

6. Patterns and Dynamics of Energy Efficiency Measures in NMCs as compared to EU-15

6.1. NMC and the EU Directive for Energy Efficiency and Energy Services

The European Directive on Energy Efficiency and Energy Services (ESD) requires all EU Member States to report on energy efficiency measures taken at the national level in order to achieve the 9% target requested by the Directive (**Figure 6-1**). This Directive is also important for the old EU Member Countries (EU-15) and the New Member Countries (EU-10 and Bulgaria). It is interesting to consider the main differences in the measures implemented so far and the knowledge about measure impacts between EU-15 and the New Member Countries in the perspective of the Directive. This indicates in how far the NMCs are equally armed with the EU-15 to tackle the requirements of the Directive (considering that a variety of EU-15 countries also will have problems to fulfil the requirements of the Directive...). It is the first time that such a comparative analysis is proposed. There are certainly a good number of characteristics common across all EU Member States; there are, however, also good reasons to believe that there are also differences which this report tries to investigate.

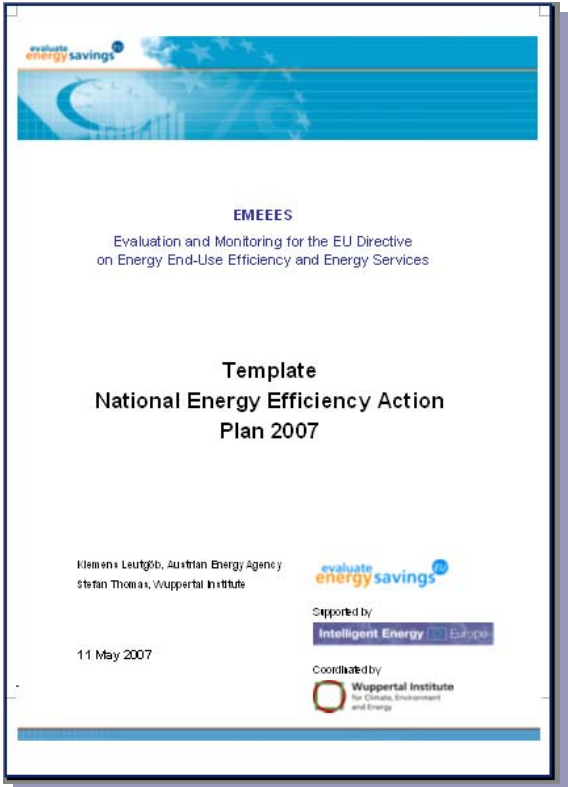
Figure 6-1: The European Directive on Energy Efficiency and Energy Services

L 114/64	EN	Official Journal of the European Union	27.4.2006
<p>DIRECTIVE 2006/32/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC (Text with EEA relevance)</p>			
THE EUROPEAN PARLIAMENT AND THE COUNCIL OF THE EUROPEAN UNION,	CHAPTER II		more and more difficult to meet the Kyoto commitments. Human activities attributed to the energy sector cause as
Having regard to the Treaty establishing the European Community, and in particular Article 175(1) thereof,	ENERGY SAVINGS TARGETS		78 % of the Community greenhouse gas emissions. The Sixth Community Environment Action Programme, laid down by Decision N° 1600/2002/EC of the European Parliament and of the Council (4), envisages that significant energy
Having regard to the Commission proposal of 12 December 2003 (COM(2003) 699) and the Council Decision of 12 December 2003 (2003/1055/EC) on the Commission proposal,	Article 4		reductions are required to achieve the United Nations Framework Convention on Climate Change objective of stabilising greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system. Therefore, concrete policies and measures are necessary.
Having regard to the Commission proposal of 12 December 2003 (COM(2003) 699) and the Council Decision of 12 December 2003 (2003/1055/EC) on the Commission proposal,	General target		
Having regard to the Commission proposal of 12 December 2003 (COM(2003) 699) and the Council Decision of 12 December 2003 (2003/1055/EC) on the Commission proposal,	1. Member States shall adopt and aim to achieve an overall national indicative energy savings target of 9 % for the ninth year of application of this Directive, to be reached by way of energy services and other energy efficiency improvement measures. Member States shall take cost-effective, practicable and reasonable measures designed to contribute towards achieving this target.		

In this context the following questions are most relevant:

- Which role play measures which are directly related to European Union legislation in the NMCs as compared to the EU-15? This indicates in how far the NMCs have taken own, national measures (in complement to the introduction of EU measures) requested by the Directive, to tackle energy efficiency improvement.
- How well evaluated are the existing energy efficiency measures with respect to their quantitative impacts in terms of energy savings? This indicates, in how far the NMCs will be able to answer to the question of measures impact quantification posed by the reporting requirements of the Directive (see for this purpose the reporting template proposed by the EMEEES-project⁶¹, **Figure 6-2**)

Figure 6-2: Template proposed by the EMEEES project for the National Energy Efficiency Action Plans (NEEAP)



National indicative annual energy savings target adopted for 2016 (GWh)		
National intermediate indicative annual energy savings target adopted for 2010 (GWh)		
Energy efficiency improvement programmes, energy services, and other measures to improve energy efficiency planned for achieving the target	Annual energy savings expected by end of 2010 (GWh)	Annual energy savings expected by end of 2016 (GWh)
Measures in the residential sector:		
1)	1)	1)
2)	2)	2)
...
Measures in the tertiary sector:		
1)	1)	1)
2)	2)	2)
...
Measures in the industrial sector (ESD scope):		
1)	1)	1)
2)	2)	2)
...
Measures in the transport sector:		
1)	1)	1)
2)	2)	2)
...
Horizontal and cross-sectoral measures:		
1)	1)	1)

- How important is the share of high or medium impact measures in the different sectors? This is also an indication of the preparedness of the NMCs for the reporting requirements of the ESD.

⁶¹ Evaluation and Monitoring for the EU Directive on Energy End-Use Efficiency and Energy Services (www.evaluate-energy-savings.eu)

- What measure types are prevailing in the different sectors? The answer to this question shows whether energy efficiency is tackled in a similar way in NMCs and EU15 or if there are major differences.
- What is the experience of NMCs with energy efficiency? This question investigates some of the possible gaps observed for the previous questions in NMCs which may be due to the late start of NMCs in this field and points to the role that the ESD might take for the NMCs to promote progress in energy efficiency measures and the knowledge about their impacts.
- Are there differences in the dynamics of measure implementation across the demand sectors between NMCs and EU-15? Have they chosen particularly innovative measures – given the late start – which may inspire EU-15 policies?

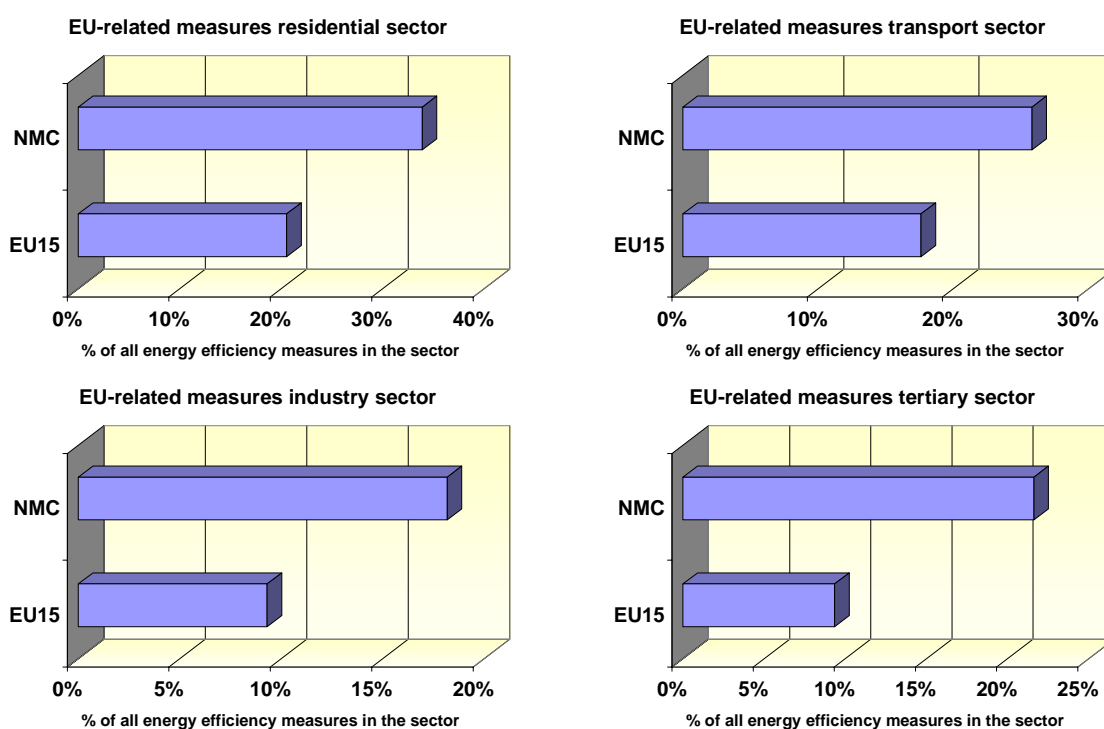
The following sections discuss answers provided to these questions on the basis of the information on energy efficiency measures collected by the NMCs partners in MURE.

6.2. Patterns and dynamics of energy efficiency measures

European Union legislation is more dominant for energy efficiency in the NMCs

The ESD aims at triggering national energy efficiency measures. Looking at the share of energy efficiency measures which are directly related to EU measures is therefore an indication whether a country or a group of countries has to make more efforts in the future in the frame of the ESD.

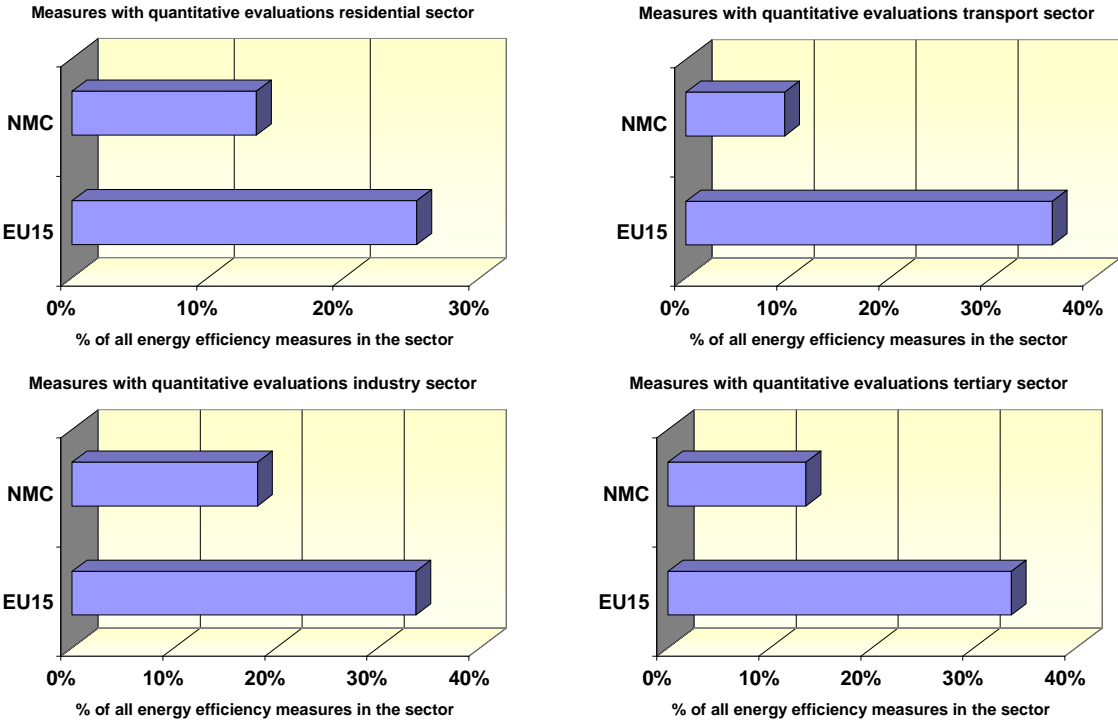
Figure 6-3: Share of EU-related measures



In the NMCs, looking at **Figure 6-3**, the share of EU-related measures in NMCs is rather identical across all sectors: roughly spoken, it is about 50% or up to two times higher than in the EU-15. Naturally this share varies across the sectors: while it is highest in the residential sector (due to the strong impact of EU legislation in the field of electric appliances labelling and the European Building Performance Directive), it is lower in the transport sector, and especially the industrial sector due to the low involvement of the EU in the latter sector (except for the important measure of the emission trading scheme which has been established in 2005). This picture is similar between EU-15 and NMCs.

One explanation for this difference might be that due to the accession process the introduction of EU legislation for energy efficiency was dominating the efforts. On the other hand it is clear that in the frame of the ESD more efforts have to be made by the NMCs to complete the EU-related measures with national efforts.

Figure 6-4: Share of measures with quantitative impacts



Quantitative impacts of existing energy efficiency measures are less well known

Concerning the question of quantitative evaluations of energy efficiency measures again there are substantial differences observable across all sectors (**Figure 6-4**): For the EU-15, depending on the sector, 25-35% of all measures⁶² are in some way

⁶² In terms of quantified impact it can be supposed that the share is generally higher because more important measures might more easily be evaluated quantitatively than smaller measures.

evaluated in a quantitative way⁶³ and hence suitable to be reported for the ESD, mostly as "Early Action" (measures taken between 1995 and the start of the ESD in 2008 but with a lasting impact up to the final year of the Directive 2016). In the NMCs on the contrary, the share of measures with quantitative evaluations is less than 10% to 15% in the industrial sector, at the best.

One possible explanation may be that most of the measures have been introduced in recent time (see some sections further on). Hence the knowledge on quantitative impacts, from an ex-post perspective, is necessarily still incomplete. Nevertheless, at least ex-ante quantifications should be available as they are requested for the Energy Service Directive in the frame of the reporting on Early Action and new measures. Particular evaluation efforts are necessary in the transport sector where the share of evaluated measures is only about 8% as compared to 35% in the EU-15.

High or medium impact measures in the different sectors have generally more modest shares

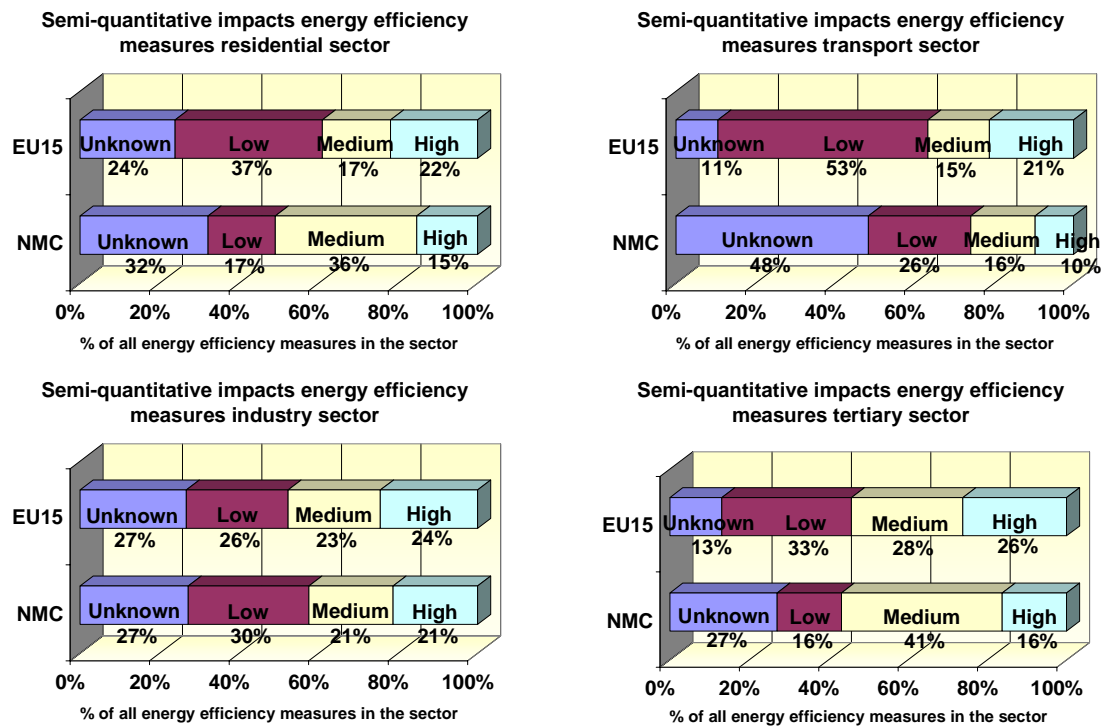
Equally important is the question how high the share of high/medium-impact measures is in the NMCs compared to the EU-15. The quantitative impact evaluations (which, as mentioned previously, are only available for some measures given the lack of general measure evaluation at national level) are complemented by semi-quantitative impact estimates for most measures provided by national experts from the energy agencies in the NMCs countries. This information contributes to characterising measure impacts at least in semi-quantitative categories (high/medium/low impact) which are linked to the energy or electricity consumption of the sector through a percentage range. These semi-quantitative estimates are used to evaluate the overall impact of a larger set of measures for which fully quantitative impact evaluations are not always available. The categories are weighted with relative factors (high impact = 5, medium impact = 3, low impact = 1), which correspond to the originally defined bands of savings. This type of semi-quantitative evaluation can certainly still be characterised as a crude approach compared to a full quantitative evaluation, but it does provide useful information for screening the measures in the form of measure maps and a first order estimate of the quantitative impact of the measures.

The share of high and medium impact measures is an indication in how far the different countries may be able to achieve the 9%-target of the ESD. Certainly, most of the measures in the MURE database are "Early Actions". But if among these the share of high impact measures is low, much effort has to be carried out on new measures. **Figure 6-5** shows first of all that the fraction of measures where even the qualitative estimate is in doubt is considerably higher in the NMCs, especially in transport and tertiary, providing further support to the issue of reporting difficulties discussed previously.

⁶³ see ADEME (2007): "Energy efficiency trends and policies in the EU-15", www.odyssee-indicators.org

Second the share of high impact measures is generally lower in NMCs (while in the EU-15 more low- than medium-impact measures exist), indicating that higher future efforts are needed in NMCs under the ESD.

Figure 6-5: Share of high or medium impact measures



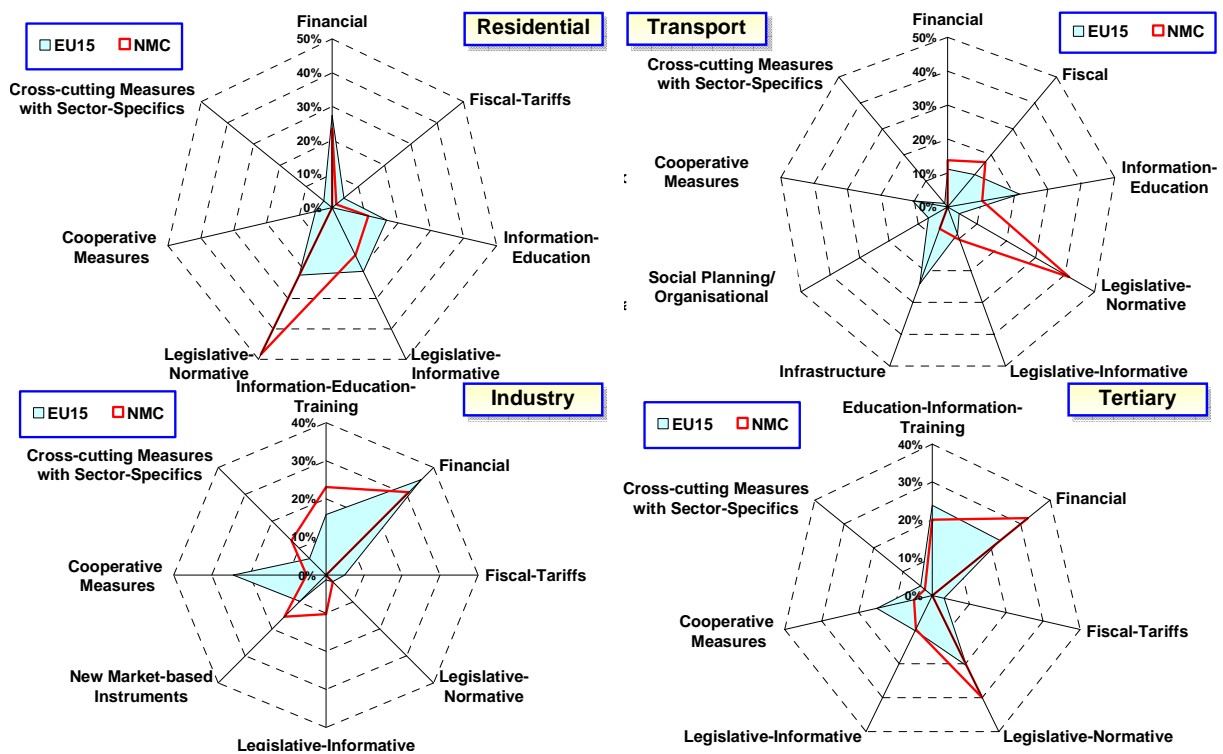
Prevailing measure types are roughly similar in NMCs and EU15 but there are sector-specific particularities

Figure 6-6 describes for the different sectors, which are the main prevailing measure types. The answer to this question shows whether energy efficiency is tackled in a similar way in NMCs and EU15 or whether there are major differences. Roughly spoken there are many similarities but some accents may be different in the NMCs.

In the *residential sector* there is, similar to the EU-15, a mix of legislative/normative (building regulations), legislative/informative (labels) and financial measures (subsidies) prevailing. However, there is a stronger importance of legislative measures (due to stronger role of EU legislation). No cooperative measures exist for this sector. In *transport*, legislative normative measures are more important (due in particular to late introduction of technical inspection schemes, which in the EU-15 countries occurred typically before 1995). Financial and fiscal measures are comparatively more important (clean cars). Again there is an absence of cooperative measures in NMCs. In *industry* there is a comparatively stronger accent on new market-based instruments which reflects the absence of co-operative measures for this sector also. There is more

emphasis on information/education/training measures as well as legislative-informative measures (mainly in relation to mandatory audits). In the tertiary sector, similar to the EU-15 legislative/normative, financial measures and information/ education/training are prevailing. There is absence of cooperative measures. Other important measures in the NMC for all sectors are energy efficiency funds and Energy Service Companies ESCOs.

Figure 6-6: Prevailing measure types



Remarkable is further that the new instrument of White Certificates for energy efficiency is not experimented in the NMCs, in difference to EU-15 countries like Italy or France. There are, however, theoretical investigations of how such a scheme could look like for example in Hungary and Bulgaria⁶⁴. Reasons mentioned for the absence of this type of instruments so far are⁶⁵:

- Fully cost-reflective prices for all sectors and all energy carriers are still a problematic issue (existence of hidden subsidies).
- Exogenously-driven and reactive policy making style in energy efficiency. Limited experience with and large suspiciousness from influential state actors towards innovation in policy making and market-based instruments.
- No history of involvement of energy suppliers in action beyond the consumer's meter (beyond information provision), stickiness of institutional adaptation.

⁶⁴ EuroWhiteCert project (<http://www.ewc.polimi.it/downl.php>)

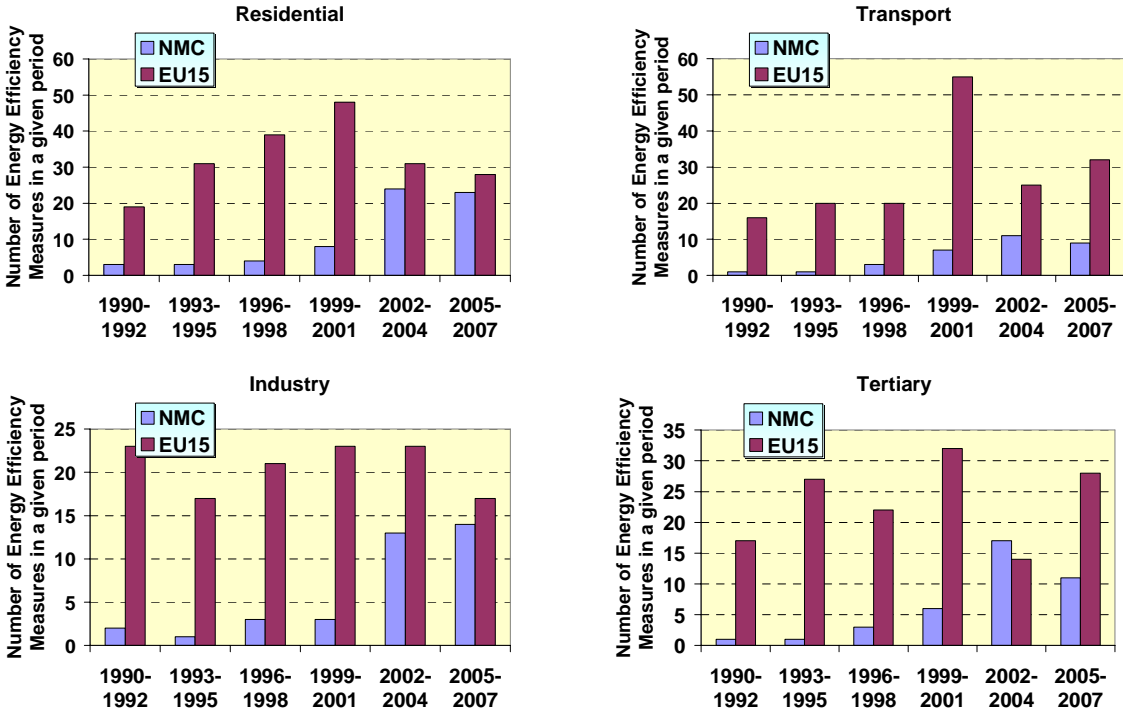
⁶⁵ National Case study – Hungary, Silvia Rezessy

[http://www.ewc.polimi.it/dl.php?file=20\)%20Hungarian%20case%20study.pdf](http://www.ewc.polimi.it/dl.php?file=20)%20Hungarian%20case%20study.pdf)

Measures on energy efficiency have been introduced quite recently in NMCs

A view on the measure dynamics over the past 17 years (**Figure 6-7**) shows that while the measures of the EU-15 have been built up continuously over the period (with some periods of stronger activity for example in the residential sector or the transport sector around 2000), most of the measures in the NMCs are originating after 2000 as a consequence of the accession process. This fact explains some of the gaps discussed previously due to the new character of the measures. In all sectors, except for the transport sector, the NMCs have now reached an activity level comparable to the EU-15.

Figure 6-7: Measure dynamics



This observation points in particular to the important role that the ESD might take for the NMCs to promote progress in energy efficiency measures and to enhance the knowledge about their impacts.

The measure shares by sector (number of measures in a given sector as compared to the overall number of energy efficiency measures in the MURE database) is shown in **Figure 6-8**. The dominance of measures in the residential sector is rather similar in NMCs and EU-15. However, transport sector measures seem less widely spread, while cross-cutting measures are clearly more dominant. One reason for the latter is the existence of normative measures for CHP, and, more prominently, the larger spreads of funds for energy efficiency (see the list in **Table 6-1**).

Figure 6-8: Measure shares by sector

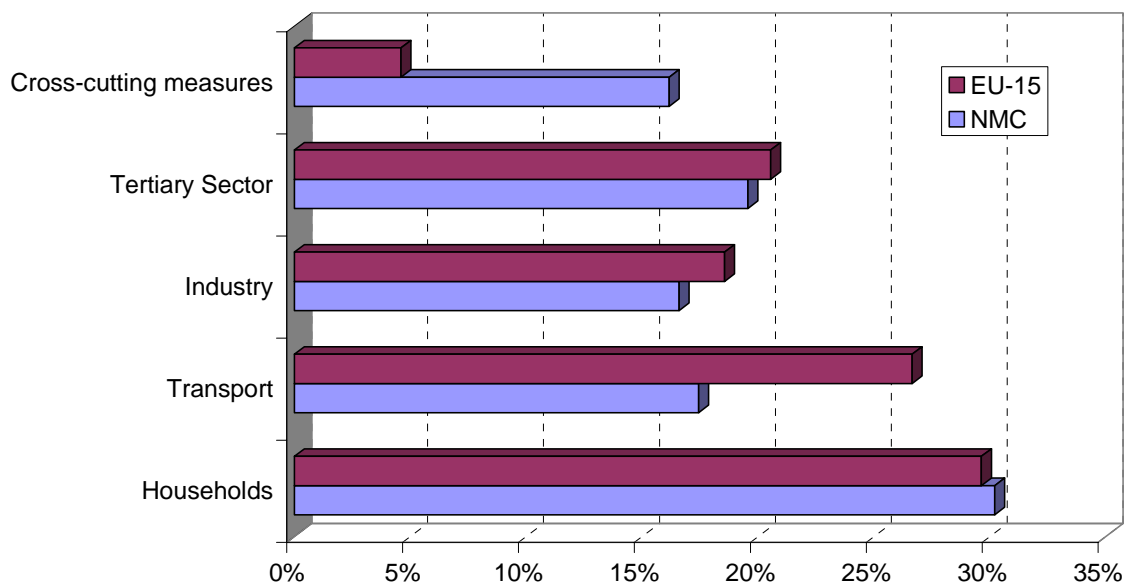


Table 6-1: Measure shares by sector

Code	Title
BG15	Bulgarian energy efficiency fund
CY1	Governmental grants, subsidies scheme for the promotion of RES, RUE, energy saving investments (Enterprises with economic activity)
CY2	Governmental grants/subsidies scheme for the promotion and encouragement of RES, energy saving and the creation of a special fund for financing or subsidising of these investments (natural persons and enterprises without economic activity)
CZ28	Government Programme for the Support of Energy Savings and the Use of RES part A 2002-2006
CZ36	Prototype Carbon Fund in Czech Republic
CZ37	Government Programme for the Support of Energy Savings and RES part B
HUN10	Hungarian Energy Efficiency Co-Financing Programme
PL5	The National Fund for Environmental Protection and Water Management (NFOiGW)
PL6	The EcoFund Foundation
SLO2	Ecological Fund of the Republic of Slovenia - ECO-Fund

6.3. Conclusions

From this comparison of measure patterns and measure dynamics in summary the following main conclusions arise:

- EU related measures have a stronger importance in the NMCs in the national measure mix of the NMCs as in the EU-15.
- While the measures of the EU-15 have been built up continuously over the period, most of the measures in the NMCs are originating after 2000 as a

consequence of the accession process. However, in all sectors, except for the transport sector, the NMCs have now reached an activity level comparable to the EU-15.

- Quantitative impact evaluations: Roughly only 8-15% of the measures have quantitative evaluations as compared to 25-35% in the EU-15. To better appreciate this gap it is important to keep in mind the very recent measure dynamics in the NMCs (see below). But this fact makes monitoring in the frame of the Energy Service Directive (ESD) more difficult (in particular also for the evaluation of Early Action).
- Semi-quantitative impact evaluations: The share of measures with unknown impacts is typically 30 to nearly 50% in the NMCs. Only the industrial sector is characterized by a larger number of high impact measures. Especially in transport lower impact measures or measures with unknown impact (which is often also a sign of low impacts) are prevailing even more than in the EU-15. Based on the semiquantitative methodology used here, this implies that it will be more difficult for the NMCs to achieve their target under the ESD.
- Consistent packages of measures are still lacking in the NMCs, although similar combinations can be observed as in the EU-15 such as energy audits and subsidies for buildings or industrial energy saving measures.
- The following points are the main observations by sector with respect to differences in measure types:
 - *Residential*: Similar to the EU15 legislative/normative, legislative/informative and financial measures prevailing. Stronger importance of legislative measures (due to stronger role of EU legislation). No cooperative measures for the sector.
 - *Transport*: Legislative normative measures more important (due in particular to late introduction of technical inspection schemes). Financial measures comparatively more important (clean cars). Absence of cooperative measures.
 - *Industry*: Comparatively stronger accent on new market-based instruments. Absence of cooperative measures. More importance of information/education/training measures
 - *Tertiary*: Similar to the EU15 legislative/normative, financial measures and information/education/training prevailing. Absence of cooperative measures.
 - *Cross-cutting*: New instruments such as Tradable White Certificate schemes for energy efficiency are currently not experimented in the NMC.