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# Efficiency First in the Energy Union: Progress Report

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## Introduction

**E**fficiency, including energy efficiency and demand response, are fundamental to the cost-effective transition to a decarbonised, reliable energy system. A recent analysis by the International Energy Agency finds that energy efficiency should account for 76 percent of emissions reductions for Europe by 2030 to meet the objectives set forth in the Paris Agreement. Demand response is necessary for the cost-effective integration of variable renewable energy resources and the uptake of electric vehicles and electric heating. The European Commission has estimated savings of 25 billion euros from the active participation of consumers, in the form of demand response and distributed generation, in power markets.

In consideration of these reasons and the health, air quality, and other many benefits of efficiency, the European Commission has adopted energy efficiency as a pillar of the Energy Union and “Efficiency First” (E1st) as a guiding principle underpinning it. This report serves to gauge progress on E1st in the Energy Union over the past year, since the release of the Clean Energy for All Europeans (CE4All) package in November 2016.

While not a new concept, the mainstreaming of E1st as a policy principle is a recent phenomenon in Europe. The principle is not yet defined in legislation—though proposals for a definition are under discussion in the current negotiations over the CE4All package—and there is no roadmap on how to embed it in policies at the European level. One of the leading recommendations by the authors of this report is for the European Commission to lead a process to do exactly this: to define E1st and to introduce a roadmap to identify the policies and processes where efficiency is ignored or undervalued. This would be the first step toward realizing the full benefits of efficiency in Europe.

The State of the Energy Union provides an opportunity to gauge progress over the past year in achieving a resilient Energy Union with an ambitious—and affordable—climate policy at its core. This report is intended as a complement to the Commission’s State of the Energy Union by looking more in-depth at progress on embedding E1st as a guiding principle in EU policies and priorities.

“Efficiency First” is a guiding principle for energy policy that would require delivery of energy savings and demand response among end-use customers whenever these resources are less costly or more valuable than supply-side alternatives. It begins with use of a systematic procedure to assess the potential for energy savings and demand response as the first step in energy planning, investment, regulation, and market design. Policies, investments, and practical measures that increase energy savings and demand response among end-use customers must be prioritised wherever they are found to deliver higher net benefits than investments in networks or supply alone.

This report is composed of two sections.

- **Section 1** gauges progress on E1st in Europe, with a focus on steps that the Commission has taken toward meeting its stated goal of incorporating E1st as a guiding principle of the Energy Union. The results are mixed. In some areas, there has been notable progress. On the whole, however, Europe is far from making E1st the backbone of the Energy Union. For this reason, we recommend a Commission roadmap and periodic assessment of progress to guide this process of integrating E1st into the energy and climate policy framework.
- **Section 2** takes a deeper look at progress on delivering energy savings in Europe over the past decade. Applying the most recently available data, it is clear that energy efficiency, alongside renewable energy, is a key driver of greenhouse gas emissions reductions in Europe. However, it is also clear that ambition continues to lag, and Europe is not yet progressing at the pace needed to meet the cost-effective potential.

## Progress on E1st: Scorecard

This scorecard builds on priority areas for delivering E1st, as identified by a diverse group of experts and published in *Efficiency First: A New Paradigm for the European Energy System and Governance for Efficiency First: “Plan, Finance and Deliver.”* The suggested action plan focused on 10 areas where the Commission’s leadership could put Europe on track to deliver the many economic, social, and environmental benefits of efficiency.

To deliver on E1st, the principle must be embedded into the regulatory and market framework guiding the energy transition. This includes, but goes beyond, traditional “energy efficiency” legislation. It must also include broader policies that avoid investment in stranded assets by taking a hard look at efficiency as a resource to the broader energy system.

While progress and leadership on efficiency happens at many levels—municipal, regional, national, European Parliament, Council of the EU, and European Council—the European Commission plays an important role in proposing, establishing, and monitoring many of the rules guiding national and local policies and decisions. 2017 has seen notable developments in the following areas:

- **CE4All Europeans:** The package, released on 30 November 2016, has been the subject of negotiations in 2017 and will continue into 2018. It represents the Commission’s vision

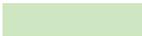
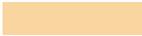
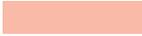
for the trajectory of Europe's climate and energy policy through 2030, and is therefore an essential landing point for the E1st principle.

- **EU Emissions Trading System (ETS):** Negotiations on the EU ETS continued into 2017 and concluded in November. The EU ETS, as a key instrument for driving decarbonisation in Europe, must be structured as a complementary policy—and not an impediment—to policies driving investment in efficiency and low-carbon resources.
- **Modelling/Impact Assessments:** The Commission bases its policy recommendations on modelling that assesses the costs, benefits, and other impacts of different policy scenarios. While highly technical, modelling is also highly influential, and has often been structured in a way that disadvantages efficiency compared to other resources.
- **Eurostat guidelines:** The statistical guidance that Eurostat provides has an effect on national, regional, and local policies. In particular, recent changes to Eurostat's guidelines on treatment of investments in energy efficiency on public balance sheets has the potential to lift a significant barrier to energy efficiency.

The table below is organized into three sections:

1. Embedding E1st into Europe's climate and energy framework
2. Energy sector planning, financing, delivery
3. Supporting implementation on local and regional level

It rates progress in these areas by color:

	Significant Progress
	Some Progress
	Little or No Progress

Note that the progress assessments do not consider amendments currently under consideration in the Clean Energy Package negotiations, but we hope to signal with this analysis areas that the Commission will attend to and monitor going forward.

Priority area for action	Description	Progress in 2017
<b>Embedding E1st into Europe's climate and energy framework</b>		
<b>Commission Action Plan for E1st</b>	Anchoring E1st in the complex EU policy framework will not happen on its own. It requires a process for assessing the opportunities to invest in efficiency, presenting a plan to realize these opportunities, and regularly monitoring progress on integration.	No action plan proposed.

Priority area for action	Description	Progress in 2017
<b>Embedding E1st into Europe's climate and energy framework</b>		
<b>E1st as a core principle to meet Paris objectives</b>	Bold efficiency policies, including policies driving energy efficiency (EE) and demand response (DR), are needed to enable the affordable transition to a decarbonised energy sector. This requires application of E1st across many policy portfolios as indicated by this progress report. It is further essential to design EE, renewable energy, and climate policies to complement and reinforce each other in driving emissions reductions.	Europe's climate, renewable energy, and EE policies must work together to drive down carbon emissions. The ETS cap is currently seen as placing a ceiling on ambition for renewables and EE policies, preventing the ETS, renewable energy policies, and EE policies from working together to accelerate emissions reductions over time. Progress has been made in the compromise text on the EU ETS adopted on 9 November that would increase the portion of surplus allowances going to the Market Stability Reserve, and retiring a certain level of allowances annually after 2023. The Commission's modelling of 2050 scenarios, which is currently being prepared, presents an opportunity to further embed Efficiency in modelling and better align policies.
<b>E1st in National Energy and Climate Plans (NECPs)</b>	NECPs play a vital role in holistically planning on national climate and energy policy.	The proposal for a Governance Regulation misses the opportunity to systematically incorporate efficiency into planning across relevant policy areas, including energy security and the Internal Energy Market, or to require that E1st be used as a guiding principle in the preparation of NECPs. Public engagement and transparency in developing and assessing progress on NECPs must be further strengthened to ensure a just and equitable energy transition, with EE as a pillar. <sup>1</sup>

<b>Energy sector planning, financing, delivery</b>		
<b>Appropriate discount rates for EE</b>	Impact assessments should apply a discount rate for EE that reflects the effects of policies in overcoming barriers to investment.	2016 modelling of the Energy Efficiency Directive (EED) has lowered the discount rate applied to EE, compared to the 2014 impact assessment. The 2016 version combines the use of 7 different models that provide evidence of the positive impacts (including health, affordability, and competitiveness) of a higher EE target for 2030, which strengthens the case for a 40 percent target. The private discount rate has been lowered for EE from 17.5 percent to 10 percent. The 10 percent still fails to account for the role of policies, such as the EED and the proposed Smart Finance for Smart Buildings Platform, in lowering the discount rate to a societal discount rate. It is important that future revisions to the discount rate reflect this.

<sup>1</sup> While beyond the scope of this assessment, it is also important to underscore the importance of transparency in modeling conducted at EU level and in the underlying assumptions, to ensure that there is accountability for how policy priorities are set and why.

Priority area for action	Description	Progress in 2017
<b>Energy sector planning, financing, delivery</b>		
<b>Energy efficiency target and energy savings obligations</b>	The economy-wide EE target must be strengthened to harness the cost-effective potential for EE and keep Europe on track to meet its Paris objectives. This requires both strengthening the target itself to reflect the cost-effective potential (40 percent by 2030) and strengthening the energy savings obligations, which are principal delivery mechanisms for EE in Europe.	The Commission's proposal would extend the Energy Efficiency Directive target and key provisions, including Article 7, to 2030 and beyond. While not enough to bring EE to the cost-effective level needed, it maintains a framework for driving investment in EE in the 2030 timeframe. In this context, the higher ambition of some proposals tabled by Parliament would better align EU policy with the cost-effective potential for EE and the need to deliver aggressive EE to meet the Paris commitments.
<b>Demand projections that account for policies that reduce demand</b>	The full value of EE and DR is not taken into account in resource adequacy assessments. More attention is needed to ensure that demand projections fully reflect the policies driving investment in EE and DR and, as a result, to ensure investments in stranded assets are avoided.	The methodology for the EU resource adequacy assessment, proposed in the recast Electricity Regulation, is required to be based on appropriate scenarios for projected demand and supply, including measures to reach EE targets. It must appropriately value the contribution of all resources, including DR. These are positive developments, though it would be important to specify that resource adequacy assessments should, at minimum, assume achievement of the established EU and national EE targets and programs. <sup>2</sup>
<b>The role of efficiency as a resource in power markets</b>	<p>Efficiency can significantly reduce the cost of securing reliability in electricity systems. It is, therefore, important to actively identify the potential for EE and DR to contribute to resource adequacy, and to invest in these resources as part of the overall resource portfolio.</p> <p>Demand-side resources should be placed on equal footing with generation, and all consumers should have a legal right to participate in wholesale power markets, through an aggregator if necessary.</p>	<p>The draft Electricity Regulation calls on Member States to consider a number of measures to eliminate any identified regulatory distortions that prevent them from ensuring resource adequacy, including demand-side measures and EE. This is a meaningful step towards investing in EE and DR as resources to ensuring security of supply.</p> <p>A number of provisions in the Electricity Directive and Regulation proposals strengthen the right of aggregators to contract with customers and to participate in markets. Moreover, several provisions strengthen the ability of DR to participate in markets. EE and DR are not explicitly listed as resources that must be allowed to bid into capacity markets. Absent such a requirement, there is a substantial risk that these resources, and particularly EE, would be excluded.</p>

2 While beyond the scope of this paper, it is also important to note that regional resource adequacy forecasts, conducted in various timeframes, will also play an important role in energy system investment and operations. In this area as well, the treatment of EE and DR will be important.

Priority area for action	Description	Progress in 2017
<b>Energy sector planning, financing, delivery</b>		
<b>Ensure transparent, quality monitoring, verification and evaluation of EE programs and investments</b>	Establishing shared principles for transparent, credible standards to monitor, verify, and evaluate EE programs is fundamental to ensuring proper policy implementation, initiating course correction when necessary, and building an evidence base of the outcomes of efficiency programs. Best practices in Europe and internationally indicate that this area is crucial to the success of EE policies and programs, and to strengthening and refining these programs over time to deliver market transformation.	In their landscape review of energy and climate policies, the European Court of Auditors identified weaknesses in monitoring and evaluating EE programs in several Member States. This has not been addressed in the CE4All Package. While the details of policy evaluation are a MS competence, current legislative guidance and facilitative dialogues (such as the Concerted Action on the EED) could be strengthened to promote greater exchange and elevate the minimum level of monitoring, reporting, and evaluation required to improve the effectiveness of EE policies and programs.
<b>Accelerate retrofitting of building stock</b>	Europe's building stock is responsible for 40 percent of energy consumption in Europe. Improving the EE of buildings and integrating them into modern, dynamic power systems is essential to the cost-effective integration of both renewable energy and electric vehicles. Deep renovation of Europe's existing building stock is crucial, as is increasing the rate of renovations.	Proposed amendments to the Energy Performance of Buildings Directive (EPBD) lay the groundwork for raising renovation rates and ensuring that the depth of renovations is aligned with a cost-effective decarbonisation trajectory. Introducing the objective of a decarbonised building stock by 2050, requiring Member States to deliver National Renovation Strategies under the EPBD, and creating the Smart Finance for Smart Buildings Platform are all steps in the right direction. The proposed "smartness indicator" and requirements for electric vehicle charging points further recognize the role of buildings in an increasingly dynamic energy sector. These changes are not, however, enough to drive deep renovation. It will be important to build on the framework proposed by the European Parliament to truly enable a broad uptake of deep renovations throughout Europe.
<b>Funding and financing</b>	To deliver on E1st, a combination of public funding and financing instruments is needed to overcome barriers and mobilize investment.	<p>In the 2016 State of the Energy Union, President Juncker pledged to extend and expand the European Fund for Strategic Investment (EFSI). Based on the list of approved projects by the European Investment Bank in summer 2017, 15% of EFSI related finance is allocated to clean energy investments out of which about 50% is allocated to EE projects, mostly in Western Europe.</p> <p>This new EU funding mechanism complements already existing mechanisms to support the implementation of EE measures such as the Structural Investment Funds, which largely benefit countries with GDP per capita lower than EU average. Additional EU support is expected to take place through the implementation of the Smart Finance for Smart Building initiative proposed in the CE4All package. The combination of EU funds and the national funds resulting from the implementation of EU directives (Electricity and gas directives – energy taxes), EU ETS (carbon revenues), and EED (Article 7) further increase public finance available for the implementation of EE measures.</p>

Priority area for action	Description	Progress in 2017
<b>Supporting implementation on local and regional level</b>		
<b>Efficiency is classified as “productive debt” and savings from energy performance contracts recognize cash savings from EE programs in the “scoring” of investments.</b>	The treatment of EE program costs and savings on public balance sheets can be a significant deterrent to investment in EE by local and regional governments. It is essential to revise these rules, set by Eurostat, to free up public balance sheets to invest in beneficial EE projects.	Eurostat rules were modified in 2017 to enable energy performance contracts to be classified off public balance sheets. This lifts a significant barrier to public investment in EE.

## Progress on energy savings in Europe

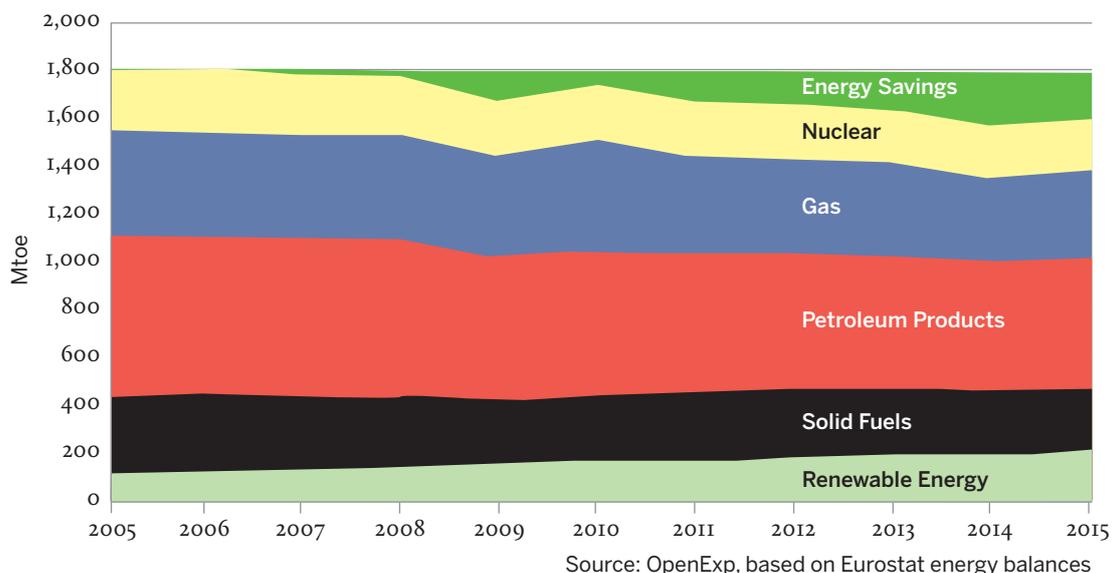
This section considers progress on energy savings in the EU, as a metric of progress on delivering E1st in Europe. Energy savings have, in recent years, emerged as an important “fuel” in the EU’s primary energy mix. Savings have been driven by energy efficiency programs and measures, structural changes, and economic trends.

Energy savings over the period 2005 to 2015 were equivalent to the entire consumption of the United Kingdom in 2015. However, the full potential of energy savings is still not being realized, and more efforts are needed for energy savings to become the “first fuel” of Europe.

In 2015, the share of fossil fuels outweighed the share of efficiency in the EU’s primary energy mix: for coal, the share was 1.4 that of energy savings; for natural gas, it was twice that of energy savings, and for petroleum products, it was three times that of energy savings.

Looking to the broader energy transition, there is progress on the combined contribution of energy savings and renewables as carbon-free fuels in the EU primary energy mix. Taken together, energy savings and renewable energy accounted for a higher share of the primary energy mix than the individual contribution of natural gas, coal, or nuclear energy. Petroleum products were still, in 2015, the first fuel of Europe, and their contribution to the EU primary energy mix was 1.4 times the sum of the contribution of energy savings and renewables taken together.

**Figure 1. Evolution of EU Primary Energy Mix**

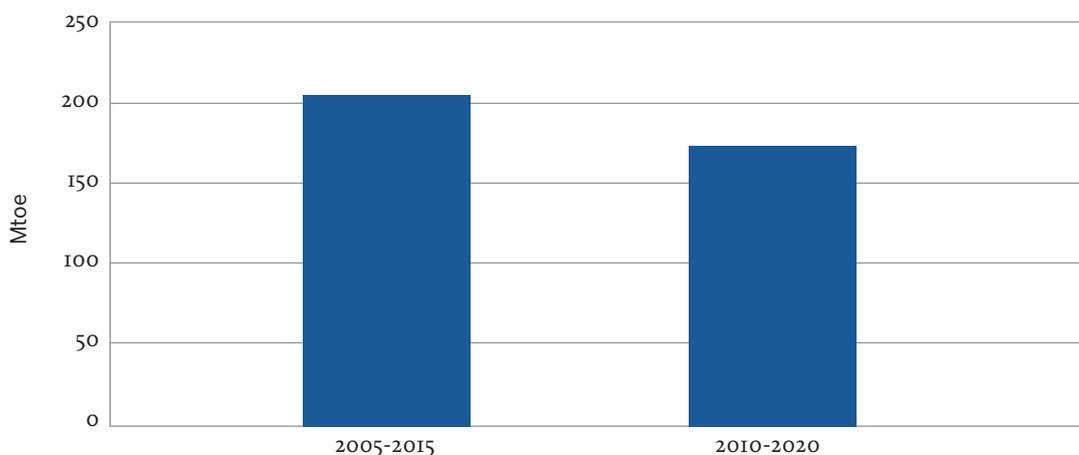


3 We do not undertake an analysis of progress on demand response, and no official assessment is available. We would recommend the introduction of an official assessment of the potential and need for demand response, and to monitor progress on implementation. A recent analysis of progress on explicit demand response in Europe is available at: Smart Energy Demand Coalition, Explicit Demand Response in Europe, Mapping the Markets in 2017.

## Savings achieved and savings trajectory until 2020

187 million tonnes of oil equivalent (Mtoe) have been saved over the period 2005 to 2015. This surpasses the projected 173 Mtoe that would have been saved over the period 2010 to 2020 if the economic crisis had not occurred. While some of the reduction in primary energy consumption is due to the economic crisis, significant savings are attributable to other sources. These include energy efficiency measures implemented by transposing the measures included in the Energy Efficiency Directive and the Energy Performance of Buildings Directive, as well as the increased number of appliances and equipment eliminated from the European market as a result of the implementation of the Ecodesign Directive. Still, it is clear that significant savings are expected to come, as not all the efficiency measures have yet been fully implemented.

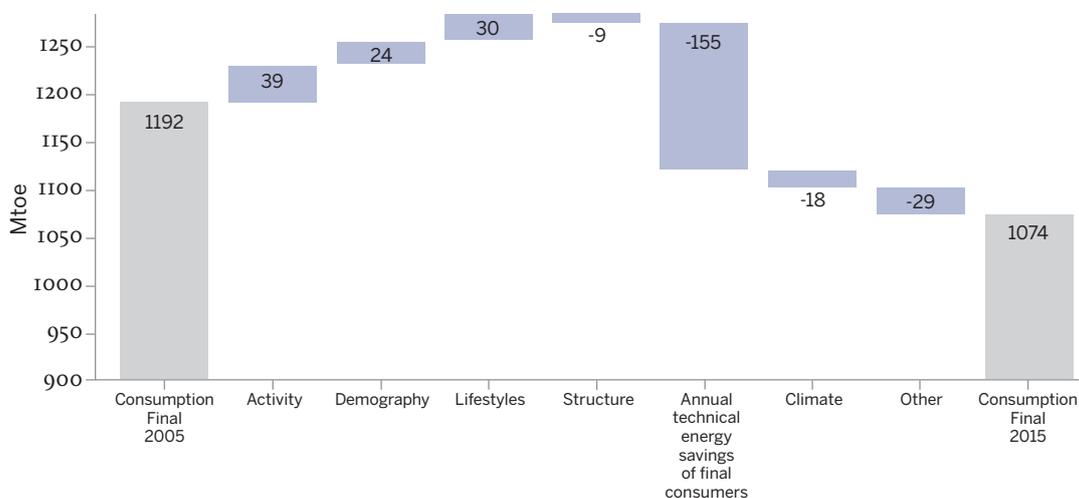
**Figure 2. Reduction in primary energy consumption over the period 2005 to 2015 and projected for the period 2010 to 2020**



Source: OpenExp, based on Eurostat energy balances for the period 2005 to 2015 and EC Impact assessment of EED based on 2016 PRIMES results for the period 2010 to 2020

Savings in primary energy consumption over the period 2005 to 2015 result from reductions in end-users' final energy consumption. Over this period, energy savings due to energy efficiency measures are estimated at 155 Mtoe. These savings allowed for compensation of the increase of energy demand due to the activity (39 Mtoe), demography (24 Mtoe) and lifestyles (30 Mtoe).

**Figure 3. Contribution of energy efficiency to reduction in final energy consumption**



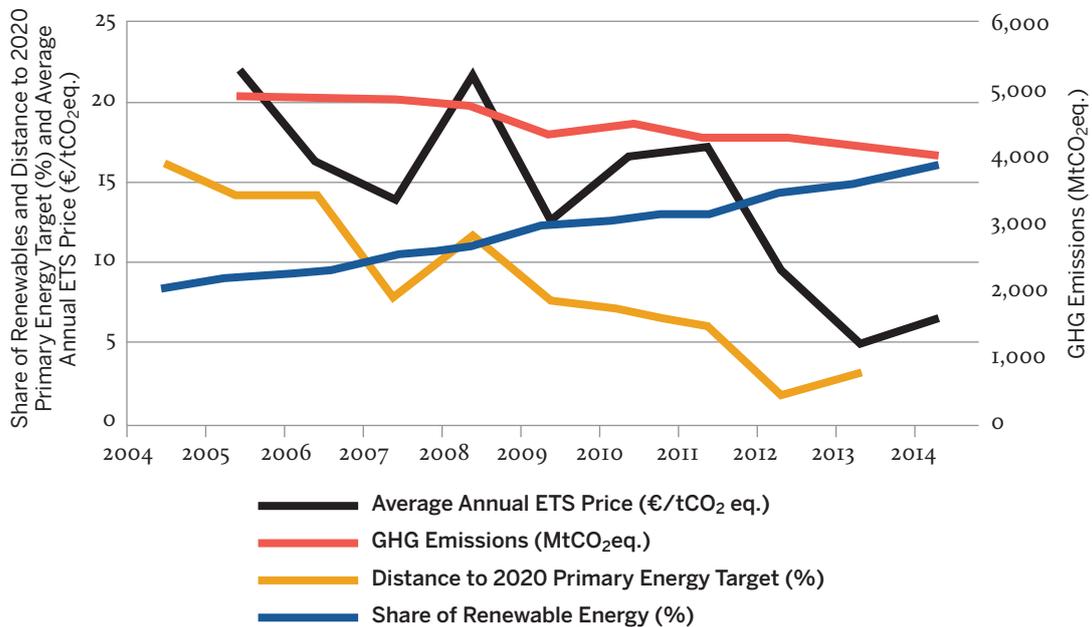
Source: ODYSSEE 2017

## Contribution of energy efficiency to the decarbonisation of Europe

Energy efficiency policies, along with renewable energy policies, have been the primary drivers of greenhouse gas emission reductions in Europe. The graphic below demonstrates how, over the period 2004 to 2014, there has been a clear correlation between greenhouse gas emission reductions and the pace of progress on energy savings and renewable energy in Europe's energy mix. This progress on energy savings and renewable energy is directly linked to Europe's 2020 targets to reduce primary energy consumption by 20 percent and to increase the share of renewables to 20 percent of final consumption by 2020.

Greenhouse gas emissions have continued to decrease despite an oversupply of emission allowances in the ETS, reflected by a declining ETS price.

**Figure 4. Evolution of Emissions Trading Scheme Price, Share of Renewable Energy, Primary Energy Distance to Target, and Greenhouse Gas Emissions Reduction**



Source: OpenExp. (2017). *Clean Energy for all Europeans Package – Do the Commission's Impact Assessments Assign the Right Role to Energy Efficiency?*

## Conclusion

This report assesses progress in delivering on the European Commission's stated goal to make E1st a guiding principle of the Energy Union. There have been some positive developments in the Commission's proposals in the CE4All package, improvements to how efficiency is valued in impact assessments, and progress on how accounting guidelines treat public investments in energy efficiency. At the same time, efficiency is not yet deeply embedded into the energy policy and investment framework.

Delivering on E1st is a process. It is for this reason that we recommend the development of an official process to identify the policies and practices where efficiency is ignored or undervalued, and to address areas where more needs to be done. In addition, it is important to strengthen monitoring and verification of progress on efficiency, including progress on delivering energy savings and demand response.

Looking ahead to 2018, there are several venues for advancing E1st. The negotiations over the various files in the CE4All Package will continue, with the potential to advance—or dampen—progress on efficiency. The Commission will present its proposal for the next Multiannual Financial Framework, where efficiency should be a leading priority. And revisions will be developed to the State Aid Guidelines, presenting the opportunity to overcome current barriers to investments in efficiency. The Commission will have an important leadership role in these various processes, with the opportunity to enable efficiency to drive the energy transition and to steer Europe towards a cost-effective, consumer-oriented transition.

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This report was prepared with expert input from:

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