II REACHING THE TARGETS

Part II details the main elements of the EED, providing a background for each of the subject areas, the requirements of the EED and recommendations for effective implementation and monitoring. Because many subject areas are covered by more than one article, each is treated separately here. Part II starts by reviewing Energy Efficiency Obligations, then follows with the public sector and energy audits, and ends with a discussion of supply side efficiency and demand response.

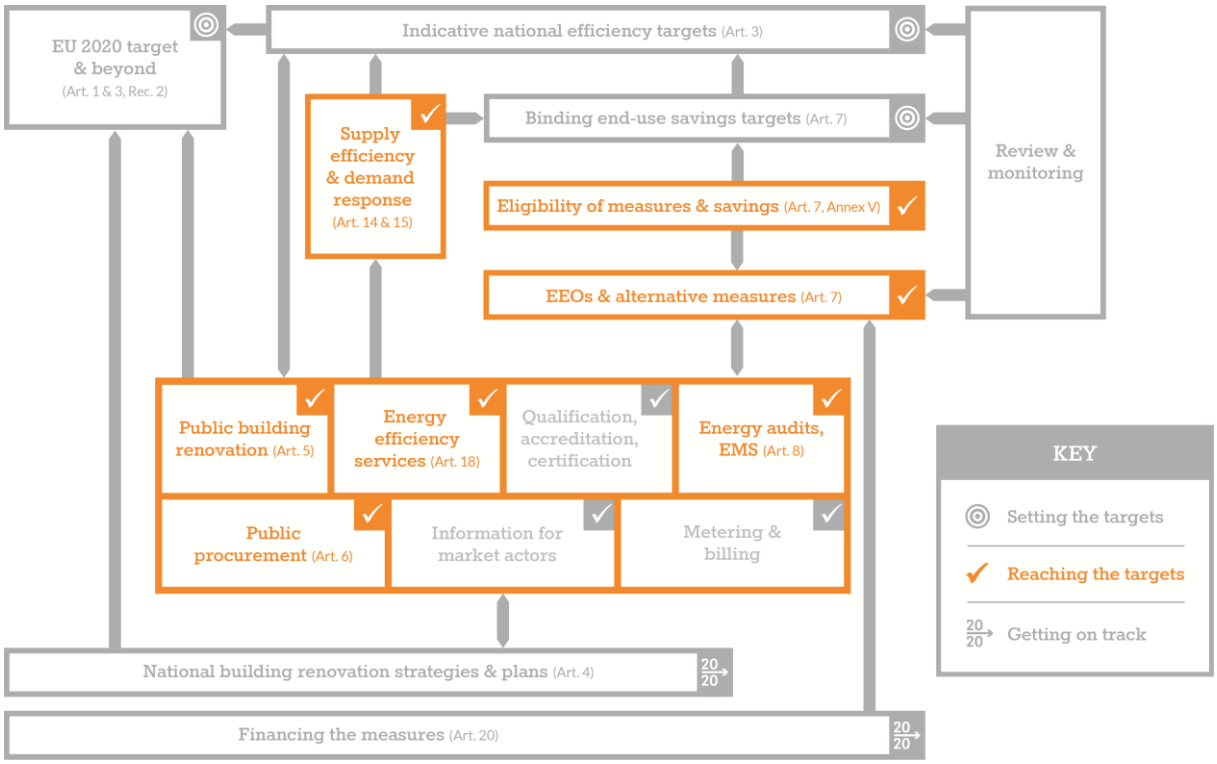

Figure 16 – Guidebook Overview Map: Reaching targets and objectives

II.1 Eligibility of measures for the energy end-use savings target (Article 7, Annex V)

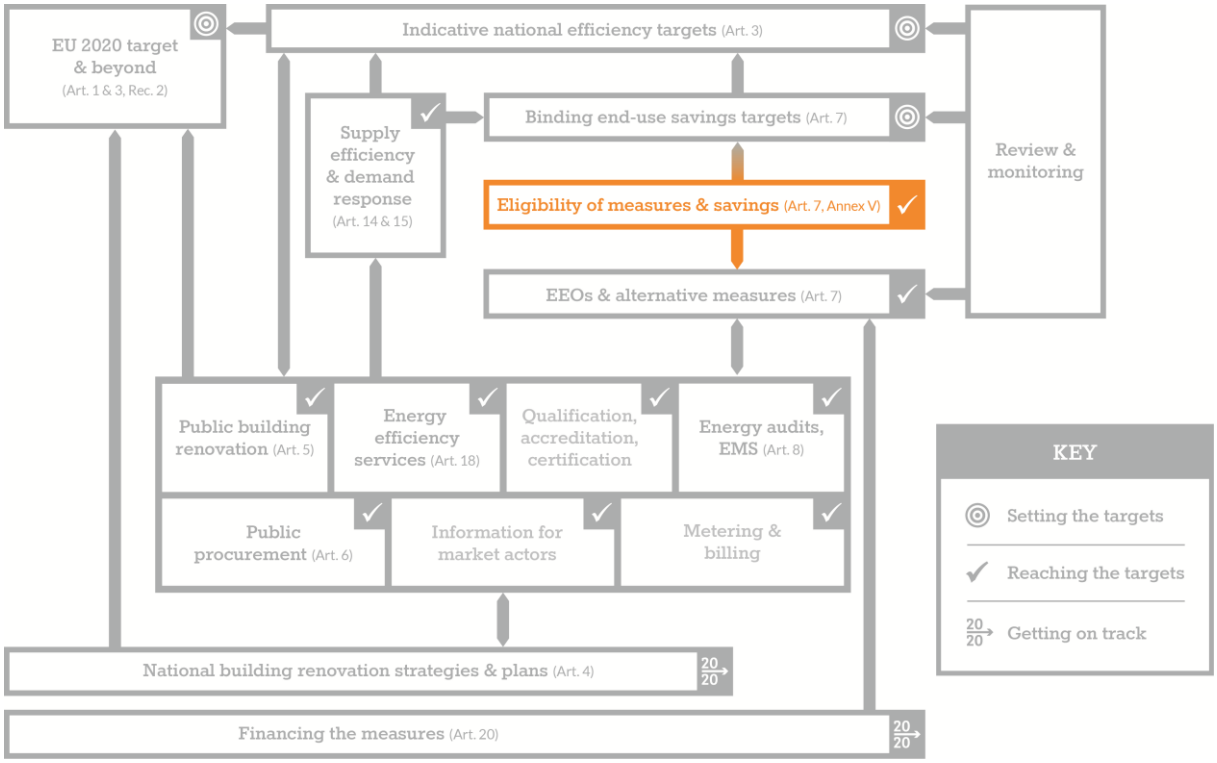

Figure 17 – Guidebook Overview Map: Eligibility of measures

II.1.1 Summary

Article 7 not only requires MSs to set an energy end-use savings target for the period 2014-2020, but also puts in place the criteria and conditions for eligible measures and how savings can be counted towards the target. Only if those measurement and verification requirements as set out in Article 7 and Annex V are strictly applied will MSs be able to count their energy savings towards the target defined in Article 7.1.

Only new savings, that is, savings resulting from additional energy end-use efficiency measures during the period 2014-20 that are above the baseline, are eligible to be counted towards meeting the energy end-use savings target. In addition savings must be the result of measures with the explicit aim to improve energy efficiency. This can then also include pricing or transport measures, even if, in the latter case, MSs make use of the possibility to exclude that sector when calculating and thus reducing the target, though this could be challenged from a policy coherence perspective.

Note also that, because the 1.5% target is cumulative, the energy efficiency measure has to deliver savings up to 2020 – otherwise additional measures will have to be put in place to replace the lost savings. For example, a low flow showerhead installed in 2014 with a lifetime of 5 years would stop delivering savings in 2019, so action would have to be taken at that time to "replace" this portion of the cumulative target.

MSs will need a system to ensure that measures are not claimed twice towards the energy end-use savings target by different delivery partners or when different policy measures are contributing to making the same measure happen.

MSs should consider energy efficiency measures in terms of their lifetime energy savings as this will be the most cost-effective technique to progress on the pathway to the 2030 and 2050 targets. As lifetime savings are derived from an annual energy saving multiplied by the lifetime

with future savings frequently discounted at a societal discount rate, it is straightforward to establish the annual energy savings in the period to meet the energy end-use savings target. Existing programmes have shown that taking a long-term approach, with regular reviews, works well.

For more details about how savings can be counted towards the Article 7 end-use savings target, refer to Annex B.

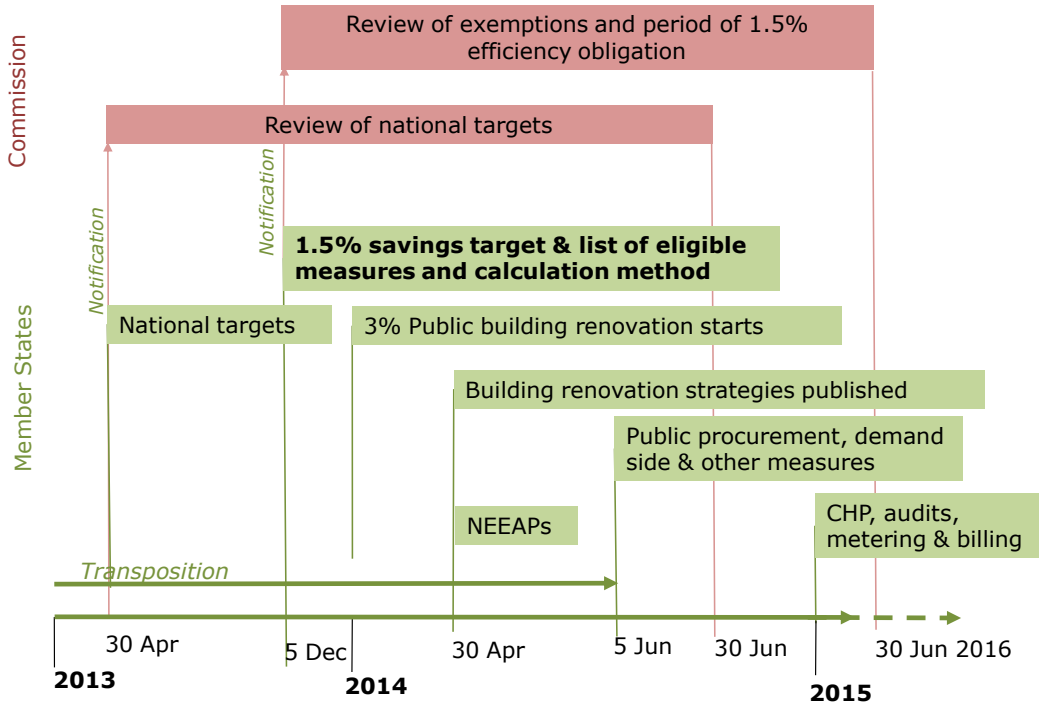

Figure 18 – Relevant deadlines regarding measures in this part of the guide (in bold)

II.1.2 Challenges

Only savings beyond "business as usual" are eligible. The following are challenges that may be encountered with deciding which savings are eligible and how they are counted:

- **A vague baseline (see also Annex B)**
    - Regulatory requirements are to be included in the baseline. This includes regulations for new buildings and major renovations resulting from the Energy Performance of Buildings Directive, which should in principle be benchmarked in accordance with the cost-optimal calculation methodology as set out in Commission Delegated Regulation (EU) No 244/2012. Only regulations above that level would be eligible to be counted as savings. However, policy measures, including financial support, that increase the rate of new build or renovation may be eligible to be counted as delivering energy savings even if they are based on energy performance requirements that simply meet the cost-optimal level.
    - In the field of energy efficient appliances and products, the Ecodesign Directive sets minimum energy performance standards in a variety of applications. In all cases, only energy efficiency improvements encouraged beyond these minimum requirements may be counted for additional and new energy savings unless higher standards exist already in the marketplace.

- A scrapping scheme for replacing products with more efficient ones within market average might only deliver eligible savings for a short period of time until replacement would have been necessary. In the case of short-lived products or efficiency requirements set by the EU, the eligible savings might become negligible and will be significant only if attached to products performing above regulatory standards and the market average.
- Support schemes for building efficiency improvement measures will have free riders, or people who would have undertaken the work anyway. Those have to be discounted by using a baseline for ongoing efficiency improvement works.

- **Double counting**. In France and Italy, for example, some energy efficiency measures are supported by energy retailers and the end user is eligible for a tax break. For EED purposes, the measure can only be counted once. In general any pricing measure for efficiency (an energy tax which provides a general incentive for consumers to take efficiency measures, for example), can be expected to overlap in its effect with specific support programmes, like financial or fiscal incentives for building refurbishment and product replacements. A simple adding up of deemed savings from those different measures is therefore not correct. A method for calculating the effect of overlapping or double counting of the impacts that results from separate impact assessments of the two measures is necessary. In this calculation, there may also be some positive synergy effects to be taken into account.
- **Not all policy measures are eligible**. To count towards the target, savings must be the result of an efficiency obligation scheme or other policy measures (Article 7.9), with the explicit aim to improve energy efficiency according to the definition set out in Article 2.18:

  > *"'policy measure' means a regulatory, financial, fiscal, voluntary or information provision instrument formally established and implemented in a Member State to create a supportive framework, requirement or incentive for market actors to provide and purchase energy services and to undertake other energy efficiency improvement measures"*

  Under this interpretation, any energy or a carbon tax would only qualify as a policy measure if its explicit aim is to increase energy efficiency. It is also clear that general taxation such as road or network charges, value added tax or taxes introduced to support other energy policy objectives (such as a feed-in tariff for renewables) would not count, any more than would price fluctuations of energy due to world market conditions or business cycles. Increases and reductions in VAT, even when energy is included in their scope, are not considered eligible measures, because of the fiscal design of VAT and for the same reasons as other exogenous price changes.
- **Short lived and decreasing impact of pricing policies, like taxation.** The size of any energy savings resulting from pricing policies designed to increase energy efficiency are governed by the product of the percentage increase through pricing measures, like energy or CO_2 taxation, from previous levels and the price elasticity. Among the principles stated in the EED for the use of price elasticities is that they should use "recent and representative official data" (Annex V.3(b)). Alone, this is inadequate guidance, as price elasticities can be measured in a variety of ways, and the range of results from individual studies is large. Most reliable evidence comes from expert reviews or "meta-analyses" that assess a range of different empirical studies. These are relatively few in number (see Annex B for examples and literature).

  Elasticities are calculated on the basis of empirical price and consumption data, within a framework econometric or correlation analysis. The results are, in actual fact, to a large extent determined by how the data sets reflect the availability and costs of technological or other substitutes during the analysis period. It is the substitution of energy through the implementation of existing or newly developed technologies and techniques that allow reduction of energy consumption. The amount of time that is

taken into account for this substitution to take place is also a crucial factor in determining the size of the elasticity or response.

The key methodological issue is thus the choice between long- and short-run price elasticities. In essence, short-run elasticities measure the effect of change of consumer behaviour on substitution, using technology from the existing stock of capital (vehicles, buildings, appliances, etc.). Long-run elasticities allow for the effect of consumer prices on the development of the capital stock as it changes and improves over time (as equipment suppliers react to the changing balance in capital and fuel costs). Long-run elasticities are larger (more negative) as they incorporate the short-run effect as well as allowing changes in the capital stock. For the purposes of the EED, there are two reasons why lower, short run elasticities should be used:

1. Significant changes in capital stock resulting from policy-induced price changes are unlikely to occur within the timeframe of the EED (2014-2020). Most energy-using capital equipment has a relatively long planning horizon and lifetime. It takes years for the equipment suppliers to develop improved designs, re-tool manufacturing plants and roll out new products through the relevant supply chains. Within the obligation period, price-induced changes in the capital stock as a whole will therefore be small.

2. In most cases, the efficiency of energy using capital plant and equipment is heavily affected by requirements of other European Directives, in particular for light vehicles (under EC Regulation No 443/2009), buildings (under the Energy Performance of Building Directive 2010/31/EU and consequential building regulations in MSs) and appliances (under the Ecodesign Directive 2009/125/EC and the Labelling Directive 2010/30/EU).

   In practice, these regulatory requirements will drive new product efficiency rather than energy taxes. As it is highly likely that there will be forthcoming EU directives which will further improve the energy performance of vehicles, buildings and appliances, this represents the capital stock improvements mentioned above. Consequently, the use of long-run price elasticities of demand would likely breach the provisions of Annex V.2(a) and risk double counting of energy savings in breach of Article 7.12.

In addition, studies indicate that price elasticities are not linear[1]. This means that several incremental price changes over a longer period of time cannot necessarily be added. Such small price changes as annual tax increases may have an accumulated effect that is still very low because the changes are adapted to (absorbed) rather than substituted for, while single large, highly visible price changes of the same total magnitude can have a more proportionate impact.
This means that energy savings from pricing policies prior to 2014 are unlikely to produce significant savings during the obligation period of 2014-2020 under early actions. It also means that the savings would not accumulate and would contribute very little to the target of 10.5% savings in the year 2020, unless the pricing measure is increasing constantly, substantially and predictably in at least real price terms. If the pricing measure is kept at a constant price level, the savings effect is diminished. If during this period, disposable income is also rising, the impact of the price increase becomes even less than the price elasticities would indicate.

- **Fuel switching effects**. At the end user level, a fairly common fuel switch occurs with heating systems, when, for example, a gas boiler is replaced with an electric system. In Europe, an average 2.5 kWh of primary fuels are necessary to deliver 1 kWh of electricity, meaning that only an electric heating system that reduces end-use energy by a factor above 2.5 would deliver eligible savings.

[1] Rittenberg, L. and Tregarthen, T., 'The Price Elasticity of Demand', *Principles of Microeconomics*, Web Books Publishing, 2010, chapter 5.1.

Another type of fuel switch occurs when the high-efficiency cogeneration and/or efficient district heating and cooling (DHC) have a lower primary energy factor than the previous solution. This conversion leads to verifiable reduced primary energy consumption. For example, if the efficient combined heat and power (CHP) or DHC has a primary energy factor of around 1 or lower[2], this means that a conversion from electric heating with an assumed primary energy factor of 2.5 to efficient CHP or DHC can lead to a reduced primary energy consumption of 1/2.5 or 60% or more. This is a primary energy savings, and eligible under paragraph 2 of Article 7 as an energy efficiency improvement measure in the transformation sector, provided it does not lead, together with other eligible measures under paragraph 2, to a reduction of more than 25% of the amount of energy savings, as referred to in paragraphs 1 and 3 of Article 7, for fulfilling the 1.5% annual target[3].

By the same token, primary energy savings resulting from fuel switching which contribute to transforming non-efficient DHC/CHP into efficient DHC/CHP should also be considered as eligible measures under Article 7.2, if MSs decide to make use of exemptions under Article 7.2.

In any case, only proven and verified primary energy savings resulting from fuel switching should be considered as an eligible measure.

II.1.3 Legal checks

Legal checks

1. **Ask for access and give attention to the methodology for calculating the impact of efficiency measures for the target achievement, which is due 5 December 2013 (see EED Annex V).**
2. **Check whether the methodology meets the following minimum standards:**
   - Additionality: Only savings which would not have happened anyway and are additional to a baseline (see Article 7.1 wording for 'new savings' and Annex V.2(a)) can count toward the target. This means that in particular the following savings must be excluded:
     - savings resulting from EU standards for products, such as cars, vans, boilers and electric motors, or buildings (see Article 7.9(d) and Annex V.2(a)); and
     - savings from taxation measures which do not exceed EU minimum levels and whose impact is not verified using recent data on price elasticity (see Annex V.3 and the caveats listed above regarding the calculation and use of elasticities).
   - New savings and materiality: only savings from policy measures with the objective of improving energy efficiency (Article 2.18) realised during 2014-2020 (Annex V.2(e)), which are material to new activities (Annex V.2(c)) and are not counted twice (see Annex V.2(d)) are eligible to count toward the target. Existing programmes that are expanded in scope or level of activity may, however, be considered to fulfil additionality criteria.

[2] This is the case on average – to be verified case by case.

[3] To ensure comparability and to differentiate between fuel switching effects and energy savings, refer to Annex IV of the EED for relevant conversion factors. In this context, also to ensure system efficiency, the difference between "energy", "exergy" and "anergy" should be borne in mind. "Exergy" is the part of an energy flow that yields high-grade energy or capacity to carry out work, for example to power mechanical processes. "Anergy" is what is left, or the low-value part of an energy flow. The bulk of waste heat from power plants, for instance, is anergy. Efficiency in energy-consuming structures calls for minimum use of high-value energy (exergy) and maximum use of low-value energy (anergy). Low-value anergy sources can be used in a rational, environmentally sustainable way for heating and cooling, thus saving high-value exergy for appliances and lighting. See "Energy = Exergy+Anergy: a formula for energy-efficient buildings", *OPEN Energy Technology Bulletin*, International Energy Agency (IEA), Issue No. 35, 05.07.2006.

3. **Ensure that the conversion factors (see Article 21 and EED Annex IV) are applied to ensure comparability of savings and to prevent "fake" savings from fuel switching.**