustainability certification has been established as a new norm in the industry globally. Sustainability criteria for biofuels have evolved at world level mainly through voluntary certification schemes compliant with legislation adopted in major markets, including in the European Union, and principally due to the RES Directive.[122]

The 2009 RES Directive did not include harmonised EU level sustainability rules for biomass used for generating power or heating. In absence of clear rules at the EU level, Member States introduced such sustainability requirements at national level. In 2010, the Commission issued non-binding recommendations to Member States on sustainability criteria for solid and gaseous biomass[123].

Stakeholders have raised two types of concerns in view of the fact that no harmonisation of sustainability criteria exists at the EU level for solid and gaseous biomass. First, the increased use of biomass, particularly for power generation, may lead to negative sustainability impacts both in the EU but especially in third countries producing biomass feedstock for the EU. Second, the lack of sustainability rules may result in the fragmentation of the internal market.

In 2014, the Commission published a report reviewing the state of play of sustainability of solid and gaseous biomass[124]. The Commission decided not to introduce EU binding sustainability criteria given that the vast majority of the biomass used in the EU for heat and power was considered to provide significant GHG savings. However, the report acknowledged that further research was needed on a number of biomass pathways which could lead to negligible or negative GHG savings or other sustainability impacts. The report also found that there was limited risk of barriers to trade of biomass in and to the EU, although existing EU legislation could for the time being prevent such barriers stemming from diverging national sustainability standards. However it did not exclude the possibility of such barriers developing in the future as a result of increasing trade in biomass.

Furthermore, it should be noted that under the RES directive, the same feedstock (e.g. maize or wood) is subject to EU sustainability criteria if it is used for biofuel production while it is exempted from compliance with such criteria if it is used for heat and power generation. A number of stakeholders have highlighted this issue and called for coherent land use criteria to apply to the same

121 "EU 2013 Report on Policy Coherence for Development (PCD), 2013

122 UNCTAD, "Second-Generation Biofuels Markets: State of Play, Trade and Developing Country Perspectives", 2016

123 COM(2010)11 final

124 SWD(2014)259 final

feedstocks, regardless of their final energy use (e.g. heating/cooling, electricity and biofuels for transports).

Finally, the regulatory uncertainty over sustainability rules for biomass for heat and power created a risk for the energy industry in sourcing fuel supplies and a potential financing risk for bioenergy project developers.

6.1.4. Has the RES Directive triggered sufficient progress in RES deployment in the heating and cooling sector, which was previously not covered by renewable energy targets?

It has only been since 2009 that the RES Directive has regulated the use of renewable energy in heating and cooling sector and buildings, unlike electricity and transport promotion measures, which were already in the scope of the preceding EU legislation. The RES Directive required Member States, through the adoption of National Renewable Energy Action Plans, to lay down sectorial targets for each of the three relevant sub-sectors, including heating and cooling. In addition, Articles 13 (4-6) and 16 (9) and 16 (11) required Member States to effectively promote the use of renewables in new and renovated buildings, in heating systems, and in local energy infrastructure, including district heating. The use of renewable energy in the heating and cooling systems and buildings is further (indirectly) promoted by the Energy Performance for Buildings Directive[125] and Energy Efficiency Directive[126].

Given that heating and cooling represents nearly half of the EU final energy use[127], it is not surprising that the highest deployment in renewable energy from 2004 to 2014 comes from the heating and cooling sector[128].

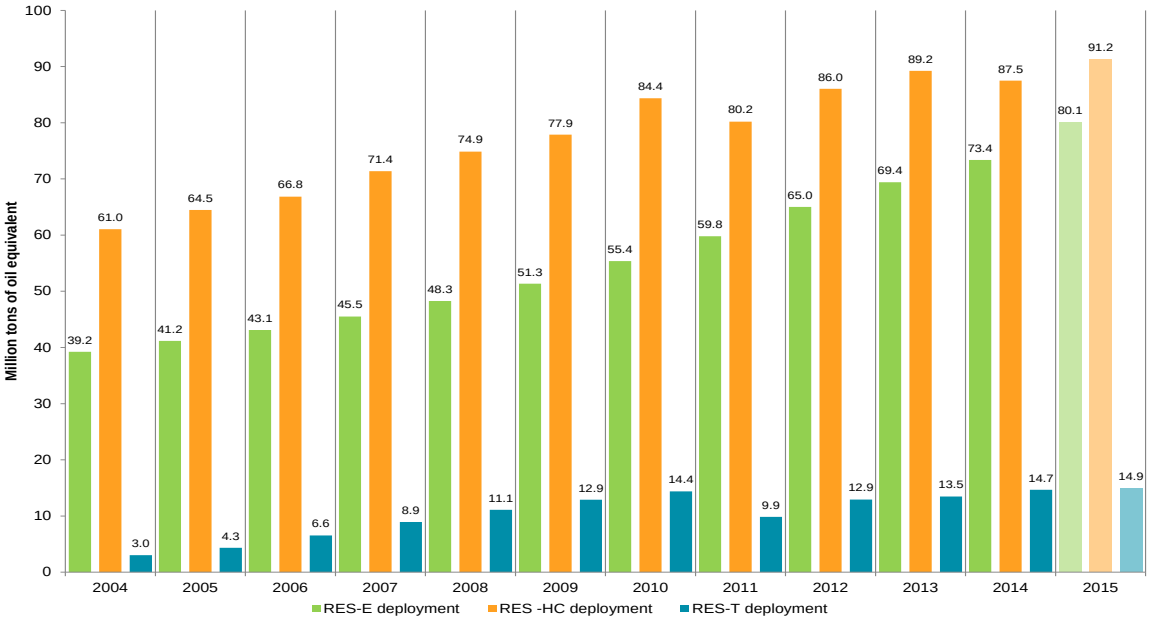
Figure 5: EU renewable energy deployment by sector 2004-2015 (Mtoe)

125 OJ L 153, 18.6.2010, p. 13–35

126 OJ L 315, 14.11.2012, p. 1–56

127 "An EU Strategy for Heating and Cooling", COM (2016) 51 final

128 "Draft Renewable Energy Progress Report", Öko Institute [to be published]



Source: "Renewable Energy Progress Report", Öko Institute [to be published]

However, this growth should be considered in relation to the remaining fossil fuel use in the heating and cooling sector, which still stands at nearly 75%. Only about 18% of the current EU fuel consumption in the heating and cooling comes from renewable energy, of which 86 % from bioenergy alone[129]. Most of this bioenergy is, as of 2015, sourced within the EU, with bioenergy imports accounting for less than 5% of the total EU biomass use for energy[130]. Since 2010, the RES share in the heating and cooling has increased by 4% points passing from 14.8% in 2010 to 18.5% in 2015.

The current linear growth of RES in the EU heating and cooling is largely due to the historical presence of large biomass use in Central, Eastern and Baltic Member States, and to dedicated policies in RES uptake in the district heating grids in Northern and Baltic Member States. It is also linked to building requirements and supportive policies at building level for RES uptake in new and renovated buildings (mainly, heat pumps) in a limited number of other Member States, notably Finland, France, Germany, Italy and Sweden. The legal transposition deadline of Article 13(4) on minimum use of RES in buildings has only been applied in Member States since 2015, and the legal provisions on nearly-zero energy standards in buildings will only become applicable as of 2020. For these reasons, it is still too early to conclude on the relevance and impact of these requirements on the RES deployment in buildings. However, it is also important to note that these provisions are aimed at RES promotion in new buildings, while most of the energy efficiency and decarbonisation potential lies in existing buildings, where two thirds of the energy needs are sourced from fossil fuels[131]. Neither the RES Directive nor the energy efficiency legislation (2010 Energy Performance for Buildings Directive, 2012 Energy Efficiency Directive) have yet fully captured this potential at the current building renovation rate.

129 "An EU Strategy for Heating and Cooling", COM (2016) 51 final

130 PRIMES, 2016 (data for 2015 reflecting current situation)

131 "An EU Strategy for Heating and Cooling", COM (2016) 51/2

6.1.5. What effects (impacts) has the implementation of the RES Directive had at EU and individual Member State's level?

The strong EU policy framework, established by the RES Directive, alongside the mixture of high levels of investment in research and development coupled with favourable incentives and abundance of renewable energy potential in the EU, has provided enabling conditions to stimulate the growth of the EU as a major global renewable energy player[132]. Furthermore, it has directly contributed to enhance the EU competitiveness and to Lisbon goals, through the creation of high quality jobs in Europe and in maintaining Europe's technological leadership. The initial EU leadership in promoting renewable energy eventually triggered a global move towards clean energy technologies: 173 currently have renewable energy targets in place, compared to 44 in 2004[133]. The EU leading role has contributed to higher participation of renewable energy in the world's energy mix. According to 2016 renewable capacity statistics by the International Renewable Energy Agency[134], at the end of 2015 global renewable generation capacity amounted to 1,985 GW (compared to 1,348 GW in 2010), after growing 8.3% in 2015, the highest rate ever recorded. Overall, RES capacity has increased by about one-third from 2011 to 2015[135]. The International Energy Agency has projected that renewable energy will become the world's number one source of electricity generation in 2035[136].

Competitiveness of the EU renewable energy industry

The EU has developed strong value chains and retains considerable competitive advantage across several renewable energy production sectors. The European renewable energy industry is leading in key sectors:

- Wind turbine manufacture, with 4 European manufacturers among the top 6 of largest market shares in 2015[137];
- Offshore wind, with 91%[138] of all offshore wind installations located in the waters off the coast of ten EU Member States;
- Ocean energy, with Europe concentrating most of the new projects on tidal stream and wave energy in open waters launched around the world in 2015[139];
- Concentrated Solar Power (CSP), with one Member States (Spain) being the global leader in existing CSP capacity, with 2.3 GW (almost half of the world capacity) in 2015[140];
- Lignocellulosic biofuels[141], at innovation and demonstration stage, though not yet at market deployment level.

132 ICF International, 2014
133 "Renewables 2016 Global Status Report", REN21. 2016
134 "Renewable Capacity Statistics 2016", IRENA, 2016
135 Idem
136 "World Energy Outlook", IEA, 2014
137 "Renewables 2016 Global Status Report", REN21, 2016
138 GWEC, "Global Wind 2015 Report" Chapter on Global Offshore
139 "Renewables 2016 Global Status Report", REN21,2016
140 "Renewables 2016 Global Status Report", REN21, 2016

In some areas, such as solar PV and onshore wind, the EU is being overtaken by Asian and US markets in recent years. The dynamic RES growth in these two markets influences the location of RES production chains: the requirement to locate key parts of the value chain, and the transport costs, encourage the localisation of manufacture closer to the deployment market[142].

The EU still retains its global leadership when it comes to RES installed capacity per capita, with Denmark, Germany, Sweden, Spain and Portugal being the champions of installed renewable power capacity per capita and Austria, Cyprus and Greece being the champions for solar water heating collector installed per capita. As regards annual investment (except the United Kingdom currently ranking n°3 globally) and total installed capacity, the EU has been overtaken in recent years by China and the US[143].

RES technology cost-reductions

According to IRENA's report on "Renewable Power Generation Costs in 2014", renewables have benefited from a cycle of falling costs spurred on by accelerated deployment. The EU's renewable energy targets for 2020 are considered to have played a vital role in this fast deployment since they have created a steady demand for cost-effective renewable energy and led to an unprecedented development of renewables in Member States, hence being instrumental in lowering renewable energy costs globally. The Renewable Energy Directive has initiated a virtuous cycle in which support policies stimulate increased deployment, which in turn results in technological improvements, as well as continual cost reductions[144].

From 2010-2015, the average cost for new onshore wind plants fell by 30% and average costs for new utility scale solar PV installations decreased by 75%. Utility scale solar PV projects are now competitive against peaking gas generation (*Figure 7).*

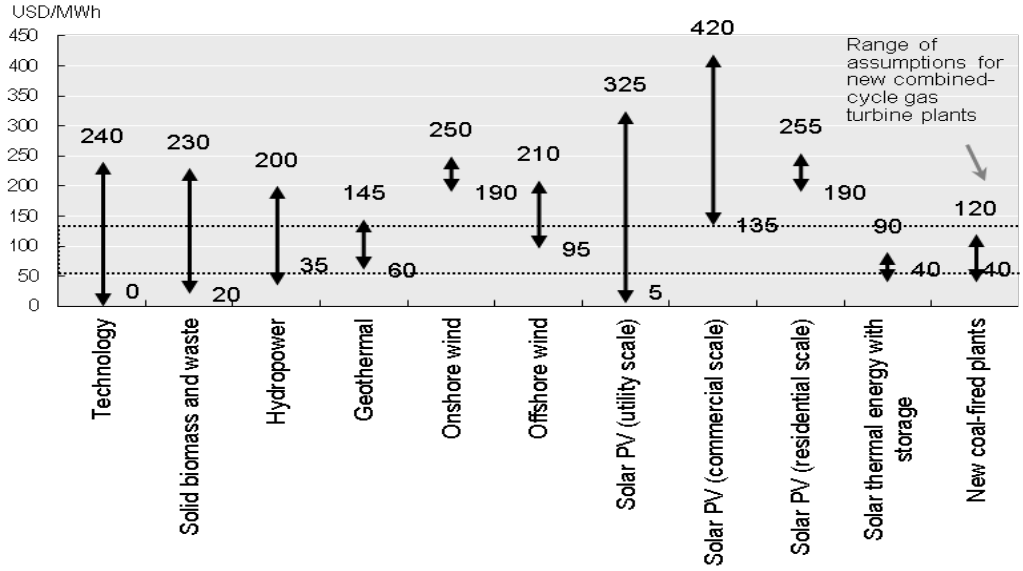
Figure 6: Levelised cost of electricity using various technologies, 2015

141 "Towards an Integrated Strategic Energy Technology (SET) Plan: Accelerating the European Energy System Transformation" C(2015) 6317

142 ICF International, 2014

143 "Renewables 2016 Global Status Report", REN21. 2016

144 "Renewable Power Generation Costs in 2014", IRENA, 2015



Source: OECD calculations, based on IEA (2015)

Other impacts

GHG: the deployment of renewables resulted in around 380 Mt of gross avoided CO_2 emissions at EU level in 2014[145]. Commission's Joint Research Centre, based on a different methodology, has evaluated substantially higher CO_2 emission reductions - 767 Mt of gross avoided CO_2 emissions at EU level in 2014. More than 65% (512.5 Mt CO_2 eq) of net GHG emission savings were attributed to renewable electricity and the rest was coming from renewable heat/cold (29%) and transport (4%)[146]. The use of renewable energy in transport resulted in 137 Mt of gross avoided CO_2 emissions at EU level from 2011 to 2014[147]. Most of these savings in the transport sector stemmed from the use of biofuels, while only a small fraction stemmed from the use of renewable electricity in transport, especially in the rail sector[148,149].

Fossil fuel displacement and avoided fuel import costs: renewables' production allowed the EU to cut its demand for fossil fuels by 110 Mtoe in 2013, and by an estimated 114 Mtoe in 2014[150], respectively (i.e. representing approximately 10 % of total fossil fuel consumption)[151], thus bringing a solid contribution to the goal of security of energy supply. Avoided imported fuel costs due to increasing use of renewable energy are estimated to be around €20bn in 2014[152,153].

145 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016

146 JRC, 2016 available at: http://iet.jrc.ec.europa.eu/remea/news/third-progress-reports-renewable-energy-development- eu2013-2014

147 Direct emission savings, therefore not including emissions from indirect land use change

148 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016

149 "Renewable energy progress and biofuels sustainability", Ecofys, 2014

150 This figure represents the total contribution of renewables to fossil fuel savings in a given year compared with the situation in 2005. This should not be compared with 234-300 Mtoe/year figure in 2020 from the 2007 impact assessment, which has been calculated for the whole energy system

151 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016

152 "Draft Renewable Energy Progress Report", Öko Institute [to be published]

153 This figure represents the total contribution of renewables to fossil fuel import savings in a given year compared with the situation in 2005. This should not be compared with 50-57 billion EUR/annum from the 2007 impact assessment, which has been calculated for the whole energy system

Employment and GDP: The influence of RES policies on GDP growth is difficult to isolate and to compare with the results of the expected impacts in 2008 impact assessment, principally due to the fact that the effects of the 2009-2010 economic crisis have not been initially factored in. However, the impacts of RES policies on GDP are deemed to have been relatively limited. A first rough estimation, based on the volume of investment and the avoided imports[154], confirms that the influence of RES policies on GDP remained below 0.5% in 2014[155]. Employment in the RES sector has grown in the EU despite the economic crisis, with almost half a million additional jobs in the EU-27 between 2008 and 2014[156]. Renewable energy industry employed 1.11 million workers in 2014[157]. The largest sectors in terms of employment creation have been the wind (314 000 jobs) and biomass (306 000 jobs) sectors. These sectors were also the ones with the largest employment gains in absolute terms. The EU is one of the key global players with regard to employment in the renewable energy sector. In 2014, it had the second highest per-capita employment in the area of renewable energy behind Brazil[158].

6.1.6. Which factors have hindered the achievement of objectives of the RES Directive?

In some Member States, favourable remuneration schemes led to high investments, sometimes reaching levels rather unexpected by Member States. A combination of high investor appetite and generous schemes in these cases led to budget concerns, pushing Member States towards unexpected policy changes, sometimes with retrospective impacts. Such action in a number of Member States caused a great deal of uncertainty amongst investors, including building owners investing in on-site renewables, and RES technology suppliers.

Investments and national RES support schemes

Total investments in renewable energy in Europe strongly increased from 2004 to 2011, and sharply declined in 2012 and 2013 mainly due to undermined investor confidence[159]. Investments rose again slightly in 2014. This increase in 2014 was mainly caused by large offshore wind projects in Germany, The Netherlands and the United Kingdom and does therefore not necessarily point to a reverting trend across the whole of the EU[160].

Figure 7: Investment in renewable energy sources in the EU from 2004 – 2015

154 Based on EEA, PRIMES and EUROSTAT

155 This figure has to be considered carefully and as gross effect, since it doesn't factor in the reduction of investment in conventional generation and other variables

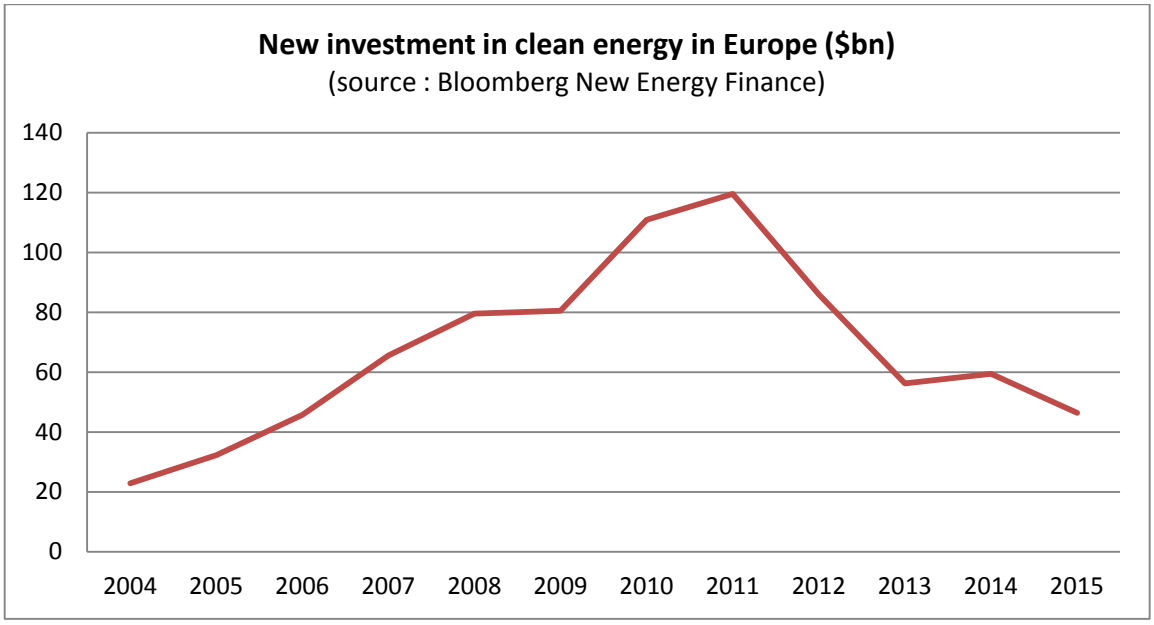
156 Based on EurObserv'ER database.and EurObserv'ER 2015 report.

157 EurObserv'ER, 15th Eurobserv'ER report, 2015

158 EurObserv'ER, 15th Eurobserv'ER report, 2015

159 Bloomberg New Energy Finance, "How to attract new sources of capital to EU renewables", 2013, and UNEP, "Green energy 2013 – Key Findings", 2013

160 RES Mainstreaming study, 2016



Source: Bloomberg New Energy Finance

Despite initial investment boom in 2009 and 2010, following the adoption of EU Energy and Climate Package, including the RES Directive, with the binding 20% EU level RES target and binding national RES targets for 2020, investments in renewable energy in Europe were influenced by a number of external factors, leading to eventual investment decline after 2011:

- **Abrupt policy changes and reduction in RES support**: major changes to the support schemes for renewable energy also created investment uncertainty and altered the investment landscape. A number of Member States (e.g. Bulgaria, Czech Republic, Italy, Spain) adopted unexpected changes to the financial incentives for existing renewable energy projects and suspended support for new projects, sometimes with retrospective effects. In addition, most Member States reduced the feed-in tariff for solar PV or decided to move into feed-in premium (e.g. the United Kingdom) in order to adapt support to the reduction in technology costs and make schemes more market-based.

- The **economic and financial crisis** had a double impact on the renewable energy sector. Firstly, investors became more reluctant to invest in RES projects, causing the investment level to drop. A second impact of the financial crisis originates prior to the economic crisis in 2008, when the total installed power capacity (also fossil fuel-based) in Europe expanded, based on optimistic economic forecasts including e.g. a 2.5% growth rate in PRIMES 2007. During the crisis (2007-2009), power demand in Europe dropped by 5%[161], causing an overcapacity of power production and lower electricity prices for all fuels. These lower electricity prices impacted on the viability of renewable energy projects, undermining previous business cases and resulted in lower investments in RES projects[162].

- The **decreasing** renewable energy technology costs, especially for solar PV, also caused lower investment levels in monetary terms, while not necessarily reducing investment volumes in the EU, as a whole.

161 Based on Eurostat table on total gross electricity generation in 2007 and 2009

162 "World Energy Outlook", IEA, 2014

- **Oversupply of ETS allowances and limited pricing of other externalities such as air polution**. The EU ETS places a price on emissions of greenhouse gases in the power and industrial sectors. The anticipated impact of ETS as an instrument that would trigger low carbon investments did not deliver as planned (2015 ETS prices are around 7.7 €/t and 2020 prices are currently expected to reach only 15 €/t[163], substantially below the expected prices for 2020 according the projection made in 2008[164]). The current imbalance between supply and demand in the ETS has limited the ETS impact to incentivize investments in less carbon intensive technologies such as renewables.

6.2. Efficiency

6.2.1. To what extent has the RES Directive, and the binding targets included therein, been efficient means of developing the European renewable energy sector? Could the use of other policy instruments, or mechanisms, have provided better efficiency?

The question of how to achieve the 20% EU renewable energy target in the most cost-effective way, while ensuring even growth of renewables across the EU and fair approach to effort sharing amongst the Member States, was thoroughly considered in the 2008 Impact Assessment. A political choice had to be made between an effort sharing set on the basis of Member States national resource potential (considered as more cost-effective option at the EU level), and an effort sharing set on the basis of a flat-rate increase in the share of renewable energy in each Member State weighted by GDP and modulated to account for earlier development of RES.

At the time of the adoption of the 2009 RES Directive, based on previous experience with indicative targets and softer policy measures, the option of voluntary industry agreements and continuation of previous approach with indicative targets was discarded as it was considered a less effective means for achieving the ambitious 2020 climate and energy policy objectives. Instead, the political choice was made in favour of binding EU level and national renewable energy targets and assuming that the higher costs of the flat rate/GDP method would be mitigated through effective and efficient transferable mechanisms trade in renewable energy.

When assessing the current renewables' share at Member State level, the REFIT Evaluation study found that some Member States[165] which had relatively low starting points for their 2020 target and targets above their potential[166] are those currently the furthest from reaching their target. The opposite is also true, where Member States with high historical starting points and high assessed potential, but lower targets, are often over-achieving, or close to achieving their 2020 national targets[167]. However, when assessing the gap between Member States projected achievements by 2020 and initial potentials as estimated back in 2008, higher discrepancies are evident than when comparing projected achievement with GDP-based targets[168] (*Figure 10*). It can therefore be deducted from the analysis that the GDP-based breakdown was the approach which has been the closest to the actual potential at Member State level.

163 PRIMES Ref2016

164 2008 Climate and Energy Package Impact Assessment - SEC(2008) 85

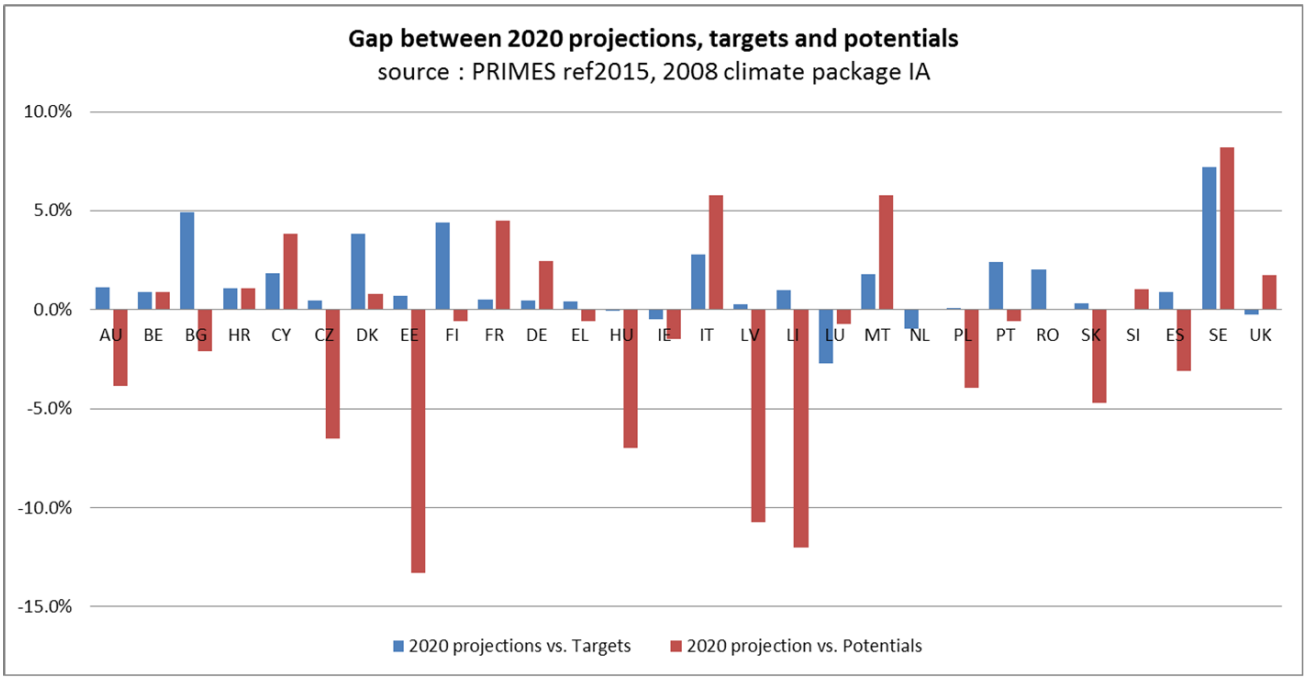
165 This correlation is particularly true for FR, NL, UK, and LU

166 Based on flat-rate and GDP

167 This is particularly true for AU, FI, CZ, LI, EE, BG

168 This is particularly true for CZ, ES, HU, LA, LI, where 2020 projected deployment is way lower than assessed potential back in 2008

Figure 8: Gap between 2020 projections, targets and potentials



Source: based on PRIMES ref2015 and 2008 climate package impact assessment

In the above graph, the red bars represent the gap between projected 2020 RES-shares and potentials as assessed in the 2008 Impact Assessment. The blue bars represent the gap between projected 2020 RES-shares and GDP-based targets as assessed in the 2008 Impact Assessment. Red bars below zero mean that the expected achievement by 2020 is lower than the potential assessed in 2008. This demonstrates the difficulty that several Member States would face to reach their target if this target had been defined taking into account only the potential, and excluding the GDP-based modulation.

6.2.2. Have the RES Directive and its national implementation measures, including support schemes, been cost-efficient means of achieving the RES targets at the EU and national level? Have the expected results been obtained at a reasonable cost? Are results proportionate to the benefits? Could the same results have been achieved with less funding/lower cost?

As already mentioned, the initially intended legal provisions permitting Guarantees of Origin as a transferable means for facilitating the RES target achievement, did not find their place in the RES Directive as a result of political resistance. Instead, alternative provisions on the use of cooperation mechanisms were included in the Directive as means to facilitate renewable energy trade between Member States. However, as also already explained in the previous sections, these tools have as of 2016 not yet been used to any significant extent, thus placing higher effort level on those Member States with high GDP and low RES potential as a starting point before 2010.

Cooperation mechanisms

Despite the apparent benefits deriving from engaging in cooperation in order to achieve the renewable energy targets jointly and in a more cost-efficient manner, the use of RES cooperation mechanisms remains limited. The only existing joint mechanisms currently in place is a support

scheme based on green certificates between Norway and Sweden[169] (in operation since January 2012). Statistical transfers and joint projects have, so far not been used.

This means that the benefits in terms of cost effective deployment (only presented qualitatively, not quantified) in the 2008 Impact Assessment, have not yet materialised. Consequently, there is not a significant base of evidence to evaluate if the original estimations were indeed appropriate. A full cost-benefit analysis of the mechanisms is therefore not feasible.

First of all there is the question on **why these mechanisms were not triggered as originally anticipated**.

The 2016 Public Consultation reveals that the main reasons for the limited use of cooperation mechanisms to date, according to stakeholders, have been Member States' reluctance to see their taxpayers, or consumers' money, being used for investments outside their country[170], together with the lack of cost-effectiveness or uncertain benefit for individual Member States[171].

The 2015 mid-term REFIT Evaluation study indicated that, although the ultimate rationale to use cooperation mechanisms is to exploit renewable energy sources in the most cost-efficient way, the vast majority of Member States considered their use primarily as an alternative instrument for target achievement and substitute for national effort. The referred study also indicates possible reasons for their limited use, adding to the ones above mentioned the uncertainty about the scope and shape of the EU framework beyond 2020 and the insufficient interconnection capacities between Member States.

The recurrent thought among network operators, professional organisations and RES industries is that the governance system of the 2030 framework needs to be clarified to enable an improved understanding of whether cooperation mechanisms will remain relevant beyond 2020.

The 2013 Commission's Guidance on Cooperation Mechanisms[172] aimed to provide additional orientation to Member States, by clarifying the criteria to choose one cooperation mechanism over the others and providing with a checklist for each type. Moreover, a dedicated study was commissioned to help Member States willing to engage in such cooperation agreements[173]. This study presented quantitative and qualitative analysis to assist Member States in cooperation mechanism design, cost-benefit allocation and the cost savings potential of cooperation.

Furthermore, this study identified three types of barriers for using cooperation mechanisms: firstly political barriers, including public acceptance for cooperation mechanisms, the determination of governments to engage in cooperation on RES target achievement and uncertainty on the continuity of the RES framework beyond 2020; secondly technical barriers, such as high degree of uncertainty on quantifiable costs and benefits, design options of cooperation mechanisms, difficulties for Member States to forecast their own RES target fulfilments and lacking transmission infrastructure

169 Discussions between Sweden and Norway on a joint support scheme already started in 2003, but came to a halt in 2006 when no agreement could be settled on the burden sharing aspect. Sharing the costs and benefits of the joint scheme turned out to be an insurmountable hurdle by that time. The second round of negotiations led to a signed agreement in 2009 and the start of the scheme in 2012

170 94% respondents consider this factor as important or very important

171 90% respondents consider this factor as important or very important

172 "Guidance on the use of renewable energy cooperation mechanism", 2013, SWD(2013) 440 final

173 "Cooperation between EU Member States under the RES Directive", Ecofys, 2013

and market integration; and thirdly legal barriers, such as potential incompatibility of cooperation mechanisms with national and EU legislation.

The second major question is **whether, based on the experience of the currently operational joint support scheme between Sweden and Norway, the original expectations were duly justified.**

The anticipated benefits of such schemes include[174]: 1) better functioning of the green certificate market, 2) increased cost efficiency and 3) increased long term stability. Referring to the first benefit, the increase in the number of parties trading green certificates was assumed to reduce the volatility of the market. It was also understood that a joint and larger market would increase liquidity. As regards the second, access to a larger production base would increase cost efficiency as the market would have more opportunities to determine where the electricity production capacity would be built. Finally, on the third, the joint support scheme was assumed to provide a politically stable system that can only be substantially changed with the agreement of both countries, which was expected to improve long term predictability to investors.

After 5 years of being operational, the initial efficiency assessment of the joint scheme has led the Norwegian government to announce its intention to phase-out the joint green certificate system after 2021. It is understood that cost-effectiveness assumptions have only partially materialised due to differences in tax regimes and depreciation that resulted in a different than expected investment pattern, with RES investments mainly going to Sweden[175].

This experience shows that having a harmonised support scheme can help exploring better the RES potential where it is most cost effective and, therefore, increase flexibilities for Member States. However a joint support scheme does not imply that the entirety of the criteria relevant for an investment decision is uniform. And those differences can matter, even between two States such as Sweden and Norway that are relatively similar in terms of investment conditions. Administrative procedures that were already discussed can be an influencing factor, as can be Member States specific weighted average cost of capital (WACC), network costs, or even other non-cost barriers, notably in the area of taxation and depreciation.

Estimations based only on a national technology cost and technology resource efficiency in a given Member State that do not factor in these non-cost national circumstances tend to overestimate the benefits to be reaped and the cost-effectiveness of EU-wide "optimal" resource exploitation (which implies use of cooperation mechanisms).

National measures, including RES support schemes

Pursuant to Article 3(3) of Directive 2009/28/EC, support schemes are but one instrument - amongst others - that can be chosen by Member States to achieve the binding national targets established by the Directive. Effectively though, the majority of the Member States use them as part of their RES policies.

174 "Cooperation between EU Member States under the RES Directive", Ecofys, 2013

175 Norwegian Energy Department announcement of 15.04.2016

In 2009, the majority of Member States were promoting renewable energy production either by green certificate regimes or quotas (23 Member States), or by feed-in-tariff system (21 Member States). Premiums were used in 7 Member States and tendering was not common practice at the time[176].

As already mentioned, Member States retained full discretion over their use of support schemes, including their design, structure and the level of support. The Directive provided no guidance on how or when using support schemes, nor even on their eventual revision or reform, in spite of the fact that a majority of Member States already had such support schemes in place well before the 2009 Directive. As a result, each and every Member State provided its own support, used different models for support schemes and all Member States started off by excluding non-domestic renewables from access to the support schemes.

When these limitations started to become apparent, the Commission issued Guidance on RES support schemes design and their reform in 2013[177]. The move towards more market-based support mechanisms was then further complemented by the Guidelines on State aid for Environmental Protection and Energy (EEAG)[178] and both paved the way for the design of future support schemes, which should be market-based and granted through a competitive process. For this, the EEAG set two major deadlines in 2016 and 2017, respectively for market-based support and competitive bidding, which is already in place in 13 Member States[179,180].

Not all national support schemes were found to be equally efficient and responsive to market signals and that difference mattered even more when adjustments were not done fast enough in line with the (unexpected) technological cost decreases. After the entry into force of the RES Directive, the investment boom in renewable energy occurred partly due to the generosity and rigid design of national support schemes. As the cost of renewable energy technologies fell, several national support schemes were unable to be adapted rapidly enough. As a result, technology bubbles were encouraged by national support schemes, unregulated by any EU Directive or State aid rules. This is evidenced by, for instance, the rapid overshooting of solar production in Spain, Italy or Germany.

Spain's long term policy objectives resulted in a sizeable domestic renewable sector. However, this development was achieved at relatively high policy costs with annual feed-in premium/feed-in tariff payments of around EUR 6.8 billion in 2013 to support 73.8 TWh of generated electricity. As a result of support scheme reform, this has been reduced to EUR 5.4 billion in 2015 to support 56.9 TWh[181]. Germany spent EUR 20.4 billion for the EEG surcharge in 2013 and EUR 21.8 billion in 2015 for approx. 160 TWh of generated electricity[182].

Early subsidies at Member State level have been a necessary step to ensure renewable technology roll-out and cost reduction, and therefore to pave the way for the next generation of enabling policies. This is particularly relevant for solar PV, where the cost of support per unit of generated energy has been constantly diminishing between 2009 and 2014. Solar PV module prices in 2014

176 Renewable Energy: Progressing towards the 2020 target, COM (2011) 31

177 "European Commission guidance for the design of renewable energy support schemes", 2013, SWD (2013) 439 final

178 "Guidelines on State aid for environmental protection and energy 2014-2020", OJ 2014/C 200/01

179 DE, ES, ET, FR, HR, HU, IT, LT, LV, MT, PT, SL, SK

180 RES-Legal

181 Based on: CNMC, "Informe mensual de estadística sobre las ventas del régimen especial", 2016

182 https://www.netztransparenz.de/de/file/20141015-Pressemitteilung_zur_EEG-Umlage_2015.pdf

were around 75% lower than their levels at the end of 2009 and the LCOE of utility-scale solar PV has fallen by half in four years[183].

With less than 5 years to go to 2020, the overall trend in Member States indicates a clear shift away from feed-in tariff to more market based approach, and following the phase-out of early support allocations, the total annual cost of Member support payments to renewable electricity production is also expected to decrease after 2020. Furthermore, this phase-out has been eased by technological progress and further technology cost reductions.

The story record of the bust and boom cycles of national support schemes illustrates the importance of providing clear and transparent framework principles in legislation.

Electricity wholesale and retail prices

Since 2012, wholesale energy prices have been decreasing in the EU. A key driver in falling electricity prices has been the pass-through of reduced coal and gas prices, but there are other drivers, such as market coupling and growing inter-connector capacity.

Reduced demand for CO_2 allowances and further decreases in CO_2 prices have also been important inducing factors. Furthermore, in some Member States, lower demand linked to subdued economic growth, combined with capacity expansion and the rise of solar and wind powered electricity, played some role. In perfectly competitive markets, changes in wholesale markets should pass through rapidly and fully to retail markets. However, in Europe, various factors have restricted this pass-through, the average household electricity price having increased at an annual rate of 3% from 2008 to 2015[184].

As the Commission's 2016 Communication on Energy Prices and Costs in Europe[185] indicates, retail electricity price increases were mainly driven by State taxes, levies and network tariffs. The energy component of prices has diminished, both in absolute and relative terms. On average, EU household prices diverge by a factor of three between the cheapest and most expensive country. These major variations result from differences in fiscal needs (incl. undesignated taxes) and energy and climate policy support cost shares in the final household electricity prices (e.g. renewable energy or CHP expenditure shares). While Value Added Tax and other relevant taxes are 59% in Denmark, they only amount to 5% in Malta. Similarly, RES & CHP levies range from as high as 22-23% in Portugal and Germany to as low as 0%-2% in Ireland and Hungary. In general, energy policy relevant levies were out weighted by taxes, including undesignated taxes which not necessarily finance energy, or climate, related policies. Undesignated taxes cost the average EU household 15% more than designated policy support costs (Figure 11)[186].

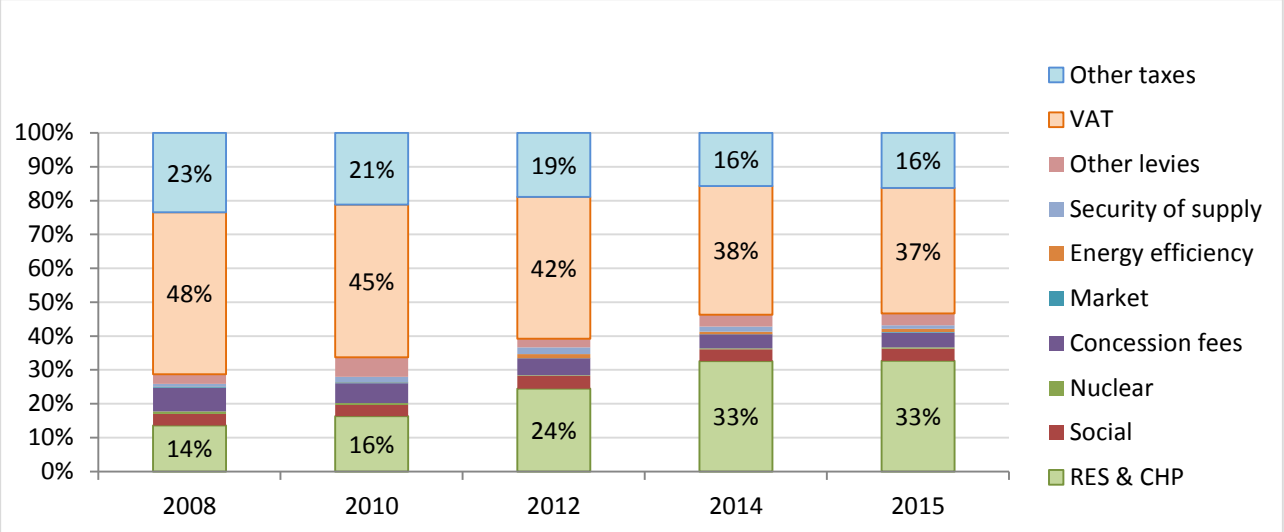
Figure 9: Share of sub-components in the weighted average EU taxes and levies component (household prices)

183 "Renewable Power Generation Costs in 2014", IRENA, 2015

184 2016 Energy prices and costs report", SWD (2016) Reference to be completed after adoption of the report

185 2016 Energy prices and costs report", COM (2016). Reference to be completed after adoption of the report

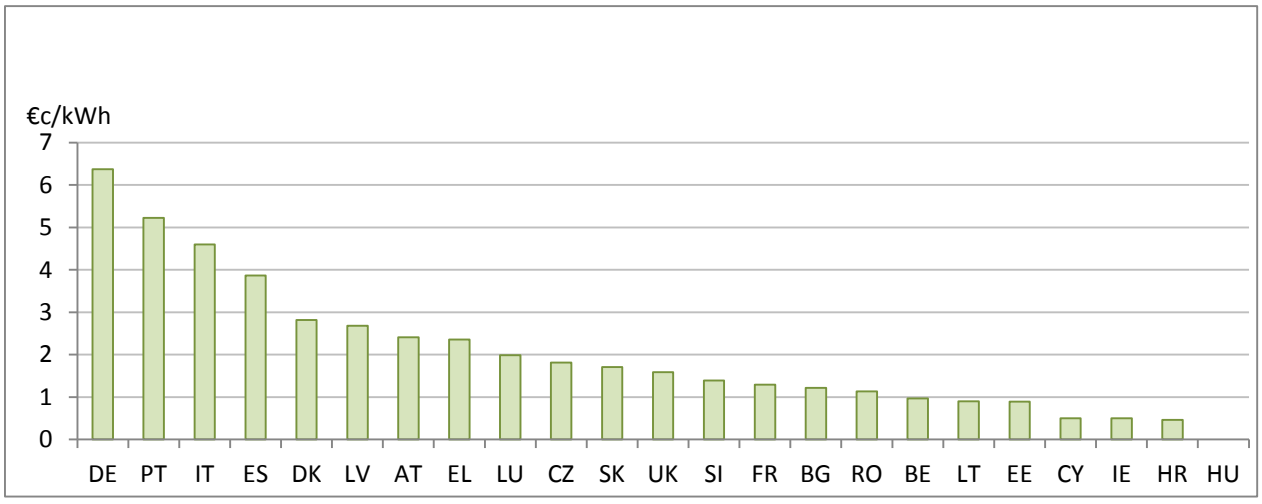
186 2016 Energy prices and costs report, SWD (2016). Reference to be completed after adoption of the report



Source: 2016 Energy prices and costs report

The EU 28 weighted average RES & CHP support cost tripled from 2008 to 2015. In 2015, Germany recorded the highest rate of RES & CHP support accounting for 6.3 €c/kWh (household prices). The smallest amount of the same cost, 0.45 €c/kWh, was recorded in Croatia (Figure 12).

Figure 10: Nominal amount of RES and CHP support cost by country in 2015 (household prices)[187]



Source: 2016 Energy prices and costs report

While Germany recorded the highest nominal amount of RES & CHP cost to households, the cost share of supporting such policies was the highest in Portugal, accounting for almost a quarter of the total price. The smallest share of 3% was reported by Ireland.

As per industry prices, energy policy relevant components (e.g. RES & CHP levies) out-weighted the component of general fiscal measures. In 2015, Germany recorded the highest rate of RES & CHP

187 5 EU countries (Finland, Malta, Netherlands Poland, Sweden) did not report RES or CHP cost elements. It is important to note that consumers in these countries are also paying RES support costs despite the fact that such costs could not be reported explicitly in the course of the study

support, accounting for 61 €/MWh. The smallest amount of the same cost, 2.3 €/MWh, was reported by Ireland.

Notwithstanding the above analysis on the energy and climate policy support cost impacts on household and industry electricity prices, over 2008-2015 period the EU average industrial electricity price was relatively stable and remained around the average paid internationally (ca €110/MWh). They were higher than those paid in Russia, Indonesia, the USA and Mexico, but lower than those paid in Turkey, China, Brazil and Japan.

6.2.3. Has the RES Directive effectively improved grid access conditions for renewable electricity producers? Has it done so in a cost-efficient manner?

The Directive has led Member States to implement priority dispatch and priority access provisions for renewable electricity in their relevant legislation. Such provisions have effectively supported the dispatch of renewable electricity sources, supporting the economics of renewables' projects and contributing to progress against the national targets (expressed in terms of generation). Priority access provisions have in most Member States effectively protected renewables against curtailment, here again providing greater certainty on dispatch and revenues for investors, and maximising output by renewables assets.

However, grid access provisions contained in Article 16 of the Directive were found to be unclear by most stakeholders. This effectively left significant discretion to Member States in their interpretation of priority dispatch and priority access rules, and to have a wide range of technical implementations depending on Member States, or sub-national level.

As regards grid connection costs, Article 16 of the Directive defines general principles (charges should be defined in a non-discriminatory and transparent manner), but leaves room for Member States to decide on which components should be included in the cost calculation. This has led to diverging grid connection charges being applied across Member States, with renewable generators bearing in some Member States only the direct costs of connection *("shallow"* model), but in other countries the direct costs and any grid reinforcement costs as well (*"deep"* model). The gap between the two models has created significant distortions in investment decisions across Member States, in particular for those projects where grid connection represent a high fraction of total project costs (e.g. offshore wind).

Furthermore, while priority provisions were adapted to the needs of emerging technologies (creating a framework with very high predictability of the total power generation thus increasing investment security), they do not ensure a cost-efficient outcome when applied to increasingly mature technologies representing a large part of the electricity market. The increasing share of renewable electricity and priority rules also for other types of generation (CHP and indigenous resources) have resulted in a situation where, in some Member States, very high shares of power generation are coming from "prioritized" sources. Against this background, priority provisions can have very significant impact on the well-functioning of the electricity market. In particular:

- Subsidy schemes based on priority dispatch (such as Feed-in Tariffs) are often based on high running hours and a mitigation of market signals to the subsidized generator ("produce and forget"). This means that non-subsidized generation is increasingly pushed out of the market even where this is not cost-efficient;

- Situations in which more than 100% of demand is covered by priority dispatch become more prevalent. This lowers the investment security and can lead to unnecessary curtailment of renewable electricity;

- Electricity generation should be guided by price signals. In a situation where the clear majority of power generation does not react to price signals, market integration fails and market signals cannot develop;

- Incentives to invest in increased flexibility, which would naturally result from price signals on a functioning wholesale market, do not reach a significant part of the generation mix. Priority dispatch rules can eliminate incentives for flexible generation (e.g. biomass) to use its flexibility potential and, instead, create incentives to run independently from market demand;

- Priority dispatch and priority grid access limit the choice for transmission system operators to intervene in the system (e.g. in case of congestion on certain parts of the electricity grid). This can result in less efficient interventions (e.g. re-dispatching power plants in suboptimal locations);

- Priority dispatch rules for high marginal cost technologies (e.g. biomass) can result in using costly primary resources to generate electricity at a time where other, cheaper, technologies were available.

Against this background, the provision of priority dispatch and priority grid access will need to be reassessed in the context of in the on-going Electricity Market Design initiative in view of the main policy objectives of sustainability, security of supply and competitiveness.

6.2.4. Has the RES Directive added administrative burden to Member States' public authorities and economic operators? Or, on the contrary, has such burden been reduced [e.g. compared to previous EU legislation in the area of renewable energy Directive 2001/77/EC and Directive 2003/30/EC]? Have Member States reporting obligation requirements become more efficient, or, on the contrary, has the reporting burden increased?

The full quantification of the impact of the reporting and planning obligations under the 2009 RES Directive for Member States linked to the requirement to adopt National Renewable Energy Action Plans (once), as well as the biennial renewable progress reports (Art. 4) is to be found in the parallel REFIT exercise[188].

According to this REFIT on reporting and planning obligations, for the Member States' planning obligation contained in article 4 and annex VI of the RES Directive, the resulting median annual costs would be at a medium level with EUR 10,309. The benefits overall were rated high for the obligation but potential was also found for further improvement in reducing the administrative burden associated to this obligation. Concerning the reporting obligation for MS contained in article 22, the study found the median annual costs to be at a medium level with EUR 4,407. This obligation was found to provide high benefits despite some incoherence identified with reporting obligations to

[188] Fitness check of the Reporting, Planning and Monitoring Obligations in the EU energy acquis. Reference number to be added when this REFIT is adopted

Eurostat, especially concerning indicators on the actual consumption of energy from renewable sources in the preceding two years and the sectorial and overall shares of renewable sources.

The public consultation of the parallel REFIT on reporting and planning obligations revealed that non-binding standard templates and guidance documents for the biennial RES reports, prepared by the Commission in close cooperation with EUROSTAT, effectively facilitated the reporting task to Member States.

Part of the legal provisions, with potential impact on Member State national, regional and local administrations, as well as economic operators, such as provisions on Guarantees of Origin (Art. 15) and regular reporting requirements (Art. 22) were already covered in the previous EU legislation in the field of renewable energy. Therefore, the impact of the RES Directive on administrative burden related to these provisions, has not changed substantially. On the contrary, the RES Directive merged the previous two separate reporting streams (annual in the case of Renewable Electricity Directive and biennial in the case of Biofuels Directive) in a single biennial report, reducing the frequency and burden of national reporting, facilitating the reporting task through standard template, and visibly improving Member State compliance with their reporting obligations[189].

However, the RES Directive established new compliance obligations on Member States, with the national plans and with the EU biofuel sustainability criteria (Art. 17-19). The latter required establishing national sustainability verification and audit systems in the Member States, placing the burden of proof on biofuel producers and conventional fuel market operators, who were required to provide evidence on the sustainability of biofuels they placed on the market.

At the same time, there is no available overview of the administrative costs placed on producers, as well as on Member States, stemming from the Guaranteed of Origin scheme. However, according to external independent analysis[190], whether or not the Guarantees of Origin are issued free of charge, differs across Member States, without a clear rationale as to why some charge for the service and others do not. Systems such as in Ireland, Lithuania or Sweden, do not necessarily apply a direct fee on users to finance the system, but costs can be recovered through other ways. Further, verifying the fees that are charged in the countries where the Guarantees of Origin are not issued for free, it turns out that, most of the time, there is a fee for getting an account in the system, a fee for registering a plant and fees for the respective activities performed. In the context of other requirements of the Directive, it is important that those fees are cost-related as required by Article 13(2) e) of the RES Directive.

189 Under the previous RES legal framework, based on two separate directives, 38 infringement cases were launched in under article 3(3) of Directive 2001/77EC189 on the biannual renewables progress reports and 53 infringement cases were launched in relation to article 4(1) of Directive 2003/30/EC189 on the annual progress reports and eight infringement cases in relation to article 3(1) of the same directive on the minimum proportion of biofuels. Under the new Renewable Energy Directive, nine infringement procedures were launched late or partial compliance with articles 4(1) and 4(2) on the NREAPs. See REFIT for energy planning and reporting

190 Ecofys (2014)

6.2.5. Has the establishment of the sustainability scheme for biofuels and bioliquids led to the creation of a cost-efficient framework? Has it achieved its aim in a cost-efficient manner? What impact has such sustainability system had on the Member States administrations and the private sector?

The administrative burden and cost for economic operators to prove compliance with the EU biofuel criteria has been evaluated as quite significant. Such burden is totally associated with the initial establishment of the system of default values for GHG emission calculation included in the RES Directive and the international certification schemes recognised by the Commission. Full cost assessment of the EU sustainability scheme is not available, but estimates from one Member State indicates that initial compliance costs for preparatory work for the sustainability scheme at the Member State level could amount to ca. 120 000 EUR and the system establishment costs ca. 130 000 EUR. As regards annual running costs, i.e. once systems are established, can amount to 40 000 EUR (incl. scheme auditing, supplier auditing, follow-up and updating the scheme, miscellaneous costs)[191].

The 2015 Fitness Check for the EU petroleum refining sector indicated that, for EU refineries, the most relevant implication of the RES Directive is the potential reduction of EU demand for fossil-based fuels due to their substitution by biofuels. The same evaluation suggests an associated impact on average EU refining margins between EUR 0.01 and EUR 0.20 per barrel of throughput during the period 2006 to 2012, and between EUR 0.01 and EUR 0.35 in 2012. At the same time, the average effect (i.e. the forgone annual net earnings of the EU refineries) of a possible decrease in the utilisation rates of refineries because of a demand drop due to the RES Directive was estimated at 3.65 euro cents per barrel of processed crude oil[192].

A final impact on the refining sector consists of additional expenditures associated with the blending, storage, and transportation of biofuels. According to industry data (Concawe 2014), these amounted to EUR 0.5 million annually per refinery during 2000-2012, and EUR 0.9 million annually during 2008-2012. In relative terms, both numbers correspond to about EUR 0.01 per barrel of refineries' throughput.

The sustainability scheme, however, has not achieved all of its objectives as by design it is not able to address GHG emissions due to ILUC which is caused by the additional demand for agricultural crops. Against this background the EU introduced with the ILUC Directive (Directive (EU) 2015/1513) a 7% CAP on the contribution of food based biofuels towards the renewable energy target in transport.

6.3. Relevance

6.3.1. To what extent were the objectives of the RES Directive relevant to the needs of the EU Energy and Climate Change policy? To what extent does the RES Directive remain relevant for the Energy Union priorities, the 2030 Energy and Climate Framework and COP 21 global climate commitments?

The 2020 renewable energy targets, and the whole RES Directive, were part of the EUs strategic energy objectives to reduce CO2 from energy use, and the wider objectives to limit the global

191 AEBIOM, 2016, based on Finnish Biomass association

192 "Sectoral fitness check for the petroleum refining sector", 2015, (SWD (2015) 284) and "EU Petroleum Refining Fitness Check: Impact of EU Legislation on Sectoral Economic Performance", 2015, (JRC, 2015)

average temperature increase, make the EU energy more energy secure and contribute to the EU competitiveness, in particular with respect to new energy technologies to stimulate a EU leadership position[193]. Furthermore, the Energy and Climate Change policy towards 2020 called for greater empowerment of consumers and stronger collaboration on energy policies amongst the Member States, within a pan-European integrated energy market.

The RES Directive has provided the legal framework to achieve the above objectives, support cooperation among Member States and provide investors with confidence to invest in new production, transport, and storage options for renewable energy sources. More than six years after the entry in force, the RES Directive continues to be relevant to address these objectives. In particular, through increased renewable energy deployment, it has contributed to:

- Reductions in CO_2 emissions at EU level (at least 380 Mt of gross avoided CO2 emissions at EU level in 2014)[194];

- Improved security of supply by reducing consumption and import of fossil fuels (demand reduction for fossil fuels by 114 Mtoe in 2014[195] and avoided imported fuel costs around €20bn in 2014[196]);

- Net positive impact on employment (half a million additional jobs in the EU-27 between 2008 and 2014[197]);

- Other economic and climate benefits, such as better health and reduced local air pollution. The OECD has estimated that the economic cost of damage to health from poor air quality amounts to about 4% of GDP on average in the countries with the highest GHG emissions[198].

The EU ambition to move towards a low-carbon economy and a more sustainable, secure and competitive energy system has been confirmed within 2030 climate and energy objectives with the EU commitment to achieve at least an 27% binding EU level share of renewables by 2030, and as one of the five dimensions of the Energy Union.

These EU commitments were renewed in the Paris COP21 Agreement, which *"recognised the need for an effective and progressive response to the urgent threat of climate change"* and required that *"all parties formulate long-term low greenhouse gas emission development strategies"* and *"foster sustainable development"*[199].

In light of these developments, the RES Directive remains relevant not only to achieve the EU 2020 energy and climate objectives, but also to prepare the EU for the new approach towards the 2030 targets, considering in particular the need to achieve the at least 27% RES target collectively at EU level (without recourse to national binding targets) in a cost-effective way, and to fulfil the EU

193 2006 and 2008 Impact Assessments, SEC (2006) 1719 and SEC (2008) 85
194 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016
195 "Renewable Energy in Europe 2016 – Recent growth and knock-on effects", EEA, 2016, No 4/2016
196 ""“Draft Renewable Energy Progress Report”, Öko Institute [to be published]
197 Based on EurObserv'ER database and EurObserv'ER 2015 report
198 OECD Business and Finance Outlook 2016, OECD, 2016
199 Article 4.19 and Article 6.4a of Paris COP 21 agreement

ambition to be the world leader in renewable energy. Moreover, it is a necessary stepping stone towards the 2050 decarbonisation commitments assumed by the EU.

This calls for revisiting and reinforcing specific areas covered in the current RES Directive in the context of the forthcoming revision proposal of the Renewable Energy Directive for the post 2020 period. These areas are:

- Effort sharing, national contributions, Member State and regional cooperation, and their relevance for the new 2030 climate and energy target architecture;
- National planning and governance of Member State contributions;
- Framework conditions for greater encouragement of renewable energy investments;
- Principles on the design of support schemes;
- Market integration of renewable electricity, cost-effectiveness and increased role for consumers, including, self-consumption;
- Relevance and adequacy of the current provisions on renewable energy promotion in the energy heating and cooling and buildings, as well as in the transport sector;
- Sustainability criteria for the bioenergy use, and
- Incentives for innovation in technology, processes and systems.

In the light of the new 2030 target architecture and wider EU energy legislative reviews, some of these legal provisions will require simplification and integration within other EU energy legislation, while others will need to be adapted and eventually expanded to make them fit for a cost effective delivery of 2030 energy and climate targets, the Energy Union Strategy priorities and the EU ambition to be the world leader in renewables.

Bearing in mind the impacts, as discussed in section 5.3 and 6.1.4, the RES Directive and, most importantly, its adaptation to the new EU energy and climate framework for 2030 remain relevant for at least three of the five pillars on which the Energy Union is built, notably energy security, decarbonisation, research and innovation, and competitiveness. A continued and sustained renewable development will be necessary for the EU to be able to continuously reduce costly energy imports and import dependency, reduce GHG emissions and develop an innovative and competitive industry.

6.3.2. To what extent is the RES Directive complementary to other EU initiatives in the field and has synergies with them?

The RES Directive complements EU initiatives to reduce greenhouse gas emissions, most notably the European Emissions Trading Scheme (ETS), by increasing the share of low-carbon technologies in the energy sector. Similarly renewable fuels contribute towards the 6% reduction in the greenhouse gas (GHG) intensity of fuel required by Article 7a of the Fuel Quality Directive (FQD). Furthermore, the RES Directive supports EU initiatives to ensure security of supply, such as the

energy security package presented by the Commission in February 2016[200], by promoting the use of indigenous energy resources, promoting energy diversification and reducing the reliance on imported fuels. The RES Directive has also encouraged continuous deployment of RES technologies, therefore supporting the creation of new opportunities for local jobs, economic activity and improved competitiveness, while at same time contributing to technology development and bringing innovative technologies on the market.

The existing synergies between the RES Directive and other EU initiatives will have to be strengthened beyond 2020. In particular, the provisions regarding the administrative procedures, regulations and codes (Art. 13), and access to, and operation of the grids (Art. 16) in the electricity sector will need to be aligned and simplified according to the new electricity market design package. Similarly, future provisions regarding the achievement of the EU-wide renewable energy target will need to be aligned with the Governance framework for the Energy Union. The synergies between Article 13(4) of the RES Directive on increasing the share of renewable energy in the heating and cooling and building sector and those of Energy Efficiency Directive and Energy Performance of Building Directive will also need to be improved and simplified.

6.4. Coherence

The analysis on **coherence** places the RES Directive into the wider context of energy market, energy and climate policy legislation, including the ETS. The 2015 State of the Energy Union report[201] confirmed that the EU climate and energy legislation, including the EU Emission Trading System and Effort Sharing Decision, the RES Directive and the Energy Efficiency legislation, are effectively contributing in a consistent and coherent fashion to the achievement of the EU climate and energy objectives for 2020. Nevertheless, further work remains to be done in each of the areas at national and EU level in order to ensure their timely implementation.

6.4.1. Is the RES Directive coherent with other EU policies in the area of energy and climate change?

The evaluation indicates that the Renewable Energy Directive has been coherent with the EU policies for combating climate change, reducing greenhouse gas emissions, achieving sustainable development and ensuring security of supply and improved energy efficiency. These include:

- the EU Emissions Trading Scheme (ETS) before and after 2020[202], and its impact on the competitiveness of renewable energy resources;
- Directive on internal electricity market;
- the requirements on State Aid;
- the existing and revised Directive on Energy Efficiency[203], the Energy Performance of Buildings (EPBD) Directive[204],

200 The package adopted by the Commission consists of proposals for a Security of Gas Supply Regulation, a Decision on Intergovernmental Agreements in energy, a strategy for liquefied natural gas (LNG) and gas storage, and a strategy for heating and cooling

201 "State of the Energy Union 2015", COM (2015) 572 final

202 "Proposal for a Directive of the European Parliament and of the Council amending Directive 2003/87/EC to enhance cost-effective emission reductions and low-carbon investments", 2015, COM(2015)337 final

- the Commission Communication on an European strategy for low-emission mobility[205];
- the Commission Communication on global technology and innovation leadership[206]

Coherence with ETS

The functioning of the ETS and the renewables contribution to GHG reductions are closely interlinked and complementary[207]. Both instruments aim at decarbonising the energy system. The deployment of renewables induced by the Directive has contributed to a slight reduction in demand for EU ETS allowances. However, the overall surplus of allowances (2 billion allowances surplus at the start of 2013) implies that the price-dampening effect of new renewable energy was extremely limited. The overall deployment of renewables induced by the Directive has worked in synergy with the EU ETS by ensuring that regulatory, administrative and energy operating systems adapted to a low carbon energy future and allowed the ETS price signal to feed through to suppliers.

Several economic and political developments (e.g. lasting demand reduction resulting from financial crisis in 2008) resulted in an ETS price that remained lower than expected. While the ETS was successful in reaching the agreed decarbonisation targets, the carbon price remained too low to achieve also a substantial shift from carbon-based power production to RES generation. The RES Directive therefore is an important complementary instrument to ensure the shift of the electricity generation assets towards RES production.

The strengthened EU ETS, with a functioning Market Stability Reserve, should contribute to improving the investment signal for lower carbon technologies, including renewables, in the future, further enhancing the case of full consistency and mutually supportive instruments.

Even though the ETS carbon price can be expected to increase as scarcity in the carbon market will resume, the uncertainty on long term CO_2 price development seems to remain an impediment for investors to fully factor in future prices in investment decisions.

Coherence with internal electricity market legislation

With significantly increasing volumes of RES production, the issue of consistency between internal market rules and RES Directive gained importance in recent years. National support schemes often incentivised RES production without sufficiently taking into account the actual demand for electricity or the infrastructure situation. This led to increased electricity production in times when it was not needed and at places where it could not be transported efficiently. Support schemes which do not sufficiently respond to market-signals reduce the capability of the electricity wholesale electricity market price to act as central steering mechanism for effective and cost-efficient electricity trade and investment decisions. Such distortions entail the risk of fragmenting national markets, thereby counteracting the purpose to use cross-border trade and aggregation of variable

203 2016/ENER/002- final references to be added
204 2016/ENER/023- final references to be added
205 Communication on an European strategy for low-emission mobility, 2016
206 Final references to communication on Technology Innovation and Leadership Initiative to be added
207 "A policy framework for climate and energy in the period from 2020 up to 2030", SWD(2014) 15 final

RES across borders to drive down prices for consumers. The Commission has described this problem extensively in its Communication on State Interventions in energy markets[208].

There is also an interlink and coherence with the Internal Electricity market provisions to the extent that the RES Directive addresses grid system issues, such as a guarantee of access for RES into the grid and developed the role of the Guarantees of Origin, as well as with regard to the infrastructure development provisions in Art 16. The 2009 RES Directive established priority access and dispatch for renewable energy to compensate for electricity market rules not providing renewable producers the opportunity to fully participate in the market[209].

In this light, the provisions in the RES Directive will need to be revised and streamlined to ensure continued coherence with the future design of the Electricity Market. Overall, this could result in a simplification of EU legislation as market related provisions could be integrated into one single piece of EU legislation. Furthermore, while transmission system operators (TSOs) set out their needs in the ten year national plans, distribution grid companies (DSOs) are less transparent regarding upcoming infrastructure requirements. An interaction in the investment planning process between TSOs and DSOs could effectively increase the efficiency and effectiveness of the investments. In this regard, the REFIT evaluation study indicated that, due to the fundamental change of the energy system by integrating decentralised RES, the whole planning process should consider switching from a top-down planning into an integrated process, where TSOs also consider the grid expansion at the DSO level[210].

Coherence with State Aid

The Commission's guidance for the design of renewables support schemes[211], followed by the Guidelines on State Aid for Environmental Protection and Energy 2014-2020 (2014 EEAG)[212], triggered the emergence of more market based support schemes and slight improvement in the convergence of national support schemes, also as Member States started learning from each other relevant practices and experiences. However, the 2014 EEAG only apply until 2020. They are to be assessed and revised in the coming years, which is raising significant uncertainty amongst stakeholders as to their content after 2020. Binding framework principles for the RES support schemes do still not exist in EU energy legislation. Investors, Member States and other stakeholders have called on various occasions for clarity to be provided on the future framework principles for support schemes after 2020 through the revision of the Renewables Directive in complementarity with State Aid rules.[213]

Coherence with the Energy Efficiency Directive (EED) and Energy Performance of Buildings Directive (EPBD)

208 See Communication "Delivering the internal electricity market and making the most of public intervention" of 5.11.2013 - C(2013) 7243 final

209 Due amongst other things to the lack of liquid intraday and balancing markets, the absence of rules fit for renewables, the lack of sufficiently flexible power systems

210 "Mid-term evaluation of the Renewable Energy Directive. A study in the context of the REFIT Programme", CE Delft , 2015

211 "Commission Staff Working Document - European Commission guidance for the design of renewables support schemes", SWD(2013) 439 final

212 "Guidelines on State aid for environmental protection and energy 2014-2020", OJ 2014/C 200/01

213 This was precisely highlighted by Member States and stakeholders in the conclusions of the Electricity Regulatory Forum held in Florence on 13-14 June

The RES Directive requires Member States to introduce minimum levels of renewable resources in new buildings and in existing buildings that are subject to major renovations. This provision is set to fully complement the requirements for nearly-zero energy buildings and energy performance standards in the existing EPDB directive.

Various stakeholders pointed to the need for improved alignment of the national measures to implement relevant European directives in the area of energy efficiency and promotion of renewable energy use in heating and cooling and buildings (i.e. the Energy Efficiency Directive, the Energy Performance of Buildings Directive and the Renewable Energy Directive).

Continued coherence will need to be ensured between the revised RES Directive, the revised Energy Efficiency Directive and the revised Energy Performance of Buildings Directive, particularly as regards possible future provisions on renewables deployment in the heating and cooling sector.

Coherence with other policies

The development of a market for renewable energy sources has a clear positive impact on regional and local development opportunities, rural development, export prospects, social cohesion and employment opportunities, especially as it concerns small and medium-sized undertakings as well as independent power producers. Renewables (especially solar PV technologies) usually create more jobs than conventional energy per unit of energy generated, capacity installed or investment. In the EU, this is amplified by the fact that the RES value chain is mostly European (manufacturing, construction, maintenance, agriculture, tertiary and research….), while the largest share of employment in the oil, natural gas and coal sectors is found in resource extraction and tertiary[214].

6.5. Added value

The following three evaluation questions on added value, given that they are closely interlinked, have been addressed jointly.

6.5.1. What is the EU added value of the RES Directive (can the objectives be better achieved by action at the EU level)?

6.5.2. Why could the RES Directive objectives be better achieved by EU action?

6.5.3. Would it be possible to achieve the same results in the absence of the RES Directive?

The Renewable Energy Directive as whole and its specific requirements (e.g. national binding targets, national renewable energy action plans, grid access) had an added EU value effect on the renewable energy deployment in all Member States. Former experience with 2001 and 2003 indicative targets for renewable electricity and transport proved that, without binding targets, substantial RES deployment would have remained very low and limited in few Member States[215]. Furthermore, the added value of the indicative interim trajectory consisted in ensuring that measures to achieve the national binding targets are introduced timely, with clear benchmarks for following the progress and assessment of Member State actions.

214 "Renewable energy jobs: Status, Prospects & Policies ", IRENA, 2011

215 CE Delft, 2015

The Directive as a whole and its provisions on the national binding targets, together with the national measures adopted by Member States to achieve these targets, resulted in economies of scale and technology cost reductions and development of new on-shore and off-shore wind and photovoltaic capacity and the rise in PV deployment for self-consumption as already elaborated in this document. This EU added value effect remains valid and will become even more relevant as the EU prepares to move from the current national binding target framework to an EU level binding target of at least 27% for 2030. In the absence of national binding targets for 2030, the achievement of this target will ultimately rely on Member States contributions to the EU level target.

The National Renewable Energy Action Plans, required by the RES Directive, increased the transparency of the measures and expected renewable energy technology choices planned by Member States in the area of renewable energy deployment, and this information on national strategies and technology choices provided a considerable added value for investors. Even though, actual policy measures and technology deployment rates by 2015 eventually started to differ from the initial Member State intentions outlined in the plans, they still served as useful reference in the assessment of actual RES market developments in Member States and the EU as a whole. Overall, the benefits of this national planning obligation were rated high for all five Better Regulation criteria[216].

Despite their slow uptake, the renewable energy cooperation mechanisms (Articles 6-12) eventually provided an EU added value and incentive for exploring regional cooperation and joint initiatives in renewable energy development. Best-practice sharing amongst Member States in different stages of advancement in RES policies and previous RES development record through the Concerted Action for the Renewable Energy Directive is just one such example of the EU added value. Member States' working parties on RES support schemes, including RES cooperation mechanisms, and biofuel sustainability have been amongst the most active working formats in the Concerted Action on the Renewable Energy Directive.

The evaluation also indicated that unexpected and eventually retroactive changes in national renewable energy support schemes occurring in some Member States had a cross-border effect on investments in other Member States. Whilst this was already addressed through the Commission's Guidance on the support schemes[217] and the revised Energy and Environment State Aid Guidelines[218] and it is still up to Member States to decide which specific renewable energy support measures they use, a need for some of principles on renewable energy support across all Member States is emerging from the views expressed in the public consultation and the continuous exchanges on the RES support schemes in the Concerted Action for the RES Directive[219]. A number of Member States are already moving towards increased regional cooperation on renewable energy support, including partial opening of their support schemes to RES producers from neighbouring Member States.

By excluding the production of biofuels on areas of high biodiversity and carbon value and by laying down biofuel sustainability criteria and methodology, the RES Directive has equally established

216 See Fitness check of the Reporting, Planning and Monitoring Obligations in the EU energy acquis. Reference number to be added when this REFIT is adopted

217 "Commission Staff Working Document - European Commission guidance for the design of renewables support schemes", SWD(2013) 439 final

218 Communication from the Commission "Guidelines on State aid for environmental protection and energy 2014-2020", OJ 2014/C 200/01

219 This was precisely highlighted by Member States and stakeholders in the conclusions of the Electricity Regulatory Forum held in Florence on 13-14 June

common EU sustainability criteria, preventing market fragmentation and potential trade barriers that could have been created in case of diverging national sustainability rules.

The RES Directive (and the energy efficiency legislation) served as a reference for establishing dedicated investment priority lines supporting Member State investments in transition to low carbon economy in the European Structural and Investment funds, and for the EIB group lending, including in the framework of the European Fund for Structural Investments. These priorities remain valid, as the EU prepares itself for achieving the 2030 energy and climate targets in line with its COP21 commitments and renewed commitment to foster sustainable and green investments[220].

Finally, the RES Directive (together with other parts of 2009 climate and energy package) and the EU global leadership role on renewable energy contributed to the global spill-over of renewable energy policies. In 2015, at least 173 countries had adopted renewable energy targets (not considering the intended nationally determined contributions prior to COP21), and an estimated 146 countries had renewable energy support policies[221].

7. CONCLUSIONS AND RECOMMENDATIONS

The comprehensive REFIT evaluation study of the Renewable Energy Directive carried out between 2014 and 2015 concluded that the objective of sustainably increasing the share of renewable energy in the EU final energy consumption has been successful. The binding national targets, the National Renewable Energy Action Plans and the biennial monitoring[222] provided for by the RES Directive have been particularly effective for promoting transparency for investors and other economic operators, and have ensured high quality information on renewable energy markets and policies in the Member States. This is illustrated by the rapid deployment increase after the date of adoption of the Directive, passing from 10.4% share of renewables in 2007 to 17% in 2015[223].

These legal provisions, together with additional national policies and other non-regulatory measures, have contributed to the overall achievement of EU's energy and climate policy goals, resulting in greenhouse gas emission saving, increased security of energy supply, innovation leadership, employment creation, public acceptance and regional development. They have proved their relevance, coherence, efficiency, effectiveness and added value for the overall EU energy and climate change objectives. Renewable energy is, currently, the only decarbonisation option in the power sector deployed at a rate that is close to what is required under long-term IEA scenarios to limit global temperature rise to 2°C above pre-industrial levels[224].

However, even if the EU and all but one Member States are currently on track towards its overall renewable energy 20% target for 2020, target achievement by 2020 will only be secured if Member States continue to meet their increasingly steep trajectories. Furthermore, the sectorial 10% renewable energy target in transport will not be met at the current progress rate. The regulatory uncertainty caused by the long political discussion on ILUC, the late adoption of the amendments on ILUC to the RES Directive and the lack of a post-2020 policy for transport, together with the lack of

220 "Europe investing again: Taking stock of the Investment Plan for Europe and next steps", COM (2016) 359 final

221 Renewables 2016 - Global Status Report, REN21, 2016.

222 National Renewable Energy Action plans and biennial national renewable energy progress reports are legal requirements set out in Art. 4 and Art.22 of the Renewable Energy Directive

223 EUROSTAT

224 IEA, 2015

commercial availability of alternative fuels and advanced biofuels at the needed scale and pace, have had a negative impact in the deployment of renewables in the transport sector.

In addition, the effectiveness of the national targets, based on a flat-rate/GDP approach (as opposed to an approach based on national potential, which would have been more cost effective, but considered less equitable[225]) was, however, compromised by the fact that flexibility and trading options were not utilised by the Member States as expected during the reference period. However, intergovernmental negotiations that were held in 2015 and 2016 amongst several potential "selling" and "buying" Member States, demonstrate increasing mobilisation of efforts towards concluding the first renewable energy cooperation agreements.

Another issue which requires follow-up is the level of investments in renewable energy. Their decline after 2011 due to undermined inverstor confidence and some external factors highlights the need to reflect on how investors' legitimate interests can be better protected.

The REFIT evaluation study of the RES Directive has also pointed to a number of shortcomings in the Renewable Energy Directive:

- *National renewable energy action plans*: While the national renewable energy action plans provided transparency and information for investors on Member States' plans for renewable energy development, they eventually became outdated as the RES Directive does not require their regular updating to adjust them to policy and global economic changes. This shortcoming was largely compensated by biennial national RES progress reports that provided regular updates on national regulatory and financial measures in the renewable energy space. In the context of the new 2030 Climate and Energy Framework and Energy Union Governance process, the current legal provisions on the planning and reporting will need to be revised for post 2020 period.

- *Cooperation mechanisms*: The cooperation mechanisms set out in the RES Directive have not yet been used to any significant extent by Member States, with exception of the joint Swedish-Norwegian support scheme. In the RES Directive, the use of cooperation mechanisms is voluntary and Member States have so far, for various reasons, preferred to use national renewable energy sources for target achievement. The opportunity given by the RES Directive to share the efforts to achieve the renewable energy target cost-effectively has, therefore, been rather underused. However, as national interim trajectories become steeper after 2015, a number of Member States are currently in active phase of negotiations aiming to conclude such cooperation mechanisms, in the form of a partial opening of national support schemes, or statistical transfers. Even so, revised provisions providing Member States with financial incentives or obliging them to resort to cooperation mechanisms might be needed to foster regional cooperation and ensure that the 2030 renewable target is achieved collectively and cost-effectively.

- *Renewable energy support schemes:* Pursuant to Article 3(3) of Directive 2009/28/EC, support schemes are but one instrument - amongst others - that can be chosen by Member States to achieve the binding national RES targets. The majority of the Member States though used them as part of their RES policies. In the absence of clear principles established in the RES Directive, Member States had wide discretion in their decisions on the design and scope

[225] "Package of Implementation measures for the EU's objectives on climate change and renewable energy for 2020", 2008, SEC(2008) 85

of renewable energy support schemes. As the cost of renewable energy technologies fell, several national support schemes were unable to be adapted rapidly enough. As a result, technology bubbles were encouraged, resulting in market distortion and fragmentation.

- *Administrative procedures*: Administrative and planning systems are very diverse across the EU Member States and progress in simplifying them has been hampered due to the large margin of discretion left in the legal provisions of Art. 13(1). Clear and transparent rules are not yet in place in all Member States and at all necessary levels. The absence of clear legal requirements to establish one administrative entity (one-stop shop) for the permit granting procedures and the absence of maximum time-limits for permit granting in Member States are still perceived as major administrative obstacles and an additional cost burden to project developers. In view of tackling investment bottlenecks and lengthy project approval procedures, further reinforcement of these provisions might need to be considered for the amended post 2020 legislation[226].

- *Renewable energy in heating and cooling supply and buildings:* The RES Directive recommended Member States to promote and integrate renewable energy in the urban and local environment (*e.g.* newly developed areas, district heating and cooling systems), and to mandate renewable energy use through buildings codes for new buildings as of 2015, while leaving full discretion to the Member States as regards implementation modes. Despite the long term decarbonisation goal in the heating and cooling sector and in buildings, the existing framework did not provide sufficient incentives for fuel switching from fossil to renewable energy in the heat supply and buildings. Further reinforcement of these provisions might need to be considered in the revision of the Directive for post-2020.

- *Grid access rules*: Certain provisions of the RES Directive are not specific enough (*e.g.* providing deadlines for their implementation) for the purpose of enabling better monitoring and enforcement. The Directive also leaves discretion to Member States on whether shallow or deep grid charging is applied, which considerably changes the risk and thus the cost for new renewable installations across Member States. In view of the intended wider electricity market reform, some of the current legal provisions on RES electricity integration might need further streamlining and integration with the electricity market legislation.

- *Self-consumption*: The RES Directive does not contain specific provisions on self-consumption, which has given Member States a wide discretion to regulate this type of emerging form of renewable energy generation. This has led to a wide range of policies across the EU, some of them hampering self-consumption development. The benefits of introducing framework principles on self-consumption to guarantee the Energy Union's objective of empowering consumers could be assessed in the revision of the legislative framework for post-2020.

[226] Building on the previous rather general requirement set out in Directive 2001/77/EC for Member States to take action to reduce and simplify administrative procedures, the impact assessment accompanying the proposal for the RES Directive considered a reinforced "national action" approach without specific EU guidance as the most appropriate way forward. However, the REFIT evaluation study concluded that even the reinforced provisions of Article 13(1) of the RES Directive have not substantially improved the situation and the public consultation for the present Impact Assessment demonstrated clear support for a more stringent approach and harmonised EU minimum rules in the post-2020 period

- *Guarantees of origin (GO)*: The regulatory framework in the RES Directive has not provided sufficient clarity and suitable provisions for the creation of a comprehensive, liquid and harmonised GO system for all energy sources throughout the EU. It allows for the provision of "green" supply contracts which are dissociated from the physical delivery of renewable electricity. The revision of this provision in the context of the legislative work for the post-2020 energy framework could look at improving the consistency in the application of the system by Member States as well as extending their use.

- *Bioenergy sustainability*: Indirect effects of biofuels were not included from the very beginning in the legal sustainability scheme for biofuels and bioliquids, creating policy instability and a serious slowdown in investments, including in advanced biofuels. Different national implementation modes of the criteria, including a lack of mutual recognition of national certification schemes, have led to some market fragmentation. Harmonized and comprehensive EU sustainability criteria for uses of all solid and gaseous biomass in the energy sector (electricity, heating and cooling and transport) were not included either. In a post-2020 scenario consideration should be given to the opportunity of revising the sustainability criteria to account, not only for biofuels and bioliquids as it is already the case, but also for solid and gaseous biomass, in a cost-efficient way. Furthermore, the future framework should give consideration to effective and pragmatic ways to enhance renewables deployment, notably advanced biofuels, in the transport sector, building on current practices of most Member States, including through improved incorporation mandates across the EU. Improved information and tracking systems are also needed to prevent fraud and abuse.

- *Synergies and coherence with other EU policies*: the RES Directive complements EU initiatives to reduce greenhouse gas emissions, such as the European Emissions Trading Scheme (ETS) and the Fuel Quality Directive, and to ensure security of supply. Nevertheless, there is a need to review consistency given that many other legislative acts are in process of being revised. In particular, the provisions regarding the administrative procedures, regulations and codes (Art. 13), and access to, and operation of the grids (Art. 16) in the electricity sector will need to be aligned and simplified according to the new electricity market design package. Similarly, future provisions regarding the achievement of the EU-wide renewable energy target will need to be aligned with the Governance framework for the Energy Union. The synergies between Article 13(4) of the RES Directive on increasing the share of renewable energy in the heating and cooling and building sector and those of Energy Efficiency Directive and Energy Performance of Building Directive will also need to be improved and simplified. Last but not least, clarity should be provided on the future framework principles for support schemes after 2020 through the revision of the RES Directive in complementarity with State Aid rules.

Annex 1: Table on Member States' performance towards their renewable energy targets (%)

	Share of energy from renewable sources in gross final consumption of energy	Targets	
Member States	**2014**	**Indicative trajectory for 2013-2014**	**2020 Target**
Belgium	7,9	5,4	13
Bulgaria	18	11,4	16
Czech Republic	13,4	8,2	13
Denmark	29,2	20,9	30
Germany	13,8	9,5	18
Estonia	26,5	20,1	25
Ireland	8,6	7	16
Greece	15,3	10,2	18
Spain	16,2	12,1	20
France	14,3	14,1	23
Croatia	27,9	14,8	20
Italy	17,1	8,7	17
Cyprus	8,9	5,9	13
Latvia	38,7	34,8	40
Lithuania	23,9	17,4	23
Luxembourg	4,5	3,9	11
Hungary	9,5	6,9	13

Malta	4,7	3	10
Netherlands	5,5	5,9	14
Austria	33,1	26,5	34
Poland	11,4	9,5	15
Portugal	27	23,7	31
Romania	24,9	19,7	24
Slovenia	21,9	18,7	25
Slovak Republic	11,6	8,9	14
Finland	38,7	31,4	38
Sweden	52,6	42,6	49
United Kingdom	7	5,4	15

Source: Eurostat

Annex 2: Procedural information

Directorate General for Energy (Unit C1, Renewables and CCS policy) was the lead DG on the evaluation. A dedicated external study was commissioned in support of the evaluation process.

A study *Mid-term evaluation of the Renewable Energy Directive: A study in the context of the REFIT programme* was commissioned to CE Delft, with the Final Report of this study completed in April 2015. The interservice group with representatives from the following DGs met on the 2nd July 2015 and took part in the quality assessment of the external study: DG ENER, SJ, SG, AGRI, CLIMA, COMP, GROW, JRC, RTD and TAXUD.

The Interservice Group recalled that the new Better Regulation Guidelines were adopted on 19 May 2015. The Guidelines list five evaluation criteria (effectiveness, efficiency, coherence, relevance and EU added value of the intervention), which must be the basis of all evaluations, or evaluations must provide due justification why this has not been the case. Due the fact that evaluation study in support of REFIT Evaluation of the Renewable Energy Directive was carried out from 1 April 2014 (before the new Better Regulation Guidelines) were adopted until April 2015, the assessment on the 5th element, coherence, was not sufficiently well considered in the external evaluation study. The inter service group concluded that the analytical work for the assessment of coherence should therefore be carried out by DG ENER experts, and a full assessment based on all 5 assessment elements as required by the Better Regulation Guidelines should be fully reflected in the final evaluation SWD.

The present evaluation SWD includes full assessment based on all 5 Better Regulation assessment criteria, whereby the results of the underlying external study only form part of this complete assessment. The rest of data and analysis constitutes a result of additional analysis carried out by DG ENER experts and results of stakeholder consultation.

Annex 3: Synopsis report of stakeholder consultation in the context of the Study

The stakeholder consultation was intended to get feedbacks of the RED as well as learn about barriers and potential new ideas for REDII, through accessing the experiences of those most closely engaged in implementing the Directive, either as Member States, regional administrations, renewable and non-renewable industries, or as NGOs whose work is directly affected by it. The responses from these stakeholders form a major part of the analysis in the study. The consultation reflects the key principles of providing 'a simple consultation strategy identifying the encountered barriers and proposing potential solutions'.

Implementing the REDII Directive does not only engage the energy authorities in Members States but has implications for many other functions of government such as planning, economic, and rural development. Because they have implications for any plan or project affecting the grid no matter what its position (producer, TSO, DSO, end-user), and have a wider implications, they are of interest to a very wide range of private sector and civic in fields such as transport, electricity, heating & cooling, commercial development.

The Study applied a range of approaches to collect feedbacks but also allowed for unsolicited contributions of evidence from groups or interests. The main approaches were:

- Meetings with EU stakeholders groups;
- A public on-line questionnaire using EU Survey;
- A dedicated High-level Conference (05.02.16).

Meetings with EU stakeholders groups

Thirteen EU focus group meetings were held: EGEC (17/12/2015), RESCoop (17/12/15), Eurelectric (15/01/2016), Norsk Industri (20/01/2016), IBEC (21/01/2016), GRDF (01/02/2016), SolarPower Europe, European Wind Energy Association, Ocean Energy Europe, European Geothermal Energy Council (04/02/2016), EWEA (12/02/2016), Greenpeace (25/02/2016), EGEC + AEBIOM (25/02/2016), Euroheat & Power (02/03/2016), Danish Energy Agency (16/06/16), Spanish Energy Ministry (16/06/16). This provided an opportunity to explain and discuss the mandate questions with a view to promoting a good response rate from the different stakeholder groups. In total, 13 organisations participated in these meetings. Discussions covered various range of topics in each case based around practical experiences of the operation of the Directive and ideas about improving the upcoming one.

Open Public Consultation

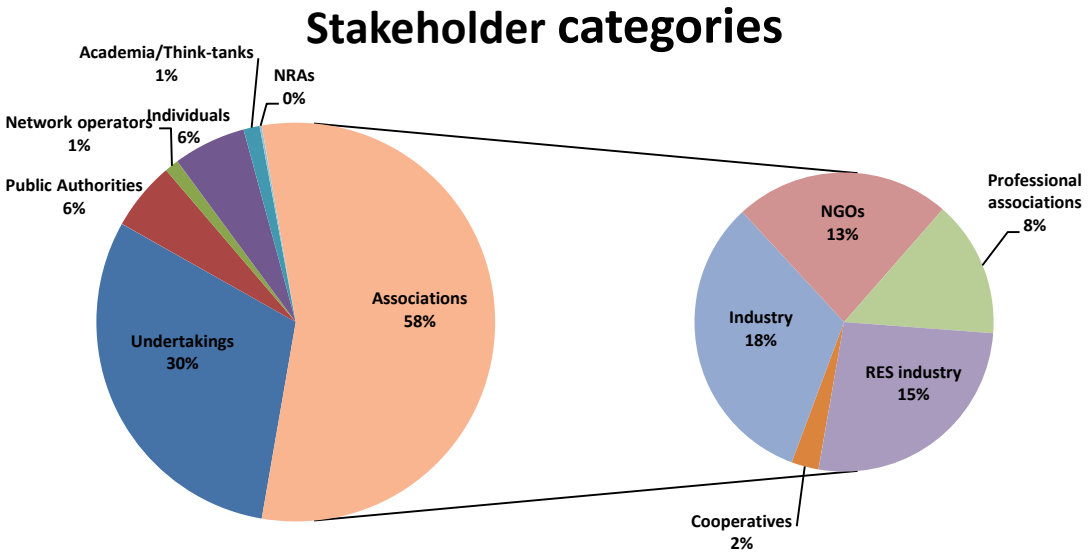
A number of dedicated evaluation questions were included in the public consultation on the new Renewable Energy Directive for the period after 2020 that took place from the 18th November 2015 until 10th February 2016[227].

The questionnaire was divided into five sections: general approach, empowering consumers, decarbonising the heating and cooling sector, adapting the market design and removing barriers and

[227] "Public consultation on the Renewable Energy Directive for the period after 2020: Analysis of stakeholder views", 2016

enhancing renewable energy use in the transport sector. This questionnaire asked 30 questions. Concerning questions on the RED and used for the present REFIT evaluation, eleven questions were relevant: 1, 2, 7, 10, 12, 15, 16, 24, 25, 28, 29, including some indirect questions as describing the barriers. All five sections were covered. The questionnaire did limit the length of response from stakeholders to 3600 characters, and was thus designed to allow scope for as much significant and pertinent information and evidence to be provided.

The Commission received replies from 11 Member States. Most stakeholders answered most of the questions. The general distribution of stakeholder's responses is detailed in the following pie chart:



Link to the Public Consultation Website:
https://ec.europa.eu/energy/en/consultations/preparation-new-renewable-energy-directive-period-after-2020

Link to the Public Consultation survey and Link to the Individual submissions:
(accessible via RES Public Consultation website):
https://ec.europa.eu/energy/en/consultations/preparation-new-renewable-energy-directive-period-after-2020

Link to Public Consultation results (Summary):

https://ec.europa.eu/energy/sites/ener/files/documents/Summary%20RED%20II%20Consultation.pdf

High-Level Conference – 5th February 2016

On 5th February, the European Commission, DG Energy, organised the meeting **"EU leading on renewables – Consulting stakeholders**", set in the context of the public consultation on the Renewable Energy Directive for the post-2020 period. The encounter gathered over 100 officials and experts, representing industry, energy sector associations, consumer and energy users' organisations,

regulators, transmission system operators, energy efficiency organisations, governments, local authorities, renewables' cooperatives, financiers and project developers, NGOs and academia. Several Commission services, the European Parliament and the Dutch Presidency were also represented (list of participants provided in annex).

The discussion focused on three points: "Making Renewables' Happen", i.e. how to get to a minimum 27% share by 2030, "Empowering consumers and communities to reap off the benefits of renewables at local level", and "Financing renewables' deployment over 2020-2030". The exchanges were enriching throughout all three sessions, as acknowledged by many of the participants.

Key messages from the RED Public consultation[228]

Achieving a share of 20% of renewable energy by 2020 and binding national renewable targets

The vast majority of the responders that commented on the evaluation of the RES Directive **acknowledged its success** in promoting RES deployment, in reducing the cost of technologies (especially PV) and in engaging MSs towards a decarbonised system. Indeed, there was a consensus among Member States and public authorities on the success of the RED helping to achieve the EU energy and climate change objectives. These views are also supported by other categories of stakeholders, including non-conventional energy industries.

With respect to the cost-efficiency of renewable energy incentives in Member States, among those stakeholders who answered the question on effectiveness and efficiency of the Renewable Energy Directive, some stakeholder groups criticized the RES support incentives for their impact on the electricity prices. Others noted the absence of a competitive market environment as a barrier to RES investments. Most stakeholders tend to agree on the need to avoid retroactive changes in legislation that have harmful impact on investors trust. Some stakeholders stress the need to avoid mistakes like imposing taxes on PV imports and replace them e.g. with quality tests for such products.

Overall stakeholders praised the importance of the EU renewable energy target and national binding targets as an effective stimulus for the renewable energy sector. Member State replies noted that in the absence of legally-binding national RES targets in the 2030 framework, cooperation mechanisms would be more relevant after 2020 and will have a more significant role in achieving the objective. It will provide the needed flexibility for the Member States while reaching overall European Union's climate and energy goals.

Achieving 10% target for the 2020 share of renewable energy in the transport sector, and sustainability scheme for biofuels

There is a general agreement among different stakeholder groups that the **RED has contributed to addressing the EU transport policy objectives**.

Renewable energy measures for transport sector (RES targets, mandates) were considered as successful means to address the EU transport policy objectives initiating the process of the decarbonisation of the EU transport sector, and the EU biofuel sustainability scheme is regarded as very successful at increasing efficiency and sustainability of biofuel production and agriculture

[228] Precise quantification of stakeholders' replies in percentage shares was not possible due to the fact not all questions were answered by all respondents. In some cases, only half of respondents replied to the specific question. Quantification of partial responses would lead to distorted representation of views.

sector. The producers of agriculture commodities, traders, biofuel producers and renewable energy associations/ centres believe that the RED has contributed to the development of biofuel market and industry, with benefits also in terms of employment and rural development. But NGOs consider that the RED was not been successful due to indirect land use change (ILUC) impacts of crop-based biofuels.

However, appreciation of the Directives success with respect to 10% renewable energy target in transport, is less pronounced in the public consultation replies. The main reasons for the slow EU and Member State progress towards 10% renewables in transport, according to stakeholder views, is the slow uptake of advanced biofuels, biomethane, renewable electricity and hydrogen in transport sector so far (based on 2015 data). The political and legal uncertainty linked to the long ILUC Directive process was also quoted. Also the complexity, lack of clarity of the legal provisions of the RED, and the delay and lack of consistency of the RED implementation in the Member States were criticised. According some stakeholders, the RED could have delivered more, particularly as regards reduction of oil imports and air pollution.

National Renewable Energy Action plans and national measures

When asked about the main lessons from RED, the three most mentioned instruments contributing to the Directive's effectiveness were national renewable energy action plans (NREAPs), binding national renewable energy targets and biennial reporting. Altogether, these provisions are considered to have provided clarity on national renewable energy deployment potential and have driven investments in renewables across the EU.

With regards to national plan, many stakeholders consider it as an important element and some believe that national plans have been useful and have contributed to target achievement.

Considering binding national renewable energy targets, many stakeholders believe that national binding target is the best method to ensure compliance with the EU wide target. On the reporting obligation, many stakeholders concede that the standardised reporting facilitated the monitoring of the Member State actions and increased transparency for investors. Providing a detailed template for planning and reporting is a key lesson from RED.

However, some stakeholders have pointed out that national plans would have been more effective if they had taken environmental sustainability and impacts into consideration, have had a spatial planning dimension and had to be periodically updated. Overall, there is a broad consensus among stakeholders on the fact local RES is very much underexploited.

Cooperation mechanisms

The public consultation shows that the main reasons for the **limited use of cooperation mechanisms** to date according to stakeholders have been Member States' reluctance to see their taxpayers or consumers' money used for investments outside their country and the lack of cost-effectiveness or uncertain benefit for individual Member States. Indeed, the majority of the respondents within 75% of the stakeholder groups - including the larger stakeholder groups like the RES industry - described as a key barrier the difficulties in communicating to the electorate that tax money has been spent on development of RES projects abroad, as this implies that benefits in terms of for instance jobs, economic/ industrial growth, tax income and security of supply are not created within national borders.

Besides, the administrative and regulatory barriers associated with making use of cooperation mechanisms like for instance a joint support scheme is a core reason for why the use of cooperation mechanisms has been limited. Indeed, network operators and public authorities consider administrative complexities as a major factor explaining the limited recourse by Member states to cooperation mechanisms whereas, non-renewable energy industries did not consider this factor as a major obstacle.

The role of the guarantees of origin (GOs)

Around 36% of stakeholders highlighted the low consumer awareness of the GO system, pointing to the need for more transparency and accuracy. A lack of consistent basis for an effective European disclosure system with GOs has been pointed out.

Strengthening the disclosure and the GO systems would generate more competition in the electricity market, lead to better offers for final customers, and facilitate the promotion of renewables. Around 40% of the respondents to the stakeholder consultation supported the idea that GOs should be extended to all kinds of production (for example, coal, gas and nuclear) and around 24% were in favour that information on CO2 emissions should be added to GOs in order to create more awareness of the origin of electricity.

Administrative procedures

Around 60% of all respondents, including 30% of the Member States, have not replied or have expressed no option regarding the administrative burden and cost of compliance with the Renewable Energy Directive.

Among those stakeholders that replied to the question on administrative barriers, the prevailing view is that **progress on removal of administrative barrier has been limited and that Art. 13 (1) provisions should be strengthened**.

Most stakeholders participating in the public consultation believe that administrative burden and compliance costs for national and local authorities due to the Directive have been important or very important (60%). This view is also shared by the majority of the Member States. Administrative burden of the current legislation is associated with the development of the national renewable energy action plans (NREAPs) and the introduction and implementation of new legislation, including on the sustainability scheme for biofuels, system of Guarantees of Origin etc. Cooperatives and representatives of local communities and municipalities point out that there seems to be too much administrative burden for small projects as administrative barriers weigh more on small local companies with a small portfolio then for big ones.

Slightly more than ½ of the respondents that expressed an opinion (54%) and the majority of the Member States (particularly smaller Member States) also believe that the cost of compliance with the RED were very important or important. Highest costs of compliance (for final consumers) are associated by the Member States with support schemes. As for the RES and conventional energy industries, it is the lack of transparency and harmonised EU market that increased both, the administrative burden and costs of compliance for industry.

RES in buildings and district heating and cooling

The public consultation highlighted an overwhelming consensus about the need to remove barriers hampering the deployment of renewable heating and cooling. A high number of respondents,

including Member States and renewable energy industry regard the absence of a functioning heat market as an important barrier.

Listing the barriers and measures in order of their importance, the vast majority of respondents quote the lack of energy strategies and planning at the national and local levels (for 84% of stakeholders), the lack of targeted financial resources and financing instruments (for 80% of stakeholders) and the lack of electricity market design supporting demand response as very important, or important, barriers hampering the deployment of renewable heating and cooling in the EU.