



Overview of overall and sectoral energy efficiency targets by country

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ODYSSEE- MURE 2010**

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Enerdata

47, Avenue Alsace-Lorraine
38000 Grenoble
France

www.enerdata.net

s.a.s au capital de 100 000 euros
RCS Grenoble 381 703 859

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1. Introduction

The objective of this report is to give an overview of all quantitative targets related to energy efficiency¹. The objective of this review is to check which top-down indicator(s) can be used to monitor the quantitative targets on energy efficiency that each country has set officially by sector or globally and whether they are well included in the present ODYSSEE data base. In conclusion, for each target or type of target, existing indicators from ODYSSEE will be identified, and if necessary new indicators will be proposed.

This report is part of Work Package 4 (“Monitoring of EU and national energy efficiency targets”) of the EIE project “Monitoring of EU and national energy efficiency targets”, also known as ODYSSEE- MURE 2010. This review will include national and sectoral targets.

The indicative 9% energy saving target in 2016 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 the most common target set on energy efficiency. The Energy Services Directive with the obligation to prepare the NEEAPs has been instrumental in the definition of energy efficiency targets in Member States, although some countries had before set up independently quantitative targets². Given the importance of the ESD, there exists only a few other targets on energy efficiency.

Although the overall savings in the NEEAP is the most common target, the review aims at identifying other national quantitative targets independently of the NEEAP.

2. Methodology and assumptions

Information for each of the 27 Member States was first gathered from a previous compilation made by Enerdata for the 2010 WEC report on energy efficiency and available on the WEC ADEME data base³. It was then completed with the MURE data base.

Following this first review, an Excel table has been built for each country (see Table 1) summarizing for each country the main targets. Then, the Excel sheet was sent to each ODYSSEE partner in order to be completed, updated and/or corrected. These Excel sheets had been updated already twice, every six months⁴.

The main assumptions used to select and identify the targets are the following:

- Only quantitative targets were identified.
- The NEEAP were classified as volume (in TWh) rather than rate, e.g. 9%.
- Energy saving targets will result in intensity decrease but this will only be accounted as a target on energy savings and not on intensity. We are interested here on the initial expression of the targets.
- Within the same policy, all quantitative targets set by sector were considered.
- If a policy is setting different target over several sectors (e.g. primary and final consumers), target is accounted for each sector (i.e. both target are taken into account).

¹ Energy efficiency follows the definition of ESD, i.e. it includes solar thermal.

² According to an ECEEE report based on interviews and surveys, the ESD, with its 9% target and the NEEAP process, has been described as the main driver for energy saving target and measures “National energy efficiency and energy saving targets”; prepared by the Association for the Conservation of Energy, UK for ECEEE, with the financial support from the European Climate Foundation.

³ <http://www.wec-policies.enerdata.eu/>

⁴ Last update in October 2011.

- If a policy is setting different targets over several time horizon (e.g. 2020, 2030), only one target is accounted for: the one corresponding to the longer term (i.e. 2030);
- To evaluate the number of targets by country, Belgium was accounted for only as 1 target, (although there are often 3 different regional targets).

Table 1 : Description of the Excel sheet sent to ODYSSEE partners

Each Excel sheet contains country's information on energy efficiency policy targets. Please add policy targets of your own country, or correct the existing rows if necessary			
Column	Variable	Options	Definition
A	Country		Name of the country
B	Name of the programme or law	National Energy Efficiency Action Plan	Please add Programs or laws on energy efficiency
		National Energy Strategy	
		Obligation of energy savings for energy companies (white certificates)	
		Grenelle de l'Environnement 2008	
		Energy Act	
		Etc.	
C	sector	Final consumers	Targeting sector
		Overall (primary consumption/TPES)	
		Residential	
		Industry	
		Transport	
		Forestry	
		Public Sector	
		Etc.	
D	sub sector	Existing Buildings	Only for Buildings
		New Buildings	
		Etc.	
E	nature of target	Energy savings (rate)	
		Energy savings (volume)	
		Energy intensity reduction	
		Energy consumption reduction	
		Thermal retrofitting	
		Energy efficiency improvement	
		Etc.	
F	target value		Mtoe, TWh, %, etc.
G	target year		
H	base year		

3. Energy efficiency programs with quantitative targets

3.1. Number of targets by sector

On aggregate, we have identified 76 targets in the 27 European Member states. All the targets are summarized in Appendix according to the model presented in Table 1.

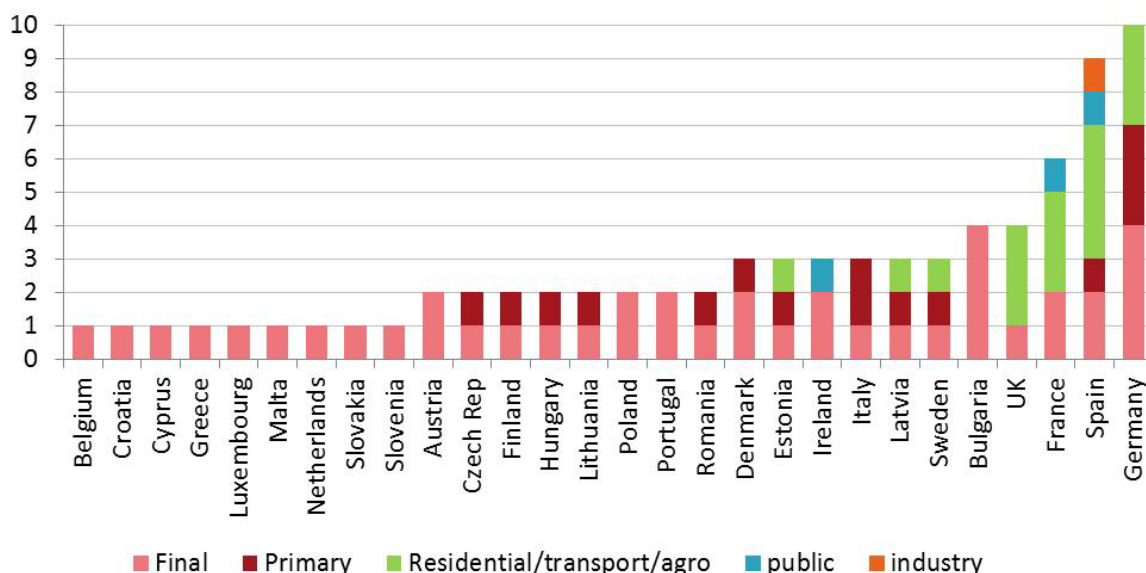
We can classify roughly the countries in 5 sub-groups (Figure 1):

1. Countries with the most targets (at least 6 targets): France, Germany and Spain
2. Countries with 4 targets: UK, and Bulgaria
3. Countries with 3 targets: Denmark, Estonia, Ireland, Italy, Latvia, and Sweden
4. Countries with 2 targets: Austria, Czech republic, Finland, Hungary, Lithuania, Poland, and Romania
5. Countries with only 1 target, the NEEAP one: Belgium, Croatia, Cyprus, Greece, Luxembourg, Malta, Netherlands, Slovakia and Slovenia.

These targets can be classified by sector as follows (Figure 1):

- **Final consumers:** All members' states, i.e. the 27 countries, have at least one target on final consumers, corresponding mostly to the NEEAP; these targets represent 55% of all the identified targets.
- **Primary consumption:** 12 countries have set a target on the primary energy consumption; i.e. 20% of the total. For most of them the nature of the target is on energy intensity reduction.
- **Residential, Transport or Agriculture sectors** are targeted in 7 countries
- **Public sector** is represented in 3 different countries
- **Industrial sector:** 1 country with target on industry sector⁵.

Figure 1 : Distribution of targets by sector and by country



⁵ ETS quotas are of course not included although they have a strong impact in energy efficiency.

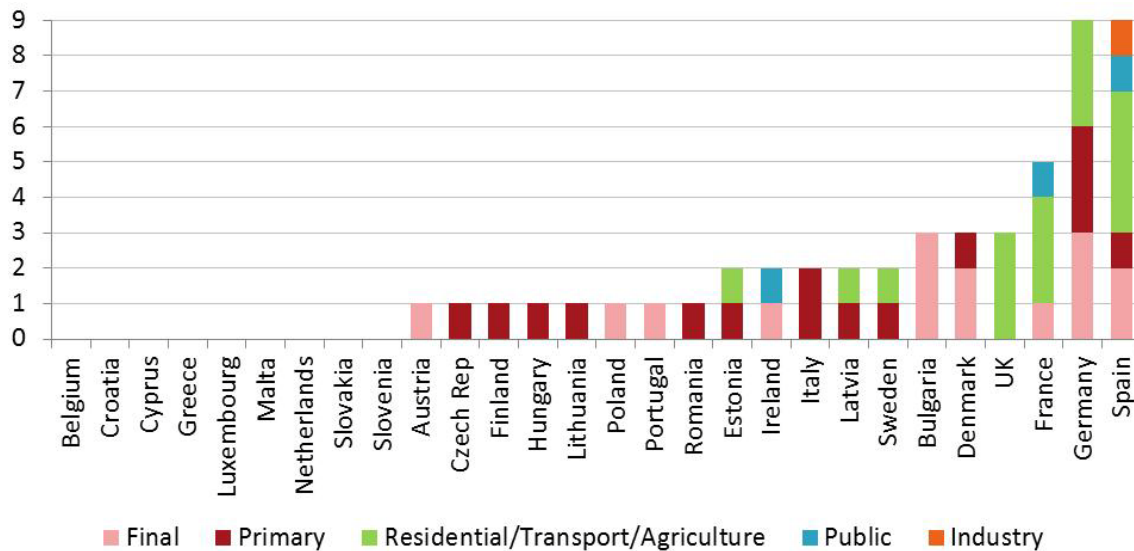
3.2. Number of targets by sector outside the ESD target

As explained in introduction, we are interested as well in quantitative targets independently of the ESD target. There are still 50 targets outside the ESD target (Figure 2). Nine countries that only have NEEAP targets have disappeared from Figure 2⁶. The total number of targets decreased by 34% compared to Figure 1.

Even if they only exist in 7 countries, about one third (32%) of the targets are sectoral: they concern mainly the residential sector (energy saving and thermal retrofitting), and marginally transport and agriculture sector. Targets on primary consumption and on final consumption represent both 32% and 30% respectively.

Spain and Germany have the largest number of targets, 9 in total, one for each sector at least in Spain. France has 5 policy targets.

Figure 2 : Distribution of targets by sector and by country outside the ESD target



⁶ Figure 2 is identical to Figure 1, except that the 9% ESD target has been excluded.

3.3. Number of targets according to the time horizon

Each of these targets has a time horizon (Figure 3). We assumed that if a policy is setting different targets over time, only one target was accounted for, the one corresponding to the longer term.

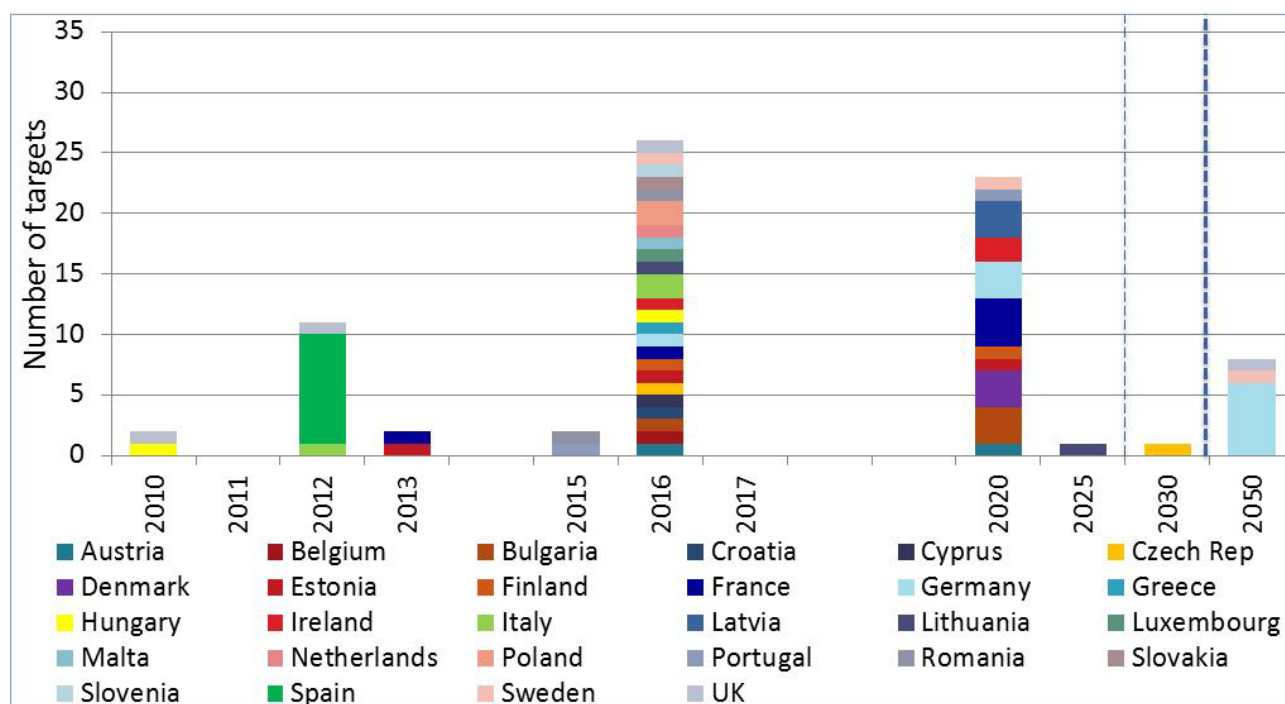
There exist targets until 2050; these targets correspond to the Energy Concept in Germany, to the Sweden environmental objectives and to the 2008 Climate Change Act in UK.

There exist two peaks, one in 2016 and one in 2020. Indeed, 34% of targets end in 2016 and 30% of them in 2020.

The first time horizon, i.e. 2016, corresponds to the NEEAP (some countries have targeted the year 2020 as the time horizon objective in their updated version, e.g. Bulgaria and Latvia). The NEEAP has set a 9% rate of energy savings in 2016 in relation to a country's reference final energy consumption, defined as an average over a 5 years period (usually over the years 2001 to 2005); this corresponds to an average saving of 1% per year over. (2008-2016).

The second term is the '2020 objective' that refers to the energy efficiency component of the so-called EU 20/20/20 energy policy objectives, i.e. a 20% saving in the EU primary energy consumption in 2020 compared to a reference projection. This 20% target is being redefined in a new directive on energy efficiency⁷.

Figure 3 : Distribution of targets according to time horizon



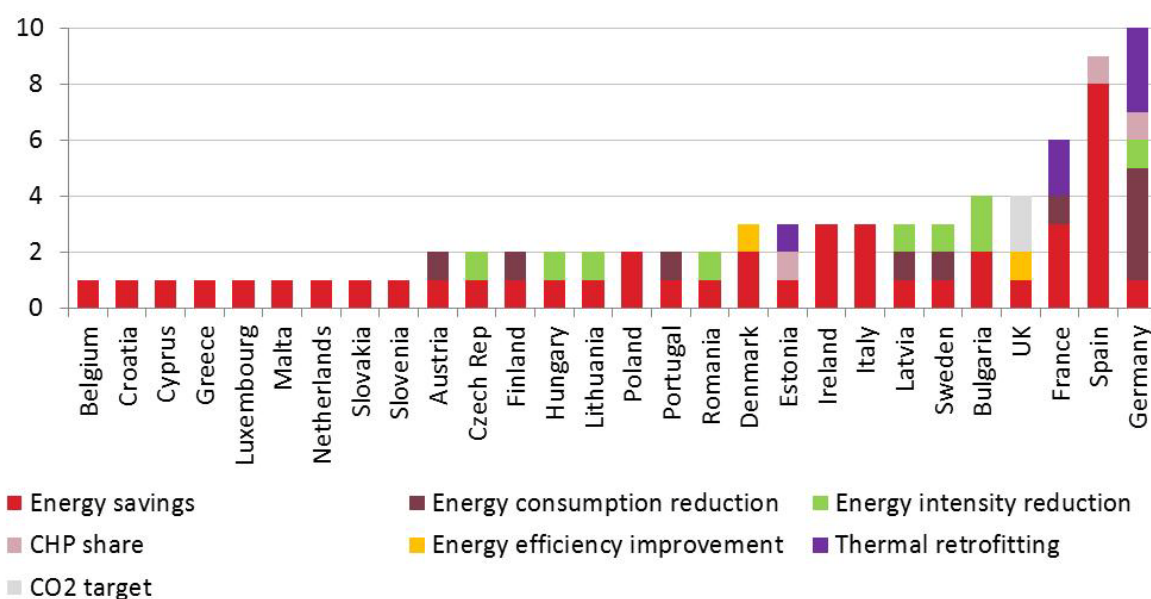
⁷ Directive called in short Energy Efficiency directive, EED: Proposal for a directive on energy efficiency and repealing Directives 2004/8/EC and 2006/32/EC, June 2011.

3.4. Mode of expression of policy targets

For each target we identified the nature of the target. We identified the following classification of the targets:

- Energy intensity reduction, the most common target in the 90's;
- An energy savings target in volume (e.g. in TWh, PJ, ktoe) (case of ESD);
- A target of energy consumption reduction (in absolute values);
- Targets on rates of energy efficiency improvement⁸, usually at sectoral or sub-sectoral level (in % or %/year);
- Thermal retrofitting objectives for buildings;
- Target as to the share of CHP (Cogeneration of Heat and Power);
- Target on carbon emission reduction

Figure 4 : Distribution of target according to their mode of expression



Almost 60% of targets concern energy savings, because of the ESD target. The rest of the targets mainly correspond to energy intensity reduction (12%) and energy consumption reduction (12%). CHP share, thermal retrofitting, and carbon emission reduction are marginal.

A target in terms of energy consumption reduction is somehow a new approach. Seven countries have such a target to limit their consumption in absolute level, which aims at limiting GHG emissions: Finland, Portugal, Austria, Latvia, Sweden, France and Germany. For instance in the Austrian Energy Strategy, there is a decrease and a freeze of Final Energy Consumption at the level of 2005 (1.100 PJ), the main objective is to keep it stable until 2020.

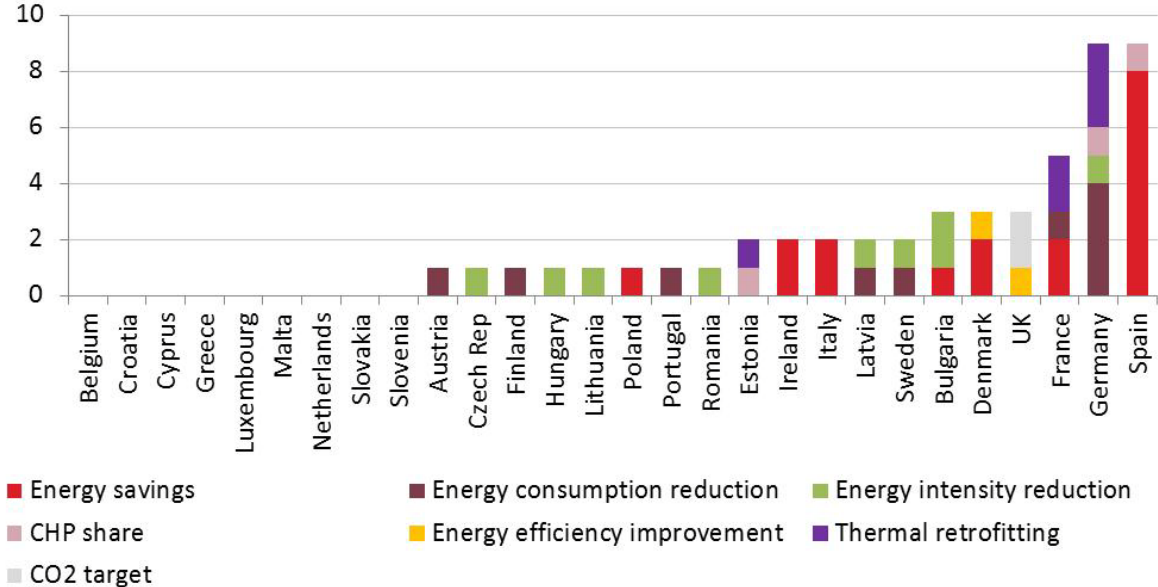
Germany has the most diversified set of targets with France and UK. On the opposite, Spain mainly accounts energy saving targets⁹.

⁸ The ESD can be classified both as an energy efficiency improvement target (1%/year) and as an energy saving target in volume. As countries are committed to a volume of energy savings, we classified the ESD target as a target on savings.

⁹ The energy savings are translated into an improvement in the energy intensities, which in the case of primary energy amounts to 1,93% in 2012 according to the Spanish NEEAP 2008-2012.

Without the ESD target, energy saving targets are still dominant (36%); 20% are on energy consumption reduction and 18% on energy intensity reduction (Figure 5).

Figure 5 : Distribution of target according to the mode of expression outside ESD target



3.5. Indicators to monitor policy targets (outside ESD target)

We will now consider how these targets can be monitored with top-down indicators, such as the ones covered in ODYSSEE. We have excluded the ESD target as the Commission has already proposed a set of indicators to calculate the energy savings that are all available in the OYSSEE database¹⁰.

Thanks to the policy target database, we can build a matrix that links the nature of the target and the targeted sector (Table 2). This table does not take into account the NEEAP policy targets.

The most common targets are on energy intensity reduction in primary consumption (16%), and energy savings on final consumption (16%), followed by thermal retrofitting in residential sector (21%) and energy consumption reduction in final consumption (10%).

¹⁰ The calculation of savings with ODYSSE indicators is even now available in the data base.

Table 2 : Classification of policy targets according to the sector and the mode of expression

	Final consumer	Forestry	Industry	Primary energy	Public sector	Residential	Transport	Total
CHP share				3				3
Consumption reduction	5			1	1	3		10
Efficiency improvement				1		1		2
Energy intensity reduction	1			8				9
Energy savings	8	1	1	2	2	3	1	18
Thermal retrofitting						6		6
CO2 target						2		2
Total	14	1	1	15	3	15	1	50

Almost all of these policy targets can be monitored with existing indicators in the ODYSSEE database. For 3 types of policy targets only, indicators do not exist in ODYSSEE, these missing indicators and the countries concerned are indicated in red in Table 3.

The target without indicators relate to three sub-sector/end-use or technologies:

- Cogeneration (CHP);
- The public sector
- Thermal retrofitting of buildings

Table 3 : Identification of indicators for each type of target

	Primary consumption	Public sector	Industry , residential Transport, Forestry Final consumption
CHP share			Industry (Estonia, Germany & Spain)
Consumption reduction	Primary Consumption	Public sector consumption	Sector consumption
Efficiency improvement	ODEX		
Energy intensity reduction	Primary intensity		Final intensity
Energy savings	Savings from ODEX	(Ireland & France)	Savings from ODEX
Thermal retrofitting			Residential (Estonia, France & Germany)

To create the indicator on the **CHP penetration**, we need the electricity production from cogeneration (auto-producers) that can be easily found in Eurostat.

The corresponding indicator could be entitled “Diffusion of CHP”. It should be defined according to the way the target is set. If the target is an overall objective, the following definition and formula can be used :

$$\text{Diffusion of CHP} = \frac{\text{Electricity production from cogeneration}}{\text{Electricity production}}$$

There is no indicator on **energy saving in the public sector** in ODYSSEE. The public sector is part of the service sub-sectors covered, but very few countries have data on the energy consumption of the public sector.

Germany and France have targets in the building sector concerning the **thermal retrofitting**. There is no data in ODYSSEE to evaluate the number of household that underwent major renovation over time. The annual number of retrofitted dwellings should be added in ODYSSEE. However, the definition of retrofitting has to be homogeneous among countries and should correspond to a certain amount of energy savings. Categories of retrofitting could be considered, such a light retrofitting (e.g. about 10% saving), intermediate retrofitting (20% saving) and heavy retrofitting leading to large savings (e.g. 40% or above). The constraint here is the lack of systematic monitoring in almost all countries.

4. Conclusion for ODYSSEE indicators

The objective of this review was to identify all targets including or not NEEAP, and to classify them according to their nature and targeted sector in order to identify indicators that are missing in ODYSSEE to monitor these targets.

The mains results are the following:

- Among the 76 policy targets identified in EU member states, there 50 policy targets (about 66%) that are not the overall ESD target.
- There are 9 countries that only have the ESD target, i.e. without national target
- There are 6 countries with more than 2 non-ESD targets: Bulgaria, UK, Denmark, France, Germany and Spain
- Non-ESD targets are:
 - For 28% of them on the primary consumption and for 32% on the final energy consumption and for residential/transport/agriculture sector.
 - For 38% on energy savings and for 18% on energy intensity reduction and energy consumption reduction.
- Most policy targets can be evaluated with existing indicators in ODYSSEE
- The 10% not covered by ODYSSEE concern the CHP diffusion, that can be easily added using Eurostat data, on the public sector and thermal retrofitting, for which there are serious data gaps.

5. Appendix: detailed policy targets by country

Country	Name of the program or law	sector	sub sector	nature of target	target value	target year	base year
Austria	NEEAP	Final consumers		Energy savings	22,3 TWh	2016	2008
Austria	National Energy Strategy	Final consumers		Energy consumption reduction	In 2020 same level as 2005	2020	2005
Belgium	NEEAP	Final consumers		Energy savings	27,5 TWh	2016	2008
Bulgaria	National Long Term Energy Efficiency Program, 2005-2015	Final consumers		Energy intensity reduction	-8%	2015	2005
Bulgaria	National Long Term Energy Efficiency Program, 2005-2016	Overall		Energy intensity reduction	-17%	2016	2005
Bulgaria	Draft Energy Efficiency Strategy 2010 - 2020 (project)	Final consumers		Energy savings	16 TWh	2020	2010
Bulgaria	Energy Strategy of Bulgaria to 2020	Overall		Energy intensity reduction	-50%	2020	2005
Bulgaria	NEEAP	Final consumers		Energy savings	15,6 TWh	2020	2008
Cyprus	NEEAP	Final consumers		Energy savings	2,2 TWh	2016	2008
Czech Rep	State Energy Policy	Overall		Energy intensity reduction	3,22%	2030	2000
Czech Rep	NEEAP	Final consumers		Energy savings	20,309 TWh	2016	2008
Denmark	National Energy Strategy	Final consumers	All	Energy savings (Annual target)	1,5 % = 10,3 PJ = 2,86 TWh	2020	2010
Denmark	Strategy for energy reduction in buildings	Overall	New buildings	Energy efficiency improvement	75%	2020	2006
Denmark	Obligation of energy savings for energy companies (white certificates)	Final consumers	All except transport	Energy savings (Annual target)	6,1 PJ = 1,69 TWh	2020	
Estonia	NEEAP	Final consumers		Energy savings	2,75 TWh	2016	2008
Estonia	National Development Plan of the Energy Sector until 2020	Primary energy		Higher share of electricity generated in CHP plants in gross electricity consumption	10.2% -> 20%	2020	2007

Country	Name of the program or law	sector	sub sector	nature of target	target value	target year	base year
Estonia	Estonian Housing Development Plan for 2008- 2013	Residential		on 10% of apartment buildings have A class energy performance label	<= 100 kWh/m2/year	2013	
Finland	Long-term Climate and Energy Strategy	Primary energy		Energy consumption reduction	310 TWh (same level than 2008)	2020	
Finland	NEEAP	Final consumers		Energy savings	17,8 TWh	2016	2008
France	NEEAP	Final consumers		Energy savings	139,5 TWh	2016	2008
France	Obligation of energy savings for energy companies (white certificates)	Final consumers		Energy savings	345 TWh	2013	2008
France	Grenelle de l'Environment 2008	Residential	New buildings	Energy savings	15 kWh/m2/year	2020	2010
France	Grenelle de l'Environment 2008	Residential	Existing buildings	Thermal retrofitting	400 000 dwellings/year	2020	2013
France	Grenelle de l'Environment 2008	Residential	Existing buildings social housings	Thermal retrofitting	800 000 dwellings	2020	2010
France	Grenelle de l'Environment 2008	Public sector		Energy consumption reduction	120 M m2	2020	2010
Germany	National Strategy for a Sustainable Development (from 2002)	Overall		Energy productivity increase	Doubling of energy productivity	2020	1990
Germany	Energy Concept (from September 2010)	Overall		Primary Energy	50%	2050	2008
Germany	Energy Concept (from September 2010)	Final consumers		Energy productivity increase	2.1 %	2050	2008
Germany	Energy Concept (from September 2010)	Final consumers		Electricity consumption	25%	2050	2008
Germany	NEEAP	Final consumers		Energy savings	208 TWh	2016	2008
Germany	Energy Concept (from September 2010)	Residential/transport/agriculture	Buildings	Thermal rehabilitation rate	Doubling from below 1%/a to 2%/a	2050	2010 *
Germany	Energy Concept	Residential	Building	Heating	20%	2020	2010

Country	Name of the program or law	sector	sub sector	nature of target	target value	target year	base year
	(from September 2010)	al/transport/agriculture	s	requirement			*
Germany	Energy Concept (from September 2010)	Residential/transport/agriculture	Buildings	Primary Energy	80%	2050	2010*
Germany	Energy Concept (from September 2010)	Residential/transport/agriculture	Transport	Final energy cons. transport	40%	2050	2005
Germany	CHP Law (from 2009)	Primary energy	CHP	CHP share in gross elec. gener.	Doubling from 12.5 to 25%	2020	2005?
Greece	NEEAP	Final consumers		Energy savings	16,46 TWh	2016	2008
Hungary	Energy Saving and Energy Efficiency Action Programme 1999-2010	Overall		Energy intensity reduction	3,5%/year	2010	1999
Hungary	NEEAP	Final consumers		Energy savings	15,97 TWh	2016	2008
Ireland	NEEAP	Final consumers		Energy savings	13,1 TWh	2016	2008
Ireland	Energy White Paper	Final consumers		Energy savings	20%	2020	2007
Ireland	Energy White Paper :Public Sector Exemplar Role	Public Sector		Energy savings	33%	2020	2007
Italy	NEEAP	Final consumers		Energy savings	126,3 TWh	2016	2008
Italy	Obligation of energy savings for energy companies (white certificates)	Primary energy		Energy savings	3,5 Mtep/year	2012	2011
Italy	Energy Efficiency in Buildings Law and EE Appliances Incentives	Primary energy	New and Existing buildings	Energy savings	73,4 TWh/year	2016	2010
Latvia	National Energy Strategy	Residential	Existing buildings	Energy consumption reduction	150 kWh/m ² /year	2020	2005
Latvia	National Energy Strategy	Overall		Energy intensity reduction	0,22 toe/1000 EUR	2020	2005
Latvia	NEEAP	Final consumers		Energy savings	6,05 TWh	2020	2008
Lithuania	NEEAP	Final consumers		Energy savings	3,8 TWh	2016	2008

Country	Name of the program or law	sector	sub sector	nature of target	target value	target year	base year
Lithuania	National Energy Strategy	Overall		Energy intensity reduction	EU average intensity	2025	
Malta	NEEAP	Final consumers		Energy savings	0,4 TWh	2016	2008
Luxembourg	NEEAP	Final consumers		Energy savings	1,77 TWh	2016	2008
Netherlands	NEEAP	Final consumers		Energy savings	51,19 TWh	2016	2008
Poland	NEEAP	Final consumers		Energy savings	53,4 TWh	2016	2008
Poland	Obligation of energy savings for energy companies (white certificates)	Final consumers	and energy generation and distribution	Energy savings	25,590 TWh*)	2016	2013**)
Portugal	NEEAP	Final consumers		Energy savings	22,6 TWh	2015	2008
Portugal	National Energy Strategy (ENE 2020) (CRM n° 29/2010 of 15 April)	Overall		Decrease in final energy consumption (volume)	45,2 TWh	2020	2005
Romania	National Strategy for Energy Efficiency (2004-2015)	Overall		Energy intensity reduction	40%	2015	2001
Romania	NEEAP	Final consumers		Energy savings	32,5 TWh	2016	2008
Slovakia	NEEAP	Final consumers		Energy savings	10,3 TWh	2016	2008
Slovenia	NEEAP	Final consumers		Energy savings	4,2 TWh	2016	2008
Spain	Action Plan 2008-2012 (E4)	Final consumers		Energy savings	59.5 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Residential and Services	buildings	Energy savings	7.9 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Industry		Energy savings	17.4 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Transport		Energy savings	30.3 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Residential and Services		Energy savings	1.7 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Public sector		Energy savings	0.69 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Forestry		Energy savings	1.4 Mtoe	2012	2008
Spain	Action Plan 2008-2012 (E4)	Final consumer		Energy savings	12%	2012	2008

Country	Name of the program or law	sector	sub sector	nature of target	target value	target year	base year
		s					
Spain	CHP target within the framework of Action Plan	Primary energy	CHP	CHP share	1,48 Mtoe	2012	2008
Sweden	NEEAP	Final consumers		Energy savings	33,2 TWh	2016	2008
Sweden	Energy Bill	Overall		Energy intensity reduction	20%	2020	2008
Sweden	Sweden environmental objectives	Residential	buildings	Energy consumption reduction	50%	2050	1995
UK	Housing Act 2004	Residential		Energy efficiency improvement	20%	2010	2000
UK	NEEAP	Final consumers		Energy savings (absolute over 9 year period)	136.5 TWh	2016	2008
UK	2008 Climate Change Act (UK)	Overall		Carbon emissions reduction	80%	2050	1990
UK	Carbon Emission Reduction Target (CERT) and energy supplier obligations	Residential		Carbon emissions reduction	293 MTCO2 cumulated 2005/2012	2012	2008
Croatia	NEEAP	Final consumers		Energy savings (volume)	5,3 TWh	2016	2008