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National energy efficiency and energy saving targets



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**Dr Joanne Wade, Pedro Guertler, Darryl Croft and Louise Sunderland
from the Association for the Conservation of Energy, UK**

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Introductory remarks

This report was commissioned and published by eceee with financial support from the European Climate Foundation.

Dr Joanne Wade, and Pedro Guertler, Darryl Croft and Louise Sunderland from the Association for the Conservation of Energy, UK. Rod Janssen of eceee has been eceee's project manager.

This report draws together the information that has been collected. It does not recommend any particular courses of action based on this information. Rather, it is intended as a resource for those involved in the development of EU and national energy efficiency policies and programmes.

Any views expressed herein are solely those of the authors, who make no representations or warranties, expressed or implied. The views do not necessarily reflect those of eceee or its members, or those of the report's funders.

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About the European Council for an Energy Efficient Economy (eceee)

eceee is a non-profit, membership-based European NGO. The goal of eceee is to stimulate energy efficiency through information exchange and co-operation. To facilitate this, eceee provides an information service through its website and e-mail newsletter, arranges workshops and conferences, and takes active part in the European Policy making process.

One of eceee's principal events is the Summer Study, held for five days every odd year in the early summer. The Summer Study attracts about 400 participants from a wide range of backgrounds. eceee and its summer study offer governments, industry, research institutes and citizen organisations a unique resource of evidence-based knowledge and access to reliable information.

Executive Summary

This report provides a snapshot of the current use of energy saving targets and opinions about these across the European Union. It is based on a survey completed by ecee members and other contacts in most Member States together with an online stakeholder consultation. This information gathering was complemented by a review of the literature.

This report is designed to help decision-makers and relevant stakeholders appreciate how targets are currently used and how effective they can be. It is hoped that this report will provide evidence to be used in the upcoming policy development discussions.

Targets to monitor energy savings or improvements in energy efficiency have been used widely in the European Union since the oil crises of the 1970s. They have been used EU-wide, nationally and sectorally. Targets monitor progress, set achievable goals and reinforce political commitment to improvements in energy efficiency or energy savings.

The report gives a comprehensive cross-EU overview. There are summaries of the situation in each Member State, based mainly on the survey, in Appendix D of the report. Full details of the information gathered from each country are included in a separate, companion report, 'National Energy Efficiency and Energy Saving Targets: further detail on Member States'.

The findings of the report need to be seen in the current policy context in Europe. A new Energy Savings Directive is to be proposed by the European Commission in June 2011. While it is currently assumed there will be no specific targets (indicative or mandatory) proposed, the possible use of targets cannot be dismissed because it is acknowledged that the EU is not on track to meet its 2020 energy savings (indicative) target. The more effective use of targets could be an option to help address that gap.

Main Findings

The findings represent the synthesised views – often supported and complemented by the background literature – of respondents to the survey, and participants in the online consultation (referred to here as consultees).

Targets in use

- While there is a wide variety of targets in use, it is difficult to compare them even within individual Member States. For example, the Energy End Use and Energy Services Directive (Directive 2006/32/EC) has raised the profile of energy efficiency and has encouraged greater use of targets across the EU (with a nine per cent indicative target to 2016). However, it is not possible to tell how much additional energy efficiency action it has resulted in.
- Targets are definitely seen as only one element of the solution: there needs also to be political, stakeholder and resource commitment.
- The types of target in use vary between sectors: white certificate style approaches with legally binding targets are favoured for the energy supply sector; voluntary agreements are used with industrial sectors, and transactional targets are most common in the buildings sector.
- Different types of target are suited to different energy efficiency policy aims, but there remains a need for a clear and understandable headline target, to act as an umbrella for all national action, supplemented by a range of other targets suited to national priorities and context.
- Targets need to balance achievability and ambition. If they are too low they are meaningless. But if they are too high it is likely that key stakeholders will not engage in the delivery process.

Measurement

- Views on measurement are very varied. However, there is general agreement that any harmonised approach must allow some degree of country-specific assumptions and adjustments to be made. Importantly, existing white certificate schemes (energy supply obligations) offer examples of pragmatic approaches to measurement that have enabled the use of legally binding targets.
- Most consultees see a value in a harmonised measurement method, but to support improvement monitoring and evaluation rather than as a tool for inter-country comparisons.

Future targets

- Consultees acknowledge the political viewpoint that sees the idea of another binding target as adding further regulatory burden. However, they remain concerned that the current differential in status between the binding renewables target and the non-binding energy efficiency target is skewing activity inappropriately towards renewables.
- Whilst a binding target would address this imbalance, the risk that it would limit flexibility of response is recognised. Also, a binding target would need to link to a harmonised measurement method, but this would have to be both robust and flexible so that stakeholders have confidence that it will enable demonstration of progress made.
- If binding targets do become the way forward, they would need to be high level and achievable and may also require the harmonised measurement framework to be simple, high-level, transparent, and with room for innovation and continuous improvement.

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Introduction

Aims of the project

This project aimed to pull together a snapshot of the current use of energy efficiency targets across EU Member States and to gather views on:

- What types of target are considered most effective;
- How targets are, and should be, set and measured;
- Whether or not mandatory targets are desirable, and
- Practical aspects of the use of targets.

This report does not get into an in-depth methodological discussion on the design of specific targets.

Method

Information for each of the 27 Member States was gathered from a number of sources:

- Existing literature;
- National surveys, and
- An online consultation.

Each of these is described in turn below. The ideal situation would be to access all three types of information for all countries, but in practice the extent of available information was limited by the willingness of national experts to take part in the work in the timeframe available.

Table 1 illustrates the sources that were accessed for each country.

Table 1: Information sources for each country

Country	Literature	Survey	Consultation	Country	Literature	Survey	Consultation	Country	Literature	Survey	Consultation
Austria	Y	N	Y	Germany	Y	Y	Y	Netherl.	Y	Y	N
Belgium	Y	Y	N	Greece	Y	Y	Y	Poland	Y	Y	Y
Bulgaria	Y	Y	Y	Hungary	Y	Y	Y	Portugal	Y	Y	Y
Cyprus	Y	Y	Y	Ireland	Y	N	N	Romania	Y	Y	Y
Czech R	Y	Y	Y	Italy	Y	Y	Y	Slovakia	Y	Y	N
Denmark	Y	Y	N	Latvia	Y	N	N	Slovenia	Y	Y	N
Estonia	Y	N	N	Lithuania	Y	Y	N	Spain	Y	Y	N
Finland	Y	Y	Y	Luxemb.	Y	N	N	Sweden	Y	N	N
France	Y	Y	Y	Malta	Y	Y	N	UK	Y	Y	Y

Existing literature

Information about the use of targets in general, and about specifics for each Member State, was gathered from a review of existing literature. A list of the reports surveyed is included as Appendix A to this report.

National surveys

The authors distributed a survey to a single national contact, and asked them to complete this for us, if necessary with the help of other national experts. Appropriate contacts who were willing to undertake this work were identified in all but six Member States.

The survey was distributed in MS Word and MS Excel formats, to enable the contacts to complete whichever version they found easiest. Both versions contained the same questions. A copy of the Word version of the survey is included as Appendix B to this report.

Where a survey was not completed for a country, national ODYSSEE¹ reports were used as the primary source of information. These reports were also used to provide appropriate complementary or supporting information about the use of targets where surveys were received.

The online consultation

An online consultation space was created, using ‘Basecamp’². Within this, a series of discussion forums (one for each Member State) were set up. In each of these a number of key questions were posed, in a series of messages. These were intended as the starting point for discussions. The questions posed are included as Appendix C to this report.

The ecee contacts database and the ecee news mailing list were used to contact a wide range of energy efficiency practitioners across Europe. These contacts lists were supplemented by recommended contacts from our national contacts who had completed surveys for us.

Following initial mailings and a reminder, a total of 84 individuals (from 22 of the 27 Member States) expressed an interest in participating in the consultation, and 72 of these people signed in and visited the consultation website. Participants included: six government / energy agency representatives, seven energy efficiency industry representatives, 27 academics and 44 others (mainly consultants and NGO representatives).

Over a period of just under one month, a total of 94 contributions were received. More detail about these can be found in Appendix C.

The terms used in this report

The indicative target required by the Energy End-Use and Energy Services Directive (ESD), to be set out by each Member State in its National Energy Efficiency Action Plan (NEEAP) is variously referred to in this report as the ‘ESD target’, the ‘nine per cent target’ and the ‘2016 target’. The nine per cent figure is in relation to a country’s average final energy consumption in the years 2001 to 2005, a quantity of energy that needs to have been demonstrably saved in the years 2008 to 2016 inclusive (a period of nine years and hence an average saving of one per cent per year).

The ‘2020 objective’ (or ‘2020 target’) here refers to the energy saving plank of the so-called EU 20:20:20 energy policy objectives, that is for each Member State to have saved 20% of its primary energy (as a proportion of its projected primary energy consumption) by 2020.

The term ‘energy saving’ refers to both energy efficiency improvements and energy savings when there is no need to distinguish between the two.

The term ‘consultees’ refers to people who participated in the online consultation. ‘Respondents’ is the term used to refer to the people who completed the national surveys.

Existing targets in EU Member States

The story of existing targets in Member States is mainly one of variety. In this section, a series of tables based on responses to the survey, provide examples of the types and

¹ See http://www.odyssee-indicators.org/publications/national_reports.php (ODYSSEE 2009)

² Basecamp is an online information sharing and discussion forum tool. More details can be found here: <http://basecampHQ.com/>

number of targets currently in place. More insight into this topic is provided in the section ‘use and effectiveness’ later as it adds the opinions of both respondents and consultees. It is very important to note four things: the information is firmly about targets, not programmes; the tables should in no way be regarded as necessarily comprehensive or representative; estimates of energy savings resulting from programmes have not been included – this includes estimates, both for individual programmes and sectors, made in Member States’ NEEAPs; and benchmark targets (such as building codes, product standards) have been omitted from the tables unless they have been explicitly linked to meeting a quantifiable target³.

Furthermore, Member States are expected to report on the 2020 objective in their National Reform Programmes (NRPs), which are submitted to the Commission every three years. NRPs describe what each country is doing to meet the EU’s shared 2020 objectives under the Lisbon Agenda, and the ‘20:20:20’ energy policy objectives are a part of this. The latest round of NRPs was more or less finalised at time of publication. While the authors were aware of targets being developed under the NRP process, survey respondents and consultation participants did not make any explicit reference to them. However, the companion report (‘National Energy Efficiency and Energy Saving Targets: further detail on Member States’) provides reference to, and extracts from, each Member State’s NRP at the time of writing.

Better and more complete overviews and analyses of indicators and programmes, and of NEEAPs in particular, have been conducted elsewhere⁴. For this report, the purpose of this section is to provide context and colour to the discussion of Member States’ use of targets and stakeholders’ opinions. The role of the ESD in setting targets is discussed in the next section.

Table 2 presents current and very recent economy-wide energy efficiency and energy saving targets reported in the surveys.

Whether targets are being expressed in terms of primary or final energy demand is not always clear from the information we have. What these targets illustrate is a wide range of timescales, levels of ambition, degrees of overlap and points of reference (to time, other countries, baselines, specific or relative objectives etc).

³ For example, when a benchmark is linked to a transactional target; e.g. 250,000 homes refurbished per year to meet energy performance standard ‘X’. Or, to give another example, if the average of a vehicle fleet’s emissions is to reach a certain benchmark.

⁴ In particular by ODYSSEE (2009), Energy Efficiency Watch (EEW 2009; Schüle *et al* 2011) and the European Commission (EC 2009).

Table 2: Economy-wide energy efficiency and energy saving targets

	Economy-wide target 1				Economy-wide target 2			
	<i>note</i>	<i>target</i>	<i>from</i>	<i>by</i>	<i>note</i>	<i>target</i>	<i>from</i>	<i>by</i>
Belgium	energy intensity (Flanders)	20%		2020				
Czech Republic	energy intensity	40%		2020	EE improvement of final energy consumption	2.1% per annum	2006	2009
Denmark	final energy demand	1.5% absolute per annum	2008		gross energy consumption	2% / 4% absolute reduction	2005/2006	2013/2020
Finland	final energy demand	30% below 2020 projection	2020	2050	final energy demand	11% below projected baseline		2020
France	energy intensity	20%	2005	2015				
Germany	primary energy intensity	20%	2008	2020				
Hungary	primary energy intensity	3.5% per annum	1999	2010	final energy demand, based on NEEAP method	1.1% per annum		2020
Ireland	primary energy demand	30% below projected baseline		2020				
Latvia	final energy intensity	0.22 toe/€1000		2020				
Netherlands	energy efficiency improvement	2% per annum		2020				
Poland	energy intensity	2005 EU-15 average		2030	primary energy	0% increase	2020	
Romania	energy intensity	40%	2001	2015				
Slovakia	energy intensity	EU-15 average	long-term goal					
Spain	primary energy demand	13.7% below projected baseline		2012				
Sweden	energy intensity	20%	2008	2020				

Table 3 provides an overview of reported white certificate or similar schemes. Bulgaria's and Poland's initiatives are slight exceptions. In Bulgaria's case, energy retailers with energy sales above 75 GWh are obliged to identify energy savings. It is not yet a full white certificates scheme, though this is reportedly currently under consideration. Poland has two entries in the table: its 'red certificates' scheme relating to heat is likely to be absorbed into a new and broader white certificates scheme: Poland has just passed its energy efficiency law, of which a new obligation on energy suppliers forms the centrepiece.

Table 3: Snapshot of white certificate or similar schemes

	<i>note</i>	<i>target</i>	<i>from</i>	<i>by</i>
Belgium	primary energy	3.5% per annum		
Bulgaria	energy retailers' share of NEEAP burden	82%		
Denmark	final energy use	5.4 PJ per annum	2010	
France	lifetime end-use savings	345 TWh	2011	2013
Italy	primary energy (gas and electricity distributors)	6 Mtoe		2012
Poland	obligation on electricity, natural gas and heat providers; 80% of target must be met from end-use energy savings	unknown	2012	
Poland	heat-related 'red' certificates scheme to promote high-efficiency co-generation	unknown		
United Kingdom	lifetime CO ₂ savings in residential sector	293 MtCO ₂	2008	2012

Absolute and relative metrics, energy and CO₂ indicators, and primary and final energy are in evidence. What these schemes all do have in common is that they represent binding and quantified energy saving and energy efficiency obligations⁵ on energy utilities. These vary also, ranging from generators to distribution to retail companies. Where reported, timescales are short, although these reflect the period of obligation energy utilities are currently in. Most of these survey respondents indicate that the targets for each period have so far grown in size and are likely to continue in this way.

Table 4 is likely to represent a very partial snapshot of targets in industry.

Table 4: Snapshot of industry targets

	<i>note</i>	<i>target</i>	<i>from</i>	<i>by</i>
Belgium	voluntary agreements with energy-intensive industries (Flanders)	15% energy intensity improvement		2012
Finland	wide range of voluntary agreements with individual sub-sectors in keeping with 2016 target	60% of each sub-sector's members or energy use 'captured'		
Netherlands	voluntary agreements pertaining to non-ETS traded energy/emissions	30% efficiency improvement	2005	2020
Romania	long-term voluntary agreements	full economic energy saving potential		
United Kingdom	voluntary agreements	set by negotiation	2001	2017

What is immediately clear is that all involve voluntary agreements with particular sites or branches of industry. What these targets also have in common is that they are expressed or agreed in terms of energy efficiency improvements – never as absolute reductions.

⁵ The UK's scheme is overwhelmingly met through energy efficiency measures.

In Table 5, an overview of reported targets relating to residential buildings is given. As indicated by italics, the targets in Germany, Latvia, Lithuania and Sweden cover all existing buildings, not just homes. Many respondents mentioned increasingly stringent building codes for new and existing buildings. Minimum standards and benchmarks have not been included here unless targets have been expressed in terms of a benchmark's impact across the sector (such as for Estonia).

Table 5: Snapshot of residential buildings targets

	<i>Note</i>	<i>Target</i>	<i>from</i>	<i>by</i>
Belgium	basic energy efficiency improvements	all homes retrofitted		2020
Estonia	provision of retrofit support; energy audits; refurbishments to high standard	8,000 apartment blocks supported; 30% of blocks audited; 10% improved to top performance category		2013
France	retrofits [private/social]	400,000/70,000 per annum; reduction of energy consumption of existing buildings by 38%/40%	2013	2020
<i>Germany</i>	<i>retrofits; primary energy consumption</i>	<i>doubling of rate from 1% to 2% per annum; reduction in retrofitted buildings' primary energy use by 80%</i>	<i>2008</i>	<i>2050</i>
<i>Latvia</i>	<i>heat demand in buildings</i>	<i>150 kWh/m²/a</i>		<i>2020</i>
<i>Lithuania</i>	<i>heat demand (absolute reduction) in existing buildings</i>	<i>7%</i>	<i>2006</i>	<i>2010</i>
Netherlands	existing homes	500,000 renovated by 2012; 300,000 per annum thereafter	2007	2020
<i>Sweden</i>	<i>total energy use in buildings</i>	<i>reduced by 20% / 50%</i>		<i>2020 / 2050</i>
United Kingdom	energy efficiency improvement	30%	1996	2011

Many of the targets relating to housing are expressed in transactional terms and combined with a benchmark or an objective for overall energy or CO₂ savings in the sector. Again, a wide variety of indicators and timescales are used and combined.

Outside of quantifications of energy savings contained in NEEAPs, respondents have not reported any specific targets for tertiary buildings. The UK's 'Carbon Reduction Commitment Energy Efficiency Scheme' was initially intended to cover large public sector and tertiary organisations energy use and CO₂ emissions with tradable permits subject to an increasingly stringent cap on emissions. However, this was recently converted into a simple CO₂ tax without a quantified objective.

In the transport sector, just two relevant targets are reported. In France, there is a target for the average passenger car (covering both new and existing) emissions not to exceed 120gCO₂/km⁶, although the deadline is not specified. Germany aims to reduce final energy consumption in the transport sector by 40% in absolute terms by 2050 compared to 2008 levels.

Finally,

⁶ This threshold is in place as a EU-wide target for fleet average emissions of new passenger by 2012. France's target covers the average emissions of the existing fleet as well.



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Table 6 provides an indication of targets relating to the public sector. These address a range of energy end-uses and apply variously to central, regional and local government assets and activities.

Table 6: Snapshot of public sector targets

	<i>note</i>	<i>target</i>	<i>from</i>	<i>by</i>
<i>Bulgaria</i>	<i>buildings (central and local government) over 1000 m² useful floor area</i>	<i>same as in NEEAP</i>		<i>2016</i>
Denmark	based on building energy certificate; mandatory for central government, voluntary agreement with local government	implement all improvements with a simple payback of 5 years or less		
France	energy efficiency improvement of state administrations; takes into account social housing target	15%		2020
Germany	electric vehicles	10% of fleet		2020
<i>Greece</i>	<i>replacement high efficiency lighting</i>	<i>at least B-rated in all public buildings</i>	<i>2006</i>	<i>2016</i>
Netherlands	local authorities energy efficiency improvements	between 2-4% per annum		2020
<i>Spain</i>	<i>central government buildings</i>	<i>savings to be achieved in all 330 buildings</i>		<i>2016</i>
United Kingdom	CO ₂ emissions reduction in central government buildings	10%	2010	2011

Bulgaria, Greece and Spain, as highlighted in italics, have made their targets for the public sector legally binding. Among all the targets reported in this section, these (aside from the white certificate schemes) are the only ones that are binding in a legal sense. To find they all apply to the public sector and have a deadline of 2016 is not surprising, not least because the ESD requires public authorities to play an exemplary role. Equally, although this may only be a partial picture, the lack of (legally binding) public sector targets for many countries is perhaps surprising.

The role of the Energy Services Directive

Evidence from respondents to the survey suggests that the ESD has been instrumental in the definition of energy efficiency targets in Member States where there had not been any before. The ESD, its nine per cent target and the NEEAP process have variously been described as: the sole driver of energy saving; raising energy saving's profile; representing a prestigious target to meet; driving improvements in measurement and monitoring; leading public authorities to take energy saving more seriously; and strengthening justification for existing action. It is interesting to note that a handful of consultees appear to perceive the 2016 target as binding.

The actual extent to which the Directive has driven new energy saving activity is less clear, but there is some evidence in newer and smaller Member States which suggests that the scope and scale of some existing programmes have been expanded to meet the requirements of the target. However, it is difficult to distinguish ESD-triggered activity from actions which would have been undertaken anyway to meet non-ESD related aims. In some larger Member States with substantial portfolios of energy saving programmes, existing action plans and in some cases more ambitious targets, the ESD appears to have led to little more than the preparation of a NEEAP to comply. There is no evidence from any of the surveys to suggest that the ESD has driven any targets and activity closer to aiming for absolute, rather than relative energy savings. In contrast, complying with (for example) a directive like the EPBD shows a much clearer causal link to new standards, programmes and ways of thinking about energy in buildings.

The ESD has driven formal recognition of existing activities' contributions to meeting the 2016 target through the NEEAP process. However, a few consultees note a lack of clarity regarding which existing activities could count towards meeting the target, and which could not. Taken together with the earlier point about which new activity is driven by the ESD, this suggests a need for greater transparency and better communication from Member States to both citizens and the Commission about which aims and targets

energy saving programmes are intended to contribute to. Improving communication in this way may make it easier and more acceptable to address areas where Member States are falling short, particularly with respect to the 2020 objective.

As in all areas of EU policy, the Commission's purpose is to help identify and suggest ways in which to overcome fundamental (or 'lowest common denominator') obstacles to meeting Member States' shared goals which cannot be addressed at subsidiary level. Of course, this means that the Commission needs also to be transparent and effective in communicating how EU level targets and initiatives relating to energy saving contribute to shared aims and objectives.

Experience of the ESD to date suggests that it contributes to this by setting out a headline target and a shared framework for measuring progress which has succeeded in ensuring a minimum level of practical recognition in Member States for overall energy saving targets. At the same time, the realisation that progress towards the 2020 objective has been too slow has reopened the debate about whether and how EU level initiatives could go further.

Effectiveness of existing targets

The use and effectiveness of different types of target

Different types of target can be defined in terms of their stringency (the degree to which they are binding – mainly legally but also politically, indicative or voluntary), the way they are measured (such as a defined absolute or relative improvement, intensity, benchmarks and standards, or transactional) and scope (economy-wide, sectoral, sub-sectoral, level of geographical applicability). Overlaying these possible permutations is the choice of primary or final energy use.

Not surprisingly, consultees and respondents to the survey agree that any type of target can only ever form part of energy saving policy in addition to concrete incentives and regulations. While legally binding or mandatory targets are often recognised as making concerted action and more resources for energy saving more likely, many survey respondents have stated that progress in relation to such targets is still lacking. Binding status in a legal sense needs to be matched by political, resource and stakeholder commitment for it to truly improve results.

There is a fairly clear trend to employ certain types of target to individual sectors. Enforceable obligations are usually applied to energy utilities and fuel suppliers in Europe's varied white certificate schemes, which usually address multiple energy end-uses and sectors. Voluntary targets to conserve energy are frequently agreed between public authorities and individual industrial sectors, and often combined with incentives linked to the EU Emissions Trading Scheme (ETS), as is for example the case in Belgium, Finland and the United Kingdom. Transactional targets are most commonly applied in the buildings sector, and usually expressed in terms of a rate of refurbishment, or a number of buildings retrofitted in a given time period, sometimes linked to a benchmark improvement.

The aim of energy saving also influences the type of target used. For example, energy intensity targets often relate to competitiveness or other economic aims, and primary energy saving targets tend to be more closely linked to energy security aims.

Targets expressed as defined improvements, particularly absolute and final energy consumption reduction targets, are frequently seen by consultees as the most transparent, understandable and effective in conveying intent – but face the strongest political resistance. Numerous consultees note a lack of political appetite to reverse the continuous increase in energy consumption. Nonetheless, the ESD and 2020 targets represent defined (relative) improvements, and many countries have imposed defined improvements of their own. This is particularly the case for white certificate schemes and obligations on the energy utilities. The 'defined improvement' is usually assessed indirectly (rather than measuring actual energy use), based variously on transactional

records, levels of investment and predictions of energy savings achieved – or combinations of these, depending on the nature of the actions allowable to obtain certificates.

What is clear is that no single type of target can possibly represent all aims at once. Despite this, a single clear and understandable target which ‘leads from the front’ is seen to be both desirable and necessary by most consultees; a target which acts as an umbrella and represents a country’s combined efforts in energy saving. Across the consultees’ views, such a target, and the way it is measured, needs to be supplemented by a variety of others, suited to a country’s priorities, economic, cultural and historical context⁷, to ensure that meaningful progress is being made. In some countries, such a ‘leading’ target is the same as the ESD target, and in at least one case it is the same as the 2020 target. It is important to note that EU targets and national ‘leading’ targets are in no way mutually exclusive, but that one or the other needs to be granted ‘headline’ status to avoid confusion in the public consciousness.

Finally, at the headline target level, the relative merit of primary versus final energy saving has been a recurring theme of discussion in the consultation. Some consultees believe that primary energy saving targets are less effective at galvanising action because some forms of renewable electricity can help in meeting the target, whilst this is not the case for final energy saving. Also, transparency of energy saving efforts is more rigorously assured with final energy targets. However, others argue that primary energy targets represent a more comfortable, less competitive fit with renewables targets.

Achievability and ambition of targets

The collective evidence from the consultation suggests it is hard to gauge the ambition of economy-wide energy intensity targets, although they are usually deemed achievable. In nearly all countries that took part, consultees suggest that there is greater energy saving potential than is captured in existing defined improvement targets. All end-use sectors are variously and frequently mentioned in this context. Though consultees mostly refer to economic potential, in some cases it is not clear whether technical potential is meant. Either way, the buildings sector is mentioned most often. Though transport is mentioned in this context as well, it is the only sector in which targets are overtly described as too optimistic (in two cases).

Targets are very important in galvanising action and understanding progress, but they also tread a fine balance between achievability and ambition. They must be founded upon need and evidence of energy saving potential, moderated by real-world expectations (in addition to economic and technical considerations) of what can realistically be achieved, as well as upon progress that can be credibly and transparently shown. Consultees state that targets that are too low may at worst be meaningless, but that unrealistically high targets, probably more so than targets that are too low, can severely undermine stakeholders’ faith in them and contribution to activity to meet them. Furthermore on this note, a number of consultees add that setting targets carefully goes hand-in-hand with strong stakeholder involvement and communication.

A further factor related to achievability and ambition, is how the details of the targets relate to longer-term objectives. One consultee pointed out the illustrative example of a ‘light touch’ housing retrofit programme in Hungary, noting the dilemma of whether to achieve a target through breadth or through depth. Improving a larger number of homes through shallow retrofits rather than a smaller number through deep retrofits may achieve a given target at lower cost. However, greater ambition in the long term, and additional costs incurred by the need to revisit the homes that were improved initially, may mean that deep retrofits at the outset would have offered the least cost path to achieving the target. This dilemma can also be observed in the UK, where the government has recently piloted a series of local approaches that aim to deepen the

⁷ At a high level, this is particularly important to consider if a country has been undergoing profound economic reform. Anecdotally, energy intensity targets tend to carry greater weight in these countries.

treatment of individual buildings in recognition of the potential for long-term cost savings but where the cost-effectiveness of meeting short term targets still plays a dominant role in programme design.

Practicalities of targets

Measurability of targets

The measurability of targets is a complex problem, related to target type, the degree of aggregation, institutional capacity and data availability subject to cost and other constraints. An additional layer of complexity relates to the purpose of measurement, for example for verification, reporting, evaluation or comparison, to name a few. Survey respondents' and consultees' views on the issue of measurability are extremely varied, and sometimes diametrically opposed.

A focus for most responses and comments on the issue was the harmonised method for measurement – combining top-down and bottom-up approaches – under the ESD (referred to as the 'recommended' method), which spilled over into views on harmonising measurement more generally. A number of consultees and respondents in newer as well as smaller Member States acknowledged the recommended method as challenging and more costly than other methods, but also as potentially very important in strengthening energy saving targets and activities. Most consultees accept that any harmonised approach must allow some degree of country-specific assumptions and adjustments to be made, particularly in the case of bottom-up measurement.

An important example of country-specific and varied bottom-up assessments, capable of encouraging greater efforts, exists in Member States' white certificate schemes. These schemes represent 'microcosms of harmonisation' and consistent measurement which allow them to take the form of binding obligations on (usually) energy utilities. Notwithstanding some respondents' critique of their overall levels of ambition, the schemes in France and Italy enjoy favourable attitudes towards, and confidence in, their practical approach to measurement. The case of Italy in particular highlights a pragmatic mixture of bottom-up methods translating into a shared certificates currency. For well-understood and simple energy saving actions (such as compact fluorescent lamps), a standardised assumption about the savings achieved is made. For more complex but not uncommon interventions, proxy measurements such as a meter reading are combined with standardised assumptions. Finally, for innovative actions, more thorough measurements are taken to ascertain savings. It is far from perfect, but this nevertheless constitutes a useful illustration of an attempt to balance accuracy with the effort and cost involved in measurement by using a mixture of methods that are reasonably fit for purpose – and an attempt reliable enough to form the basis of binding energy saving targets. Achieving this balance is viewed by many consultees as essential. This is because at the basic level, the knowledge about which actions need to be undertaken – and where scarce resources need to be prioritised – already exists.

One of the most important drivers of harmonisation is the consistent and comparable national reporting of efforts to meet the ESD target – an essential condition if a target set at EU level is to be meaningful. On the surface, most NEEAPs offer some degree of international comparison, having employed reasonably consistent headline metrics of energy consumption and energy savings, mostly reported against the same or similar end-use sectors. However, as is evident from the surveys and consultees' comments, a wide variety of measurement methods underlie each Member State's first NEEAP⁸, depending on the sector. This makes comparisons between countries less meaningful than they may appear. *Within* almost all Member States, meaningful comparisons between various energy saving-related targets are at least as difficult to make, considering the range of metrics, timelines and baselines used.

⁸ Germany, for example, is one of a handful of countries which has used the recommended (combined top-down and bottom-up) method across all sectors. Romania will be fully using the recommended method for its 2011 NEEAP and primarily used the top-down method for the 2007 Plan.

Differing perspectives on harmonisation from a number of consultees lead them to a partially shared conclusion. On the one hand, the more prescriptive harmonisation guidelines are, the more individual countries' specific weaknesses (in terms of institutional capacity and data availability) are exposed – undermining measurement reliability and, consequently, comparability. On the other, the more that flexibility is allowed within a harmonised approach, the less comparable measurements become – although, and this is important, reliability of measurement does not worsen as a result. An important additional point, noted by two consultees, is that where a lack of flexibility in harmonisation weakens the reliability of measurements, it also undermines the legitimacy of targets assessed this way.

Consultees often state that reliable and robust measurement results are important for demonstrating effective and credible progress against targets, so measurement methods should be no more (nor indeed less) detailed than reliability (i.e. institutional capacity and the collection of good data) allows. A harmonised method, as proposed under the ESD, is a legitimate and worthwhile objective to encourage and work towards. However, it is important that the development and expression of EU level targets is in step with this progress, not ahead of it.

The implication of the above point is that some of Member States' resistance to binding EU level targets is linked to difficulties with the harmonised method. Furthermore, a number of consultees report a political aversion to inter-country comparisons, especially when reliable comparability is not guaranteed. Most consultees see the value in working towards a harmonised method, but they see improved programme monitoring and evaluation as the main benefits, not comparisons.

In light of the growing use of white certificate schemes in Europe, it is worth asking whether the driver for harmonisation (of bottom-up methods) may shift from comparability to the related but different issue of tradability. A further question worth asking is whether the emphasis for harmonising top-down methods may change in the same way: by focusing more on the issue of tradability in a burden-sharing sense.

Coherence or conflict with other national targets

The difficulty of comparing or relating targets within countries has already been noted, for example how an energy intensity target from 2005 to 2030 relates to the national ESD target from 2008 to 2016. Almost no respondents report how different types of headline energy saving targets are connected. The simple answer from many of the surveys is that they are not, as they have either been set by different government departments or successive administrations. A notable exception was reported from just one country (Greece), whose NEEAP outlines actions to meet both the ESD target and the differently measured 2020 objective.

When asked about coherence or conflict with other national targets, respondents mostly focused on the relationship between energy saving, CO₂ mitigation and renewables targets. In their answers, the emphasis shifts quite clearly away from the ESD target towards the 'trio' of goals represented by the 20:20:20 objective.

The picture that emerges contrasts theory and practice. Nearly all commentators agree that, in theory, binding CO₂ and renewables targets should drive cost optimal investment in energy saving to help meet them. They all agree that, in practice, this is not the case. A number of consultees state that, in theory, binding CO₂ targets alone should lead to a better outcome for energy saving than CO₂ and renewables targets combined. They say that this combination, without granting the energy saving target the same binding status, skews priorities in practice towards renewables. While most commentators believe that binding energy saving and renewables targets would complement each other well, many think politicians simplistically view additional binding targets as an additional regulatory burden which increases costs.

This skewing of priorities may create new, or reinforce existing, miscommunications between various aspects of energy and climate policy. One consultee anecdotally

highlights that if France were to meet the 20% target for energy saving, as well fulfil its plans for energy supply investment, it would be producing 150% of its energy needs⁹. Highlighting a different but related type of miscommunication, one consultee (who is well-placed to judge this) asserts that meeting the 20% renewables and energy saving targets would result in a higher CO₂ reduction of 25%. By simplistic extension, meeting the binding CO₂ and renewables targets is likely to mean that the energy saving target is not met. Does this matter? Yes, if it means higher costs per tonne of CO₂ saved or failure to meet non carbon-related energy efficiency goals.

What these mismatches illustrate is that binding status for energy saving would treat the symptoms of a lack of coherence between targets, but would not address the causes: a lack of integration in the development of energy and climate policy at both EU and national levels. One consultee adds that a target set in terms of achieving all CO₂ reductions below a certain mitigation cost per tonne would focus minds on more integrated policy development. This is of course something that better national and EU measurement of energy saving can contribute to addressing. As has been discussed by Member States for some time, increasing the CO₂ target would also be likely to galvanise energy saving efforts, given that the renewables target is already agreed and deemed to be ambitious.

As it stands, most consultees judge the effect that the EU's CO₂ and renewables targets have on energy saving to be minimal in practice. However, some consultees state that other national objectives, particularly those following social and economic aims, do more to drive energy saving than climate change, in part because it does not need to compete for the same resources. What is certain is that the combined effect of the 20:20:20 targets on Member States, irrespective of whether the energy saving target is binding or not, vary considerably.

Responsibility for meeting targets

Views on where responsibility for meeting targets lies, or ought to lie, vary considerably by country. Responses generally reflect the institutional make-up of the country they come from. Responsibility in this sense has many parts: political (which may include legal), technical (i.e. measurement, verification), sectoral, communication, punitive and so on.

As a broad generalisation from both the surveys and the consultation, overall political responsibility should (and often does) lie with central government – usually the ministry which covers energy policy. Responsibility for meeting sectoral commitments are often (at least partially) assigned to ministries which cover policy towards individual energy end-use sectors.

A few consultees suggest that a single organisation with overall responsibility is needed to coherently communicate to, and successfully engage with, stakeholders. Often, the national energy agency plays this role in coordination with central government. Energy agencies are often assigned day-to-day technical responsibility for monitoring and reporting on the combined efforts of various ministries, regional and local authorities, energy utilities and others involved in delivery. In this capacity they may also act as a hub for exchange of information between stakeholders and continual improvement of programme design and implementation. This is generally seen as a good model.

In the case of countries with white certificate schemes (which are generally binding obligations on energy utilities), energy market regulators usually take the role that energy agencies do in other areas of energy saving (although in some cases agencies and regulators are parts of the same organisation). This includes monitoring and verifying utilities' progress, communicating results, and enforcing compliance with targets.

A few consultees report that public sector leadership in energy saving becomes especially important if high-level political responsibility for meeting targets is to be

⁹ It is not clear whether this is intended, but it is unlikely.

meaningful. This is critical for enhancing the credibility of compliance mechanisms (such as in white certificate schemes).

Views on legally binding national targets

Legally binding energy saving targets – with the exception of white certificate schemes where they are effectively ‘outsourced’ to the private sector – are broadly speaking relatively rare in the EU. Mandatory minimum standards, or ‘benchmark’ targets (such as for buildings and products) are common. This is in part a reflection of EU policy in this area, in particular of the energy performance of buildings and ecodesign directives.

Most of the discussion by survey respondents and consultees on this topic focuses on the possibility of binding European targets for each Member State. Those consultees who specify a possible future binding target always refer to the 20% by 2020 objective. Nearly all believe, as discussed earlier, that this objective should be given equality of status with the binding renewables target.

As noted in the earlier section on measurability, attitudes towards binding targets are often related to views about the harmonised methodology needed to support them. When taken together, these two issues are seen as more contentious than when each is discussed in isolation.

No consultees argue with the idea that some form of harmonisation is required for any type of target or objective to be made binding across the EU. However, a number do highlight one particular but significant risk of a harmonised method, if it is not adaptable to the national context: the risk of a situation where stakeholders believe or know that good progress has been made in energy saving, but cannot clearly demonstrate the results because of methodological constraints.

This risk is currently displayed in two forms. For the ESD target to 2016, it will be demonstrated nationally in the second round of NEEAPs due this year. For the 2020 objective, this risk is manifested by the difference between Member States’ own estimates of primary energy saving and the harmonised estimates of their efforts made by the Commission’s use of the PRIMES model. Views on the latter are mixed – it is simultaneously seen to be important to use, but also viewed as lacking transparency.

Relating back to the discussion about coherence of different targets, there is a commonly held view among consultees that increasing numbers of mandatory targets suppress flexibility to meet any of them. Yet, given recognition of the fact that energy saving progress across the EU is slow, consultees’ balanced judgement is that the drawbacks of reduced flexibility are currently easily outweighed by the benefits of the extra impetus binding energy efficiency targets could make.

Many consultees see political resistance as a significant barrier to binding EU targets – especially (as mentioned before) if they were to reduce absolute consumption. Another issue, also mentioned earlier, is general resistance to new regulatory burdens, which are often simplistically viewed as imposing extra costs and reducing flexibility. A further political barrier is the concern about unfavourable comparison with other countries.

Consultees also discussed political opportunities. Recession, and its downward pressure on energy consumption, is a factor affecting political perception of binding targets in a number of Member States, for example in the following ways: targets would be easier to meet, economies are adjusting anyway, and implementation brings economic and social benefits. A number of consultees argued that binding targets would make it politically easier to impose new and/or more stringent white certificate schemes, as well as more stringent voluntary energy saving agreements with industry. They would also support efforts in Member States which are more ambitious than the EU level target. Furthermore, the fear of unfavourable comparison with other Member States exists anyway: a robust binding target regime would allow countries to show they are not lagging in energy saving. Consultees assert that in European politics, this imperative is stronger than the desire to be seen as leading the field. This can be seen as inherently



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compatible with the EU's philosophy of legislating for a minimum shared level of achievement and standards, whilst encouraging innovation at subsidiary level. The energy performance of buildings and ecodesign directives, of course, do just this.

If binding EU targets were to become the way forward, they would of course need to be in keeping with this philosophy and address the previously mentioned fundamental political barriers and opportunities. In practical terms, this would imply that targets are high-level and achievable (as the 2016 and (all the) 2020 targets are deemed to be), and may require that the harmonised framework for measuring progress is in tune with this by being simple, high-level, transparent, *and* with room for innovation and continuous improvement.

Appendix A: literature

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Appendix B: the survey

General Introduction

This survey is part of a project being carried out by the European Council for an Energy Efficient Economy with funding from the European Climate Foundation. The aim of the work is to provide a snapshot of the use of, developments in, and opinions on energy efficiency targets across all EU Member States.

In addition to the survey, there will be an online consultation on key issues, which all survey participants and other experts will be invited to participate in. This will provide all participants with the opportunity to share their ideas and hear what others think.

The results of the work will be published in a report that will be circulated to policy makers at the EU and Member State levels; all contributors will be acknowledged in this report.

By targets we mean any quantitative objectives with associated timescales for reaching them. The targets could be legally binding, indicative, or voluntary.

There is a diagram included in this survey (see below) which gives you an overview of how each of the questions we are asking fits within the overall picture of what we are interested in. All the questions we are asking correspond to elements of this diagram.

We are firstly asking you about targets that are in place now. For each of the main sections below however, it would be useful if you could provide us with any important information about what – if anything – was in place before the targets. If you know anything about future developments in the targets, it would be good for us to know that too.

The questions are divided into six sections:

1. Scope: this will give us an overview of the targets that are in place;
2. Assessing progress: we would like to know how progress towards energy efficiency aims is measured and recorded;
3. Delivery responsibility: who has responsibility for delivering the targets;
4. Drivers: why are the targets set and used;
5. Nature: how strict/binding are the targets; how achievable are they; what progress has been made so far;
6. Cogeneration: although the survey is primarily about energy efficiency targets, we also have a few questions about cogeneration targets.

Scope

We would like to know about targets that are in place, whether they are voluntary or binding. Please describe all targets relating to energy efficiency and/or energy conservation in terms of:

Audience

Do the targets refer to the economy as a whole, or to specific sectors:

- Are there targets for industrial energy efficiency and/or for specific industry sectors?
- Are there targets for the transport sector and/or for specific sectors within this?
- Are there targets for buildings (commercial and residential)?
- Are there separate targets for the public sector and/or for specific elements of this sector such as schools, public transport vehicles etc?

Do any sector specific targets form an explicit part of an economy-wide or other higher-level target?

Vector

Please explain the broad terms of each target. Are they fuel-based (e.g. GWh) or technology-based (e.g. efficiency of appliances)? Are they transactional (e.g. number of buildings refurbished)? Are some targets a combination of these?

Also, let us know what the actual targets are in each case.

Timescales

Are targets short (annual), medium (5 to 20 years) or long term (20 years or more)? Do any targets combine a long-term objective with shorter term goals?

Geography

Are targets set nationally, regionally or locally? Are any local or regional targets explicitly linked to overarching targets at a higher geographical level?

Stringency

Are targets legally binding (enshrined in law), voluntary (e.g. agreement with industry) or indicative (e.g. official but not enshrined in law)? Or have the targets taken another form of stringency?

Assessing progress

We would like to know about arrangements in place for assessing progress towards energy efficiency and energy saving objectives.

Measurement and verification

What metrics are being used to measure targets and progress? (For example primary energy used; final energy demand; lifecycle energy consumption; money spent on energy efficiency investments; number of installations of efficient technologies.)

How are data collected? (For example through: measurement of actual energy use; measurement of proxies; estimation of the impact of actions, etc.). In the case of energy measurement, is the methodology bottom-up (i.e. measuring performance of a group of energy services) or top-down (based on energy intensity); or is a combined methodology used?

What methods are used or being considered to identify the precise effects of energy efficiency and energy saving activity? (For example to distinguish between the effects of an energy saving programme and an economic downturn.)

Connected to the previous question: What verification procedures are in place, in particular where multiple third parties are involved in measurement - in particular to avoid 'over-reporting' of savings and double-counting?

Reporting

In addition to preparing national energy efficiency action plans (NEEAPs) under the Energy Services Directive, what reporting mechanisms are there in place? Which aspects of energy efficiency and energy saving policy activity are reported? Who are they reported to, and how often?

Please provide links to any publicly available data and reports (in addition to NEEAPs).

Evaluation

Is there a process (formal or informal) for learning from experience, and amending targets based on new evidence and revising policies and programmes? If so, please describe how this is done.

Responsible organisations

Which institutions are responsible, formally or informally, for measurement, verification, reporting and evaluation?

Obligated/responsible organisations

Who has ultimate responsibility for delivering against the targets? We would like to distinguish between 'audience' (addressed in section 1; i.e. the end-user, for example residential households) and 'obligated entity' (the agent responsible for delivery, for example national energy agency, local authority, utility etc). As part of this, can you tell us the following:

- In the public sector, which level(s) of jurisdiction and administration?
- In the private sector, are utilities responsible for delivery against any of the targets?
- Which, if any, other organisations are responsible for delivery?

Drivers

What are the main drivers of targets for energy efficiency and energy saving? For each target, including any for the economy as a whole, please let us know why these targets have been set: is climate change or CO₂ mitigation the driver; Competitiveness and affordability; Energy security; Compliance (for example with the Energy Services directive)?

Anything more to add?

Nature

In this section, we are looking for honest and inevitably more subjective opinion. We also intend to use answers to these (and the above) questions to feed in to the online national stakeholder discussion. Please answer as many of the questions as you can for as many as possible of the targets you described .

Achievability and ambition

Do you think targets achievable within their timeframes? What is your view on how they relate to identified energy efficiency and energy saving potentials? Where you think they are relatively easily achievable, would you consider them ambitious enough to meet their objectives (see section 0)?

Success

In your opinion, how successful have activities been in meeting targets set? In your view, where and why have efforts fallen short of ambition? Where there is a shortfall, are steps being taken to ensure that targets will be met?

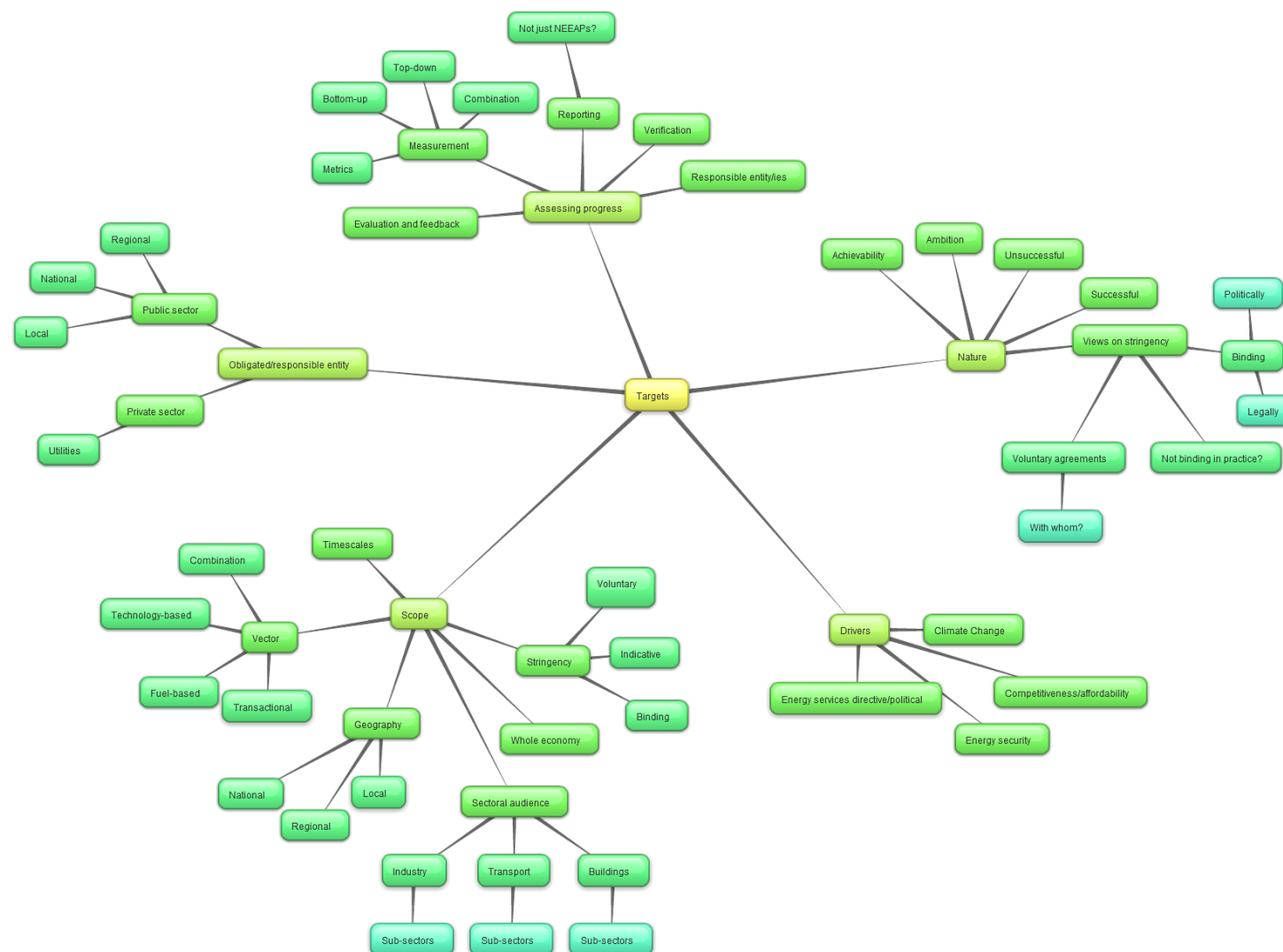
Opinion on stringency

For targets that are binding or official, which do you think are binding in a political sense (e.g. are high-profile, high-prestige etc) and why? For targets that are voluntary or indicative, and do you have any views on success in meeting these compared to other types of targets?

Addendum – CHP

On a somewhat separate note, can you tell us whether there are any targets of any nature relating to or governing co-generation?

Diagram of target topic areas



Appendix C: online consultation

The questions

Effective targets

Which of the existing energy efficiency targets / aims in [country name] have been most effective? Why is this?

Which have been least effective, and why?

What would be the most helpful change in the recast of the ESD for achieving your country's contribution to the EU's 2020 target?

What would be a challenging yet achievable energy efficiency target for [country name] for 2020 / 2030?

Target setting and measurement

From the experience in [country name], which of the following types of target is most effective in achieving energy efficiency aims:

1. Defined improvement (i.e. reduction in energy consumption or emissions)
2. Intensity (reduction in energy consumption or emissions per unit of economic activity)
3. Benchmark (energy consumption in comparison to others)
4. Transactional (for example, number of buildings insulated; number of cost-effective measures undertaken)

Which type of target is most practical for [country name]? (which is most politically acceptable; which is easiest to quantify and monitor?)

What do you think is the best trade-off between accuracy or fairness and the effort involved in measurement?

Is the reliable measurement of energy savings a barrier in [country name] to effective progress in energy efficiency?

Can a harmonised method for measuring energy efficiency across Europe be developed? What would be the essential components of this method that would work in [country name]?

Mandatory targets

Are you in favour of a legally binding national energy efficiency target? Why / why not?

Is your opinion the same as the official national position for [country name]? Is the official national position based on consultation with stakeholders or is it only the position of government?

Would the introduction of mandatory energy efficiency targets be in competition or conflict with other existing targets (for example, for renewable energy or greenhouse gas emissions reductions)? Are the existing targets aligned well with one another, or is there already competition between them?

Targets in practice

How important would a mandatory energy efficiency target be in stimulating greater energy efficiency investment in [country name]? If there are other incentives in [country name], would the target be as important, more important or less important than them?



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Is it important that the responsibility for meeting the target is given to a particular institution / group of institutions? If so, where should it lie (for example, with government - central, regional or local, with an energy agency, with energy companies, or with groups of institutions within the sector to which the target applies)?

Where (which sectors) would you expect to be able to improve the most in energy efficiency? Which sectors currently have the largest potential for improvement that is not reflected in an existing target?

The response

Country	No. requesting login	No. actually visiting the site	No. of contributions			
			Effective targets	Setting and measurement	Mandatory targets	Targets in practice
Austria	1	1	0	0	1	1
Belgium	3	2	0	0	0	0
Bulgaria	2	2	0	1	1	1
Cyprus	4	4	0	1	0	0
Czech Rep	6	6	2	4	2	4
Denmark	3	2	0	0	0	0
Estonia	0	0	0	0	0	0
Finland	2	2	0	3	2	3
France	4	4	0	1	2	3
Germany	8	8	2	5	6	5
Greece	4	4	3	3	3	3
Hungary	4	3	0	0	5	1
Ireland	0	0	0	0	0	0
Italy	4	3	0	0	2	1
Latvia	2	1	0	0	0	0
Lithuania	1	1	0	0	0	0
Luxembourg	0	0	0	0	0	0
Malta	2	1	0	0	0	0
Netherlands	3	3	0	0	0	0
Poland	2	2	1	1	1	2
Portugal	7	5	0	1	1	1
Romania	5	4	0	1	1	3
Slovakia	0	0	0	0	0	0
Slovenia	0	0	0	0	0	0
Spain	3	3	0	1	0	0
Sweden	6	4	1	1	1	1
UK	5	5	0	4	0	1
Total	83	72	9	27	28	30

Appendix D: country summaries

Austria

Austria's revised energy strategy of 2009 set the target of constraining the country's final energy demand in 2020 to the level it was in 2005. It is not clear how this relates to the ESD nine per cent target (expressed as 80,407 TJ of the annual average consumption in 2016), but it is the NEEAP's outline of how the latter will be reached which forms the basis for Austria's energy efficiency policy. The NEEAP refers to the Government Programme for 2007-10 which includes measures relating to target of improving energy intensity by at least 20% by 2020. Targets within this programme are largely in the buildings sector and are expressed as transactional targets: increase the renovation rate of buildings to at least three per cent per year during 2008-12 and five per cent per annum in the medium term; thermal renovation of all post war buildings (1950-1980) by 2020; 50% of all new buildings to reach the 'klima:aktiv' climate protection standard.

Seemingly unique amongst Member States is Austria's public-facing ESD portal, which allows for collection of bottom-up data from energy users to measure progress against the ESD target.

Belgium (Flanders)

The region of Flanders has an indicative target which is in line with the ESD – a nine per cent saving by 2016 in final energy use¹⁰. Separate targets linked to programmes which will deliver this saving cover a broad mix of sectors, indicators and types of stringency. Targets cover: retrofitting all homes with basic improvements by 2020 (political commitment); a 20% reduction in regional energy intensity by 2020 (indicative, results from progress in other areas); a 15% energy efficiency improvement in energy-intensive industry by 2012 (voluntary agreements); and an annual 3.5% annual primary energy saving obligation on distribution system operators (legally binding). A mixture of bottom-up and top-down methods are used to assess progress, depending on each target.

In Flanders, compliance with the ESD is a by-product of other factors – CO₂ mitigation and economic competitiveness – driving the use of the targets mentioned above. The targets are deemed to be achievable but challenging within their timeframes. The sole exception to this has been the obligation on the distribution system operators, who have since 2003 achieved surplus savings and have been allowed to carry these forward, making the 3.5% target easily achievable. One commentator has remarked that a way of making the obligation more suitably challenging would be to express it in actionable terms (such as requiring operators to offer insulation subsidies). For the remaining targets, however, 'challenging' is not the same as ambitious; the same commentator cited Belgian buildings' energy performance and Flanders' energy intensity as being considerably worse than the EU average – as well as a study identifying 30% energy saving potential in Belgium by 2030 – justifying more ambitious targets and action. Notwithstanding concerns about the transparency of reporting progress against the voluntary agreements with industry, the Flemish Government innovatively provided EU ETS permits to industries entering into such commitments to improve their energy efficiency.

Bulgaria

In Bulgaria, the ESD's nine per cent target was made legally binding in early 2011 for some of the sectors delivering their share of savings: large public buildings, SMEs and energy retailers respectively¹¹. In public buildings and SMEs, building owners are to achieve at least 50% of the energy saving potential identified in energy audits, which is

¹⁰ Each of Belgium's regions has set itself the indicative nine per cent target; it does not exist at federal level.

¹¹ When first introduced in 2008, the targets were indicative (ODYSSSEE NR).

ambitious, but owners are falling short. Amongst those who have already taken action, the two groups are achieving just seven and 11 per cent of this potential respectively, thus falling quite a way short. One commentator says this is a result of a mismatch between the targets and the resources and support available to meet them. The largest share (82%) of the national target burden falls on energy retailers, and whilst this is deemed to be both challenging and achievable, it could be made more ambitious by granting retailers the ability to trade white certificates and expand it to include efficiency of conversion and transmission in their obligations.

As a country heavily dependent on energy imports, targets in Bulgaria – perhaps also their binding nature – have been driven by pressing energy security concerns. As a result of this, a new energy strategy to be adopted in 2011 is likely to strengthen the role of energy efficiency and may extend binding targets to large commercial buildings.

Cyprus

Current targets in Cyprus are as manifested in 2007's NEEAP prepared in compliance with the ESD. Indicative targets in the NEEAP are described and quantified for each end-use sector¹². Together, they add up to a 10% saving over the 2008-2016 period. Prior to accession and to the NEEAP, Cyprus did not have a 'comprehensive' energy saving / efficiency policy, so the use of targets, and measuring progress against them (using the official methodology), is recent. Against the backdrop of expected electricity demand growth of 2.7% per year, possibly tripling by 2030, the question of whether Cyprus' targets are sufficiently ambitious is up for discussion. This is supported by the fact that the services and tourism sectors account for 78% of GDP, but just 10% of the savings envisaged in the NEEAP.

Only last year, six municipalities in Cyprus joined the Covenant of Mayors, providing evidence of increased activity to save energy at local level. The contribution of devolved action had not been captured in Cyprus' first NEEAP, but ought to be in the second due this year.

Czech Republic

The use of targets in the Czech Republic is currently driven by the NEEAP and compliance with the ESD. The nine per cent indicative target¹³ carries with it the objective of a 1.6% saving of final energy consumption in 2010, and is broken down by sector. Other targets in place at the time the NEEAP was published include the objective of reducing energy intensity by 40% by 2020 and improving the energy efficiency of the electricity and final energy consumption sectors by 2.6% and 2.1% per year respectively. It is not clear how these different targets relate.

A study of energy saving potential in the Czech Republic – using both bottom-up and top-down assessment methods – was conducted to inform the first NEEAP, and it is said that this potential is greater than meeting the nine per cent target. The later Climate Protection Policy (2009) stated that further reducing final energy consumption had the largest contribution to make in achieving additional CO₂ abatement. In contrast, all of the activities that go toward meeting the NEEAP target were already underway in 2007, leaving some room for critique of a lack of clarity from the European Commission regarding the extent to which existing activity would count towards the ESD target. Whilst this may have resulted in a NEEAP which is lacking in ambition, it may mean that the ESD target is likely to be achieved. A second study of potential to inform the next NEEAP has been carried out¹⁴, and in the view of at least one commentator, the ESD has resulted in higher visibility for energy efficiency and the Czech authorities taking it more seriously.

¹² Residential, tertiary, industrial and transport.

¹³ Initially, the NEEAP put quantified a seven per cent saving, which was expanded to nine per cent later.

¹⁴ Although neither study has been published.

Denmark

Denmark currently has two national energy efficiency targets in place. The older of the two is for gross energy consumption to be reduced absolutely by two per cent by 2013 compared to 2005. The other is for a four per cent absolute reduction by 2020 compared to 2006. The seemingly lower ambition of the latter target is made up for by the fact that final energy demand increased by 1.75% from 2005 to 2006. The ambition is increasing again with a proposal by the government this year to increase the latter target to six per cent by 2020 – in part brought about by observed reductions in gross energy consumption in 2008 and 2009 as a result of the recession. The nature of expressing an energy saving target in gross consumption terms means that an increasing share of wind power in the electricity mix has contributed to meeting the target. However, a target to save 1.5% of total final energy consumption per year has been in place since 2008 – though how this relates to the primary energy target is not clear. Nevertheless, the use of obligations on energy distributors to deliver end-use energy savings since 2006 has grown since 2008 (by 85%) to the point where these obligations were set to deliver half of Denmark's annual energy saving target. The penalties for non-compliance appear proportionate and credible¹⁵.

Late last year, the independent and official Danish Climate Commission outlined recommendations for a zero fossil fuel economy by 2050. To achieve this, the Commission envisaged that final energy demand would need to fall by nearly one fifth on 2008 levels, with large reductions in the residential and transport sectors making up for small increases in industrial and service sector demand.

Estonia

The NEAAP forms the basis of Estonia's energy efficiency policy – and whilst it intends to meet the ESD's nine per cent target, the plan covers the 2007-2013 period. To 2013, Estonia has developed a broad range of specific indicative objectives relating to energy efficiency. Amongst these are: maintaining a downward trend in energy intensity; increasing the share of A-rated electrical appliances sold to 50%; 8,000 apartment blocks receiving retrofit support; 30% of apartment blocks to receive energy audits, and 10% to be improved to be in the top energy performance category.

However, Estonia's national audit office found in 2009 that the NEEAP did not constitute a clear, agreed objective and plan for energy saving. This has been deemed to be mainly due to shortcomings in the methodology put forward for measuring energy savings, but also due to a lack of resources for meeting the objectives outlined. Adoption of the official ESD methodology – published after the deadline for NEEAPs – should in the opinion of the audit office allow for a stronger target and plan. A review of policies and measures is planned for mid-2011.

Finland

Finland has a non-binding target of a reduction in final energy demand by 11% below the projected baseline in 2020. At 37 TWh savings and corresponding to the EU's 20 by 2020 objective, this is in excess of the nearly 18 TWh saving in final energy demand required by 2016 under the ESD. Beyond this, the objective is to reduce final energy demand by a further 30% below 2020 levels by 2050. These overarching targets are complemented by sector-specific plans – in place before the ESD but adjusted to match it – which are again due for an update this year. Finland's approach is characterised by these plans which are a) each expressed in terms of the ESD's nine per cent target and timeline; b) take the form of voluntary agreements with each significant energy, industry and service sector; and c) each aim to capture at least 60% of a sector's members or energy use¹⁶ with the agreements. Linked incentives are designed to entice members of

¹⁵ Every kWh they fall short of their target by in a given year cannot be charged to consumers, and their obligation is set to increase in size the following year.

¹⁶ This is a broad generalisation in the interests of brevity; the nature of each sector-specific plan and voluntary agreements for energy saving is quite variable.

each sector into agreements – by making carrots for energy audits contingent on entering into an agreement, and carrots for energy efficiency investment dependent on having an energy audit. Finland's use of voluntary targets with individual sectors has grown in coverage and ambition over the years.

Whilst these voluntary agreements have been designed to complement other instruments in Finland such as the EU ETS and domestic energy taxes and standards, compliance with the ESD has of late been the primary driver of their use. As a result, meeting the ESD target is deemed to be achievable. On the other hand, there are no indications at present that the voluntary approach will go beyond the ESD target, nor that they will overcome the primacy of efficiency and relative savings over absolute savings.

France

Unlike in many other Member States, not one target in place in France is linked to compliance with the ESD. Targets for buildings¹⁷ are expressed in benchmark (e.g. 50 kWh/m²/a) and/or transactional (e.g. 400,000 retrofits per year) terms. Quite separately, there are targets for reduced overall energy intensity (two per cent lower per annum from 2005 to 2015), delivery of energy savings (white certificates) by energy providers, and CO₂ intensity of passenger cars. All of these targets, save for the white certificates scheme, have emerged as a result of one piece of environmental protection legislation, and are thus primarily driven by environmental, climate change, biodiversity and sustainable development concerns. Other factors such as competitiveness, affordability or energy security have expressly not driven energy efficiency in France.

Most of the above targets are generally seen by one commentator as ambitious, but at risk of being missed due to a combination of factors. In the case of existing buildings, this is deemed to be due to a lack of effective measurement and reporting of progress, as well as an absence of 'sticks' in the presence of 'carrots' such as low interest loans. More dramatically, the public sector and energy intensity targets are likely to be missed because they are seen to have very low political credibility. Measurement, verification, reporting and trading of white certificates, on the other hand, is judged to be thorough and precise, not least because the Ministry responsible for energy closely monitors the scheme. However, despite the fact that the scheme is set to deliver 345 lifetime TWh savings from 2011 to 2013 (up from 54 TWh for 2006-2009), the view is that it could be more ambitious.

Germany

Targets pertaining to energy efficiency and energy saving in Germany are driven by multiple factors. Economy-wide, there are three indicative and relevant targets: the climate protection target (for a 40% GHG cut by 2020 and an 80% cut by 2050 on 2008 levels), which embodies a package of programmes; the competitiveness-driven¹⁸ energy intensity target (for a reduction in primary energy use per unit of GDP of 20% by 2020 and 50% by 2050 on 2008 levels) which embodies a series of sectoral objectives; and the nine per cent 2016 target, driven by compliance with the ESD. Borne out of Germany's relatively new strategic energy policy¹⁹, the energy intensity target has explicit links to sectoral targets for saving electricity, and energy in buildings and transport. Forthcoming legislation to implement the *Energiekonzept* may change the sectoral targets' stringency, which is currently indicative. By 2050 compared to 2008, electricity consumption is to fall by 25%; the retrofit rate of buildings is to double to two per cent and their primary energy use to fall by 80%; and final energy use in transport is to fall by 40% compared to 2005.

Germany is one of a handful of countries using the harmonised bottom-up and top-down method to measure progress against the ESD target. In contrast, the new targets emerging from the *Energiekonzept* do not yet have agreed methods to assess progress.

¹⁷ For new buildings, existing private buildings, social housing and the public sector.

¹⁸ Which, interestingly, has been linked to extending the life of the nuclear phase-out.

¹⁹ Known as the *Energiekonzept*.

What slightly muddies the waters in the targets landscape is that it is not yet clear how the *Energiekonzept* targets relate to earlier objectives which emerged from the previous Government's Integrated Energy and Climate Package and have now taken a backseat. Furthermore, it is unclear what the current status is of an older, more ambitious target to halve energy intensity by 2020 compared to 1990²⁰. The climate and *Energiekonzept* targets are generally deemed to be ambitious, although their achievability is unclear, given that policy detail is still missing. The 2016 target on the other hand is deemed to be unambitious compared to energy saving potential and to have had barely any impact on the German market. Overall, Germany's emerging energy efficiency and energy saving objectives appear promising, but there are serious concerns about monitoring and evaluation of progress to date; the relative lack of efforts to tackle industry; and the absence of a more systemic and integrated approach to energy savings (such as white certificates).

Greece

Prior to the ESD process, Greece did not have a quantitative energy saving target. The ESD and EPBD in particular have been instrumental in changing this. The ODYSSEE national report cites energy efficiency as the 'second axis' of Greek energy policy, after the renewables target. The overall NEEAP target, corresponding to the nine per cent by 2016, is 18.6TWh²¹. It is enshrined in law, though the sectoral allocations are non-binding. The target was set, mindful of the 2020 objective, following analysis of economic potential for energy efficiency, and progress against it is measured using top-down methods. Lesson learning and evaluation is through the ESD reporting procedures, and compliance with the ESD compliance has been the primary driver.

Delays to the implementation of the NEEAP have led one commentator to suggest that the residential and tertiary targets will be difficult to meet, though still achievable. The high fuel costs and savings on offer for households mean that the achievement of these targets is politically important. In addition to the NEEAP target, a measures-based target is in place that requires all lighting outlets in public buildings have to meet a minimum energy efficiency rating of B by 2016. The target is legally binding and predicted to save 0.3 TWh by 2016. Legally binding targets for new buildings ensure that new public buildings from 2014, and all new buildings from 2019, will be required to cover all their primary energy needs using renewable energy sources, cogeneration systems, district heating systems or high efficiency heat pumps.

Hungary

In 1999, Hungary set itself a target of improving primary energy intensity by 3.5%, corresponding to 1.8 Mtoe per year²². In part due to economic restructuring, it improved by an average of 2.4% per annum, while final energy use fell by over 2.5% annually between 1991 and 2007. Nevertheless, according to the ODYSSEE index (ODEX), Hungary's energy efficiency improved by 18.8% between 1998 and 2007, well in excess of the EU 27 average of 10.2%.

In accordance with the ESD, Hungary published its NEEAP in 2008, outlining the actions to achieve the nine per cent target by 2016. Progress continues to be measured using the ODYSSEE database, and responsibility for its implementation and monitoring it have been delegated to the (then) Ministry of Transport, Telecommunication and Energy (now Ministry of National Development) and the Hungary Energy Centre. The latter is awaiting assistance from Eurostat for guidance on compliant measurement and reporting of progress in the tertiary sector. Weight is given to achieving the nine per cent saving as EU targets are viewed as prestigious.

²⁰ The earlier target implies an increase in energy productivity of 3.3% rather than 2.1% per year from now on.

²¹ The sectoral break down is: residential, 5.5 TWh; tertiary 5.7 TWh; industrial, 0.7 TWh; transport, 6.7 TWh.

²² Assuming an annual gross domestic product (GDP) growth of 5% and a growth rate of energy consumption of 1.5% per year

Italy

Italy has an ESD target of 9.6% reduction in final energy consumption by 2016. The residential sector sees the largest share, with 45% of the target, though this is not a legal requirement. A key contribution to this will come from a legal obligation (white certificate scheme) placed upon electricity and gas distributors to save 6 Mtoe primary energy by 2012. Changes to the scheme introduced in 2008 make a connection between the energy savings delivered and the national targets of NEEAP.

In addition, legal targets exist for RES (17% electricity by 2020, and 7.55% of energy by 2012), biofuels (4.5% by 2012), and a CHP target of 0.8 Mtoe savings per year by 2016. All targets seems to be driven by a need to comply with EU Directives, notably the ESD and the RES Directive. CO₂ mitigation, competitiveness and affordability, and energy security are all additional drivers.

Ireland

Ireland's NEEAP was published in 2009, and outlines measures to meet the nine per cent and the 20% target. The earlier Sustainable Energy White Paper (published in 2007) first outlined measures to meet the 20% target, as well as setting an indicative 30% target by 2020 to go further. Aside from the sectoral and programmatic allocation of the targets in the NEEAP, the Government has an aim to have 10% of its vehicle fleet electrified by 2020. Numerous sectoral indicators are used by the Sustainable Energy Authority to measure semi-quantitative progress of energy efficiency programmes.

Latvia

Latvia's NEEAP is classed as a 'short term planning document' and sets out how policies and measures will deliver the nine per cent target. The Environment Ministry is responsible for energy efficiency, an area of policy which in recent years has risen up the agenda relative to renewables. The 'Guidelines for Energy Sector Development for 2007-2016' cover all aspects of energy policy, and include a mixture of 'implementation benchmarks' for energy efficiency. These are to a large degree characterised by Latvia's extensive use of heat networks and encompass by 2020: final energy intensity reaching 0.22 toe/€1000²³; cogeneration capacity constituting 300 MW_{th} of heat load in large cities and 100 MW_{th} in other towns; reducing buildings' heat demand to 150kWh/m²/a; increasing the average efficiency of heat generation to 80-90% (from 68%) and reducing heat transmission and distribution losses from 17% to 14% by 2016.

Lithuania

Lithuania has a national energy saving target enshrined in law as part of the National Energy Strategy (NES). It requires a nine per cent reduction in final energy consumed by 2016, compared to 2005 levels. Achieving this target would deliver a saving of 4,700 GWh, beyond the ESD target of 3,797 GWh. A 'Plan of Implementation Measures of the NES' sets out the immediate savings for 2008-2010, with an aim to save 1.5% compared to average 2001-2005 consumption. The remaining 7.5% will be saved between 2011-2016.

The national official target is binding and is based on an assessment of energy saving potential. Savings are measured using a bottom-up approach (where possible) and reported in final energy terms; a top-down methodology is used where data are incomplete.

There are non-binding projections of savings attributed to industry (eight per cent of target), transport (10%), residential (37%), and commercial/public service (five per cent) sectors, as well as policies delivering cross-sectoral reductions (40%). It is expected that these projections will be met, with the exception of the residential sector, where one commentator suggests that a lack of funding and slow implementation of a multi-dwelling modernisation programme has hindered progress.

²³ Measured as 0.28 toe/€1000 in 2007

Malta

An indicative ESD-compliant target of a nine per cent saving in final energy consumption from 2008 to 2016 is described in Malta's NEEAP. The Plan was the result of a public consultation, which also served to ensure that the target could be accepted as realistically achievable. Malta's economy is strongly characterised by tourism, small-scale manufacturing and full dependence of non-grid imports to meet fossil fuel demand. Partly as a result of this context, Malta does not have any mandatory targets for limiting or reducing greenhouse gas emissions. Energy efficiency does constitute the first priority of its 2006 energy strategy, but the only quantified objective is the ESD target – suggesting that the use of targets is primarily compliance-driven.

Netherlands

The Netherlands has a national indicative, non-binding, target of two per cent energy efficiency improvement measured in energy consumption per annum. This annual target is set within the context of the EU 20% by 2020 target. The two per cent target has never been met and, it is felt that without additional policies, instruments and political will the target will not be met.

The Energy Research Centre of the Netherlands is responsible for evaluating progress against the targets. The last evaluation dates back to 2008.

Non-binding targets also exist in the buildings sector, industrial sector and for local government. The buildings targets are coined in transactional terms: number of existing homes renovated per annum; and EPC performance of new buildings. The existing homes target is thought to be too ambitious and is expected to be substantially lowered later this year, despite the recognition that there is potential in this area and political salience.

Industry targets have been set through voluntary agreements on non-ETS and ETS businesses. The non-ETS agreement targets 30% efficiency improvements by 2020 compared to 2005, which is considered to be close to the real potential. The 30% breaks down into a 20% energy efficiency improvement within site limits and 10% outside of it. The last milestone in 2007 was successfully met. The ETS sector voluntary agreement (also to 2020) is based not on a target but on an energy efficiency plan, which commits participants to invest in cost effective measures. However, participant industry sectors have been asked to scope out plans for achieving a 50% energy efficiency improvement by 2030. Involvement enables businesses to receive a discount on energy taxes. The actuality of energy savings achieved through this agreement has been questioned.

Local government's voluntarily agreed targets are set in line with the national targets at between two and four per cent annually to 2020. Central government has committed itself further, including for all of its buildings to be 'climate neutral' from 2012.

There is reluctance to instate more mandatory policies. A proposal in 2005 for the introduction of a white certificate scheme was effectively lobbied against by utility companies.

Poland

The indicative NEEAP target to achieve final energy consumption savings of nine per cent by 2016 compared with 2001-5 is the main energy efficiency target in Poland. This target is expected to become enshrined in law in early 2012. The savings are calculated in terms of final energy used without counting the energy used in installations covered by the EU ETS. As part of the NEEAP, an intermediate target of two per cent by 2010 was introduced. Poland's national ODYSSEE report stated that a white certificates system was to be introduced as the 'main instrument' for improving energy efficiency.

Savings are calculated through a combination of 'top-down' and 'bottom-up' approaches to identify overall savings and individual contributions. The main drivers behind the policy are compliance with the ESD, and a desire to increase productivity. No sectoral

targets exist, aside from a red certification scheme to support high efficiency co-generation. A public sector target to reduce energy demand by one per cent a year was proposed, but eventually removed from the draft Energy Efficiency Law.

There is a longer term ambition to reduce the energy intensity of the Polish economy to the 2005 EU-15 average by 2030.

One commentator suggests that Poland is unlikely to meet the NEEAP target given delays in implementation and lack of progress with most of the actions within the plan. There is a view that the longer term ambition does not reflect the greater opportunities for efficiency in Poland.

The ambition is for all heat generated in Poland to be from co-generation by 2030 and a further obligation on energy companies to purchase 16% of their electricity from co-generation by 2010.

Portugal

Portugal's NEEAP outlines a national target of 10% reduction in total final energy consumption by 2015 (not 2016) – 20% higher than required under the ESD. This is not a target enshrined in law but a failure to accomplish the expectations would have political ramifications. Portugal has achieved just over 18% of this target by 2009.

The NEEAP outlines specific measures in the transport, residential and services, industry and state sectors, with three cross cutting action areas. The proposed measures for each sector have detailed indicators that correspond to the 2010 and 2015 timescales – many of these are transactional indicators.

A bottom-up methodology is used to measure energy savings and the national Energy Agency is responsible for collecting the data from all measures, reporting to the DG for Energy and Geology. Ultimate responsibility is held by the Ministry of Economy and Innovation.

Contextually, energy intensity has been increasing, primarily as a result of growth in the transport sector and electricity consumption. The National Energy Strategy outlines three priorities for 2010: renewable energy, energy efficiency and electric vehicles. It is felt that the government has not been sufficiently ambitious with its energy efficiency targets when compared to renewable energy or electric vehicles policies and has not prioritised this area. Some sector specific measures in the NEEAP are not felt to be achievable in their timeframe and it is felt that more promotion from central Government is needed. Measures in the transport and state sectors are felt to have been less successful than in the industry and residential and services sectors.

Romania

The national target for Romania was set in the first NEEAP. The national target for 2016 was set at 13.5% of average final consumption taken from the period 2001-5 (with a 2010 target of 4.5%). The higher target (than the nine per cent objective of the ESD) was established in response to the country's high levels of energy intensity compared to the EU average. Savings potentials are outlined in the Energy Efficiency Strategy (2004, due to be updated) as a reduction in energy intensity of 40% by 2015 against 2001 levels on all economic and social activities. Annual savings are identified in this strategy by sector, and within sectors by existing and new infrastructure.

The national targets are expected to be met but this is in the context of an economic downturn. Efforts in the housing sector are felt to have been consistent, while efforts in the industrial sector seem to have been insufficient. In 2011, the Energy Research and Modernizing Institute ICMENERG will complete top-down and bottom-up models for ex-ante and ex-post calculation of energy saving from energy saving measures. At present data is gathered using top down methodologies with the bottom-up methodology in development.

Slovakia

Slovakia's economy wide national target is set out in the Concept of Energy efficiency of Slovak Republic that covers the period nine year period 2008-2017. This indicative target is set at 4135 TJ per year over the period and is divided into sectoral targets for 2008-10 through the NEEAP²⁴. The overall drivers of the national target are compliance with the ESD and energy security considerations. Drivers for the sectoral activities include inadequate building quality, financial considerations in the public sector, competitiveness (agriculture and transport) and the reduction of CO₂ emissions. The percentages of the total target for the three years 2008-10 allocated to each sector are:

- Horizontal measures 31%
- Buildings 11%
- Appliances 3%
- Public sector 3%
- Industry and Agriculture 30%
- Transport (extending to all stakeholders in the transport sector with a focus on public transport) 22%

The targets are expected to be met with the economic benefits to the larger economy or to stakeholders groups (particularly in the agricultural sector) driving success. In particular the initiatives in the buildings sector are felt to have high political profile due to the quality of life impacts of the initiatives.

The national target and most of the sectoral targets are measured using combined methodologies consisting of measurement of energy or fuel consumption, estimation of impact, measurement of proxies, or aggregated statistical data. The buildings target is measured using a bottom up methodology. A monitoring and information system is under development by the Slovak Innovation and Energy Agency. At present, measurement is undertaken by consumers, operators or institutions. Data collection and monitoring are coordinated around the preparation of the NEEAP, with final responsibility sitting with the Ministry for the Economy.

Slovenia

Slovenia's national target is driven by the NEEAP/ESD and is set at 2.5% by 2010 and nine per cent by 2016. The economy wide target is split into specific targets for the industrial, tertiary, household and transport sectors, aside from which there are inter-sectoral and horizontal targets. The general target is fuel based though specific targets are a combination of fuel and emission based, supplemented in many sectors with transactional targets.

Though in principle energy efficiency has a position of importance in Slovenia, implementation and financial allocation is lacking which places doubt over whether the targets will be met. At an EU level, Slovenia supports a binding 20% target expressed as final energy.

Procedures for monitoring, evaluation and reporting are patchy with formal responsibility placed with different Ministries responsible for different targets and in practice many parties measure individual savings. Both bottom up and top down methodologies are used following ESD and Eurostat methodologies but to measure different parts of total energy savings. Deficiencies are recognised in this area and improvement is being made in response to EU reporting obligations.

Compliance with the ESD is the main driver for the energy efficiency targets (and the nine per cent target is seen as legally binding), although the drivers of increased employment opportunities and the potential for expansion of the energy efficiency sector are strengthening.

²⁴ The ODYSSEE country report adds that a long-term goal to reduce energy intensity of GDP generation down to the level of other advanced EU countries (EU-15) is also in place.

Activity is particularly lacking in the transport sector. Although voluntary agreements have been established between businesses and government under which investment are made in greenhouse gas emissions reductions in return for carbon tax exemptions, no overview is available indicating what investments have been made or savings can be attributed.

The general trend is for decentralisation of responsibility to municipalities, energy distributors and end users, which is expected to continue.

Spain

In Spain the content of the NEEAP is derived from a pre-existing Saving and Energy Efficiency Strategy covering the period 2004-12. Within this strategy a savings target of 13.7% is set for 2012 measured in primary energy against a reference scenario. This target is translated in the NEEAP into an ESD target of 11% (although it is not clear if this has been calculated in compliance with the appropriate methodology).²⁵ The EU targets, including the 20% reduction in primary energy use by 2020 will be included in a new Law on Sustainable Economy. The driver for energy efficiency is Spain is compliance with Directives and the Spanish greenhouse gas reduction target with co-benefits of energy independence and employment and economic benefit.

Within the 2004-12 Strategy, the 2008-12 Action Plan outlines national indicative (non-binding) targets for seven sectors and a goal for installed co-generation of 8400 MW_e. A number of legally binding targets sit below these sectoral savings covering for example share of biofuels in the transport energy mix and energy savings from public buildings. Two Ministries are jointly responsible for all of the sectoral targets. All targets are measured in ktoe and in per cent (expressed in both final and primary energy), compared to a business as usual reference scenario.

The targets for all sectors apart from Industry have been increased in the 2008-12 Action Plan from the levels initially set in the 2004-12 Strategy, with the need to reduce greenhouse gas emissions named as the driver. The savings expected from Industry have not been increased due to the fact that energy intensity in the sector increased between 2000 and 2005. Industry has the second most ambitious target and there is uncertainty if this target is achievable, although higher savings are available with better defined objectives and instruments (similar for buildings sector). The transport target is the most ambitious and similar concerns exist about its achievement with the diffuse nature of the sector and the low quality and low level of competition in the freight services named as barriers.

In general it is felt that measures implemented do not have clear enough objectives and are not results driven, suffering also from a failure to assess the impact of programmes. Energy consumption is reported annually by sector and source of energy, along with energy intensity. Nationally, primary energy, final energy, primary energy intensity, final energy intensity by source of energy are also reported. Estimations are made on the economy level structural effects of energy efficiency though the effects of the economic downturn and oil and gas prices have not been drawn out from this analysis.

Sweden

Sweden has a long-term target of 20% energy efficiency improvement by 2020 (expressed as inter-sectoral target of 20% lower energy intensity between 2008-2020). Indicative targets for reduced energy use in 2010 and 2016 have also been adopted, outlining that final energy use will decrease by 6.5% by 2010 and nine per cent by 2016.

These targets exist within the context of the integrated energy and climate policy and its long-term goal for reducing emissions under which three action plans guide activity. One of these action plans is for energy efficiency. Initiatives under the plan include: a focus on locally and public sector driven activity in part through agreements entered into

²⁵ Commission synthesis of the NEEAPs

by public sector bodies with the Swedish Energy Agency which set targets for energy efficiency; energy audits for high energy using businesses; efforts to promote energy efficiency technologies; and smart metering for hot water and electricity.

Another driver for activity comes within Sweden's 16 objectives for a sustainable environment, which are to be met within a generation (set in 1999). One of the 16 objectives outlines that the total energy use per unit area heated in dwellings and public/commercial premises should be reduced by 20% by 2020 and by 50% 2050 on 1995 levels.

The Swedish Energy Agency has the responsibility for evaluating the activities under the NEEAP and is charged with creating the second action plan. It will develop a calculation method using both bottom-up and top-down methodologies. To date evaluations of policy instruments in respect to their effects on energy efficiency have been scarcely performed in Sweden. More common are evaluations on the effects on carbon dioxide emissions in respect to the climate strategy.

United Kingdom

In its National Energy Efficiency Action Plan the UK adopts a nine per cent target for 2016, but indicates that it expects savings from key policies and measures to be equivalent to 18% by 2016 without formally committing to this higher target. The UK has however adopted a nine per cent intermediate energy savings target for 2010.

The UK has historically set itself binding targets for energy efficiency. The Home Energy Conservation target required Local Authorities to improve energy efficiency in the housing stock by 30% over the period 1996 to 2011 however reporting against this target has lapsed and Government have been seeking to repeal the Act that set the target. In addition, approximately 10 years ago the Government set a target to double CHP installed capacity to 10 GW_e by 2010 but the failure to obligate a party meant the target remained aspirational and was not met. Recent activity is driven by the legally binding carbon targets the UK has set itself under the Kyoto protocol and has focused on the buildings public sectors. In 2010 central government set itself a non-binding target to reduce carbon emissions by 10% in 12 months but the trend currently is to move away from binding targets.

The UK has three different schemes placing requirements on businesses to deliver energy savings (measured in Carbon) in the commercial and domestic sectors.

The first is a target of 293MtCO₂ of lifetime savings over the programme is placed on all energy suppliers over a threshold size. The primary aim of the target is to make a contribution to the UK's legally binding target under the Kyoto protocol but secondary drivers also include reducing energy demand, energy security, household energy bill reduction, alleviation of fuel poverty and green jobs. The target is achievable through energy saving measures installed in homes to which an ex-ante score is applied. Similar programmes date back to 1994, though these were measured in GWh. The target is enshrined in legislation, it is monitored and reported on (quarterly) by the national regulator Ofgem and fines are payable to the government if the target is not reached unsurprisingly therefore all historic targets have been met by suppliers, individually and collectively. The targets have been increased over the years, responding to the known deliverables in the previous scheme meaning that the targets are considered to be ambitious.

The second scheme is another mandatory scheme (commenced in 2010) placing responsibilities on all large public and private sector organisations (measured through annual electricity consumption). Individual targets are set on qualifying companies and cover all CO₂ emissions (energy use converted to CO₂) except those from domestic accommodation, transport, those included under a Climate Change Agreement (CCA, see below) or the EU ETS or consumption outside the UK. The savings are self-certified by the participating companies with audits carried out by the Environment Agency (a Government Agency) and penalties for companies failing to meet the reporting

requirements. The overall target for the scheme is consistent with the aim of meeting the five-yearly carbon budgets. It is too early yet to make any conclusions on success or effectiveness but it is expected that the scheme administration will be simplified following consultation in 2011.

The third scheme is a long running scheme introduced in 2001 which focuses on energy intensive industry. Sector associations or facility operators can negotiate a voluntary CCA with government (Department of Energy and Climate Change) on a challenging energy efficiency target using a business as usual baseline and based on technical potential and individual assessment. The targets are revised every two years. Through this agreement participants can benefit from an 80% reduction in the energy tax (Levy). Energy use is converted to CO₂ to form the metric for the target. Annual savings from the sectors covered by agreements ranged from 14.4 MtCO₂ to 16.4 MtCO₂ between 2004 and 2006. Initial targets have been criticized for being too lenient but have been tightened with experience. Current agreements are set to expire in 2013 though there is commitment to continue them until 2017, contributing additional savings.