Energy Demand in The EU

A comparision of forecasts and ambitions

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a contributing research paper to

Energy Savings 2020: how to triple the impact of energy saving policies in Europe

CONTENT

1. INTRODUCTION

Europe committed itself to reduce its GHG emissions by 80-95 % by 2050 and in the shorter term, by 2020, to reduce GHG by 20%, increase the share of renewables to 20%, and save 20% energy. The latter is the weakest of the three objectives. Accountability is unclear and monitoring progress mainly indirect and based on estimating policy impacts.

In light of the ongoing review of the EU's energy savings policies this paper aims to compare and assess the different energy use scenarios and outlooks at EU and national level: the reference (REF) and the additional energy efficiency (ENEFF) scenarios in the National Renewable Energy Action Plans (NREAPs)[1], the high policy intensity scenario (HPI) in the Energy Savings 2020 report[2], and the reference scenarios under the European Commission's forecasts, PRIMES 2009 and 2007[3]. This should provide information on the estimated changes in energy use and national policy ambitions and give an insight on the possibility to compare the different situations and on the methodological problems posed by such a comparison. The scenarios used for the comparison are briefly described below.

REF and ENEFF scenarios in the NREAPs following the RES Directive implementation

According to the Commission Decision of 30 June 2009 establishing a template for NREAPs, the reference scenarios and additional energy efficiency scenario are defined as follows: "Under the heading reference scenario, a scenario has to be presented taking into account only the energy efficiency and savings measures adopted before 2009. Under the heading additional energy efficiency scenario a scenario has to be presented taking into account all measures to be adopted from 2009. The elaboration of the other parts of the NREAP is based on this additional energy efficiency scenario". This means that the ENEFF scenario in the NREAP would be the latest statement of the national ambition on energy efficiency.

1. National Renewable Energy Action Plans (NREAPs) as referenced at ec.europa.eu/energy/renewables/transparency_platform/action_plan_en.htm
2. Energy Savings 2020. How to triple the impact of energy saving policies in Europe. Ecofys and Fraunhofer ISI. 2010
3. EU energy trends to 2030 - Update 2009. European Commission. 2010 & European energy and transport. Trends to 2030 - Update 2007. European Commission. 2008.

HPI scenario as presented in the Energy Savings 2020 study

The HPI scenario assumes that sufficient policy measures are put in place to overcome the barriers to all cost-effective efficiency measures, i.e. measures where the individual end user will have net savings from reduced energy bills over the life time of the investment.

The study concluded that sufficient and yet untapped cost effective energy efficiency potential at end use is available under this HPI scenario to still achieve the EU 20% energy savings target, in conjunction with achieving renewable energy targets.

forecast 2030, updates 2007 and 2009 (PRIMES 2007 and 2009)

These are the reference scenarios as used in the Energy Savings 2020 Report.

We did not use the information provided by the National Energy Efficiency Action Plans (NEEAPs, developed under the Energy Services Directive) as the data is difficult to assess and compare, due to the diversity of reporting formats used, the lack of clarity on how early actions have been included in setting energy efficiency ambitions and the diverse treatment of the ETS sector. In addition to that, the deadline for reaching the target has been set at 2016 which is quite far off the 2020 objectives.

2. APPROACH AND FINDINGS

If the EU and national forecast models would be sufficiently accurate and comparable we could expect the following picture for 2020:

- PRIMES 2007 should present the highest energy use levels, as the scenario does not include energy efficiency measures after 2007 as well as the impacts from the economic downturn;
- REF scenario in the NREAPs should have already predict lower energy uses as it includes all efficiency measures until end of 2008;
- PRIMES 2009 should predict lower energy use than REF as it includes all energy efficiency policies and measures put in place by the end of 2009 as well as the impacts of the economic recession;
- ENEFF scenario in the NREAPs should lead to even lower energy use levels as PRIMES 2009 as it includes energy efficiency measures until 2009 as well as planned and envisaged efficiency policies from 2009 onwards;
- HPI scenario could be expected to deliver the lowest energy use levels as it includes all cost-effective efficiency measures. Though it does not include the impacts of the economic recession, which means that the ENEFF scenario could be lower, but in any case REF scenario should be higher.

However, such an incremental comparison is not always possible due to the different methodologies used. NREAPs estimates are based on gross final

energy consumption, which includes transmission losses in addition to the final energy demand. The Energy Savings 2020 Report and the Commissions energy trends provide data for final energy use or final energy demand. Therefore only relative changes in energy use in 2005 to 2020 in the different scenarios can be compared.

Figure 1 shows for each country investigated[4] the changes in final energy demand from 2005-2020 predicted under the ENEFF and the HPI scenario.

And Figure 2 compares for each country investigated[5] the changes in energy use under the respective baseline scenarios: REF scenario and PRIMES 2007 and 2009 scenarios.

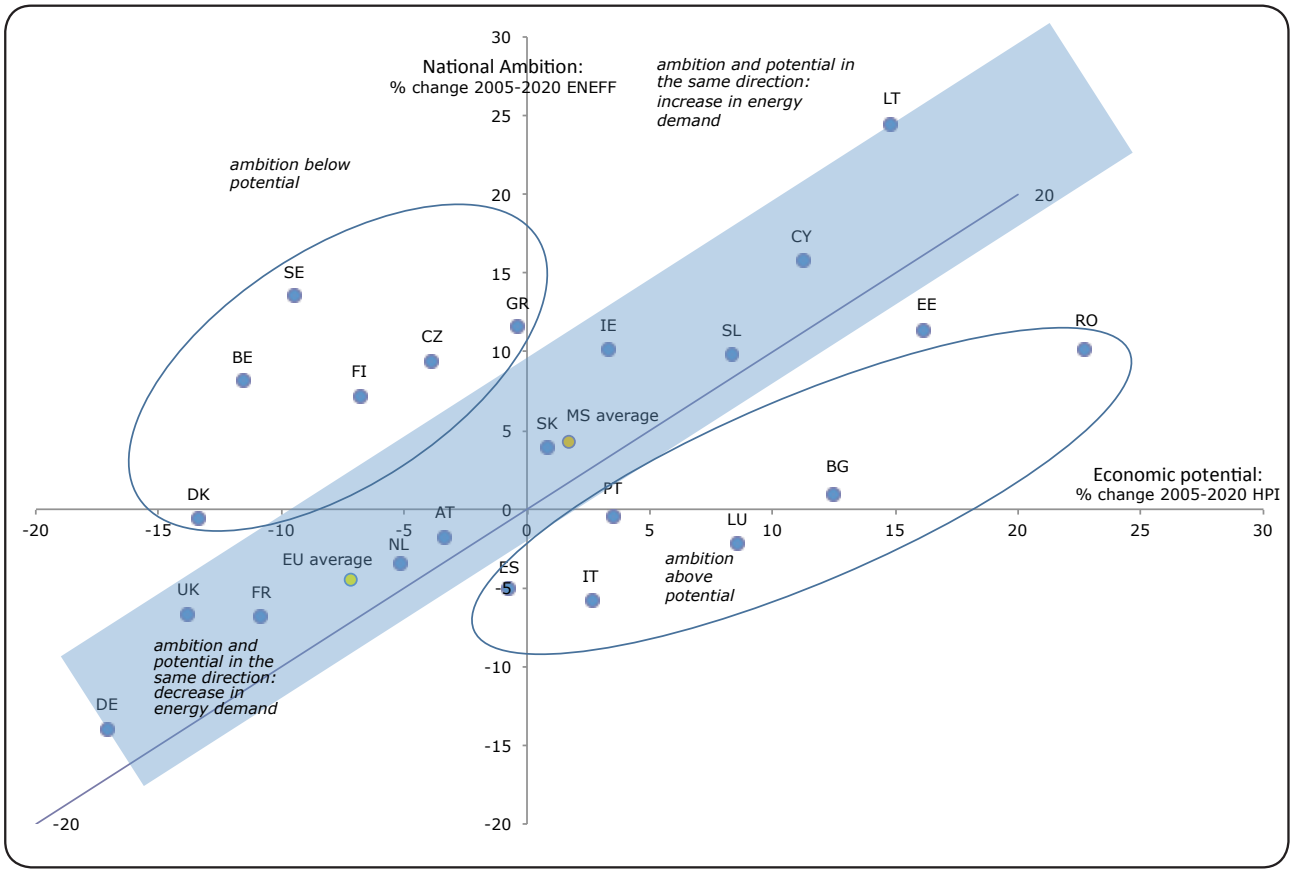

Figure 1 Comparison of predicted changes in energy use 2005-2020 in NREAPs considering additional energy efficiency measures (ENEFF) representing the national ambition and the cost-effective saving potential (HPI using the EU outlook) representing the energy efficiency measures which save the consumer money over the life-time of the investment. The dotte arrwos represent the direction of a possible correction due to structural difference in the results of national and EU outlooks.

4. All EU 27 except Malta and Poland as their NREAPs fail to provide gross final energy demand for 2005, and without Hungary which has not submitted a NREAP

5. All EU 27 except Malta and Poland fail to provide gross final energy demand for 2005, except Finland, the Netherlands and Slovenia as their NREAPs fail to provide gross final energy demand data for 2020, and without Hungary which has not submitted a NREAP

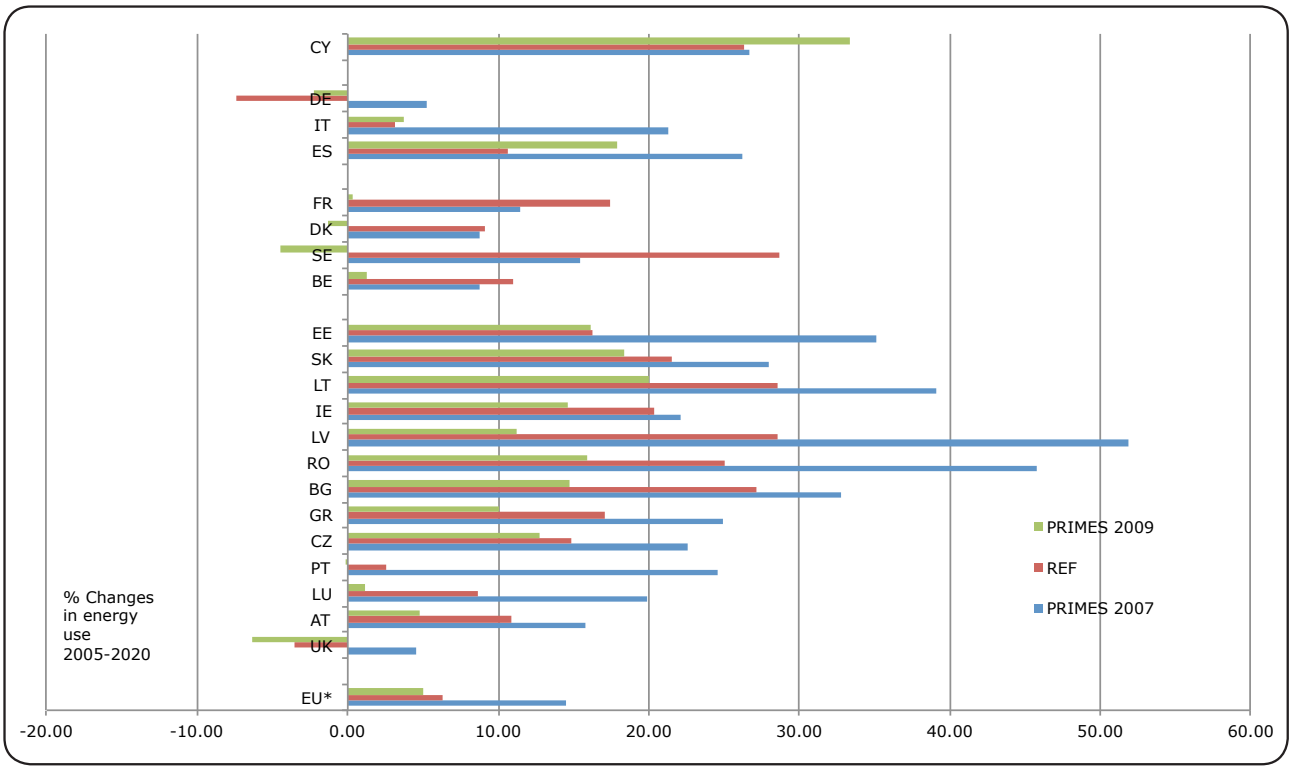

Figure 2 Comparison of different estimates of changes in national final energy uses 2005-2020 under different scenarios:
- PRIMES 2009: EU's outlook using PRIMES model including all efficiency measures until end of 2009 (and assuming achievement of GHG and RES targets)
- REF: the predicted energy development considering all efficiency measures until end of 2008
- PRIMES 2007: EU's outlook using PRIMES model including all efficiency measures until 2007

The analysis of both figures leads to following interpretations:

- Most national energy outlooks seem be to fit into the pattern produced by the EU model - PRIMES. In BE, DK, FR and SE the national predictions are significantly above the EU ones and in DE, ES and IT they are below EU ones. This means that for those seven countries the comparison of absolute changes under ENEFF and HPI outlooks have to be corrected eventually. For Cyprus the picture is not conclusive and would require further investigation.

- Most countries' ambitions in reducing energy use are close but below the cost-effective economic potential:

DE, UK, FR, NL and AT demonstrate energy efficiency ambitions which are close to the HPI and would achieve an absolute decrease of energy use in 2020 compared to 2005.

The REF scenario in DE seems to be more optimistic as PRIMES 2009 and thus the ambition might actually be lower

The REF scenario in FR seems to be less optimistic as PRIMES 2009 and thus the ambition might actually be higher

SL, IE, CY, EE, SK and LT demonstrate energy efficiency ambitions which are close to the HPI but would still lead to absolute increase of energy use in 2020 compared to 2005.

- BE, SE, FI, DK, CZ and GR have significantly lower energy efficiency ambition than the cost-effective energy saving potential

  The REF scenario in BE, DK and SE seems to be less optimistic as PRIMES 2009 and thus the ambition might actually be higher

- Finally we have ES, IT, PT, LU, BG, EE and RO which have a higher energy efficiency ambition than the cost-effective energy saving potential.

  The REF scenario in ES and IT seems to be more optimistic than PRIMES 2009 and thus the ambition might actually be lower

3. CASE STUDIES

Based on the first observations we further investigated the SE, DK and DE case.

The Swedish case is the most bizarre: Sweden predicts an increase in final energy use of almost 14% above 2005 levels by 2020 already taking into account additional efficiency measures, while the HPI scenario would result in a 10% decrease. The Danish picture is similar.

Quite the contrary, Germany is standing out as it presents the highest saving ambition in Europe with 14%, which is close to the HPI scenario of 17%. The country has recently given itself a new energy strategy with far reaching saving targets.

In our investigation based on interviews we observed that officials in charge of the NREAPs do not seem to coordinate their work with the departments in charge of efficiency policies and the ESD implementation.

SWEDEN

Sweden estimates in its NREAP an increase in gross final energy use of 13.62% by 2020 compared to 2005. It is difficult to explain such an increase in energy demand. It could be linked to population and energy intensive manufacturing growth and / or significant behaviour and efficiency changes (bigger houses, worse energy performance, more travelling etc...). However, such growth is not predicted for Sweden (according to PRIMES 2009) and behaviour / efficiency change would conflict fundamentally with Swedish energy efficiency policies, which are aimed at achieving a 9% saving by 2016 according to the NEEAP.

Analysing the NEEAP of Sweden provides some clarification. Sweden used the option of counting district heating as an energy efficiency improvement measure (measured as final energy savings) as outlined in Annex III of the Energy Services Directive. This means that when Sweden switched from electric heating to district heating (and a large scale use of CHP), massive final energy savings were calculated, making further end use efficiency measures largely superfluous in view of the 9% ESD target achievement.

However, the supply side savings via district heating are not counted in the gross final energy use under the RES Directive. Thus the almost 14% increase in gross final energy use predicted by Sweden by 2020 in the NREAP can sit next to a 9% energy saving target under the ESD, as indeed Sweden might not have in place measures to increase end use efficiency and get a grip on growing energy demand.

In addition it seems the Swedish NREAPs ENEFF scenario is actually a business as usual and not a policy objective. According to officials from the Swedish Energy Agency the energy savings potentials estimated in the NREAPs under the ENEFF scenario do not include a large number of new energy efficiency measures, because the basic assumptions of the prediction were made prior to the Swedish Parliament having reached a comprehensive energy efficiency programme in June 2009; this means that the additional energy efficiency scenario ENEFF is more a business as usual scenario. It was also confirmed that predictions made in the NREAPs are more in line with the climate reporting, and that a new forecast is prepared to be launched in January 2011, in which new energy efficiency measures will be included, and which will be a more up to date view of the Swedish energy savings potentials and policies.

Denmark

The situation in Denmark seems to be similar to the Swedish case. Denmark predicts a decrease in energy use of 0.6% by 2020 compared to 2005, while the HPI scenario indicates a 13% saving potential by 2020 compared to 2005. But the ENEFF scenario in the NREAP, developed by the Danish Energy Agency, is based on a so-called ”frozen policy» scenario including the achievement of the 4% national primary energy consumption reduction target by 2020 against 2006.

Germany

Germany’s ambition for energy savings stated in its NREAP is the highest of all EU Member States and close to its specific HPI potential. The renewable action plan identifies 14% savings, not far off the 17% potential identified in the Energy Savings 2020 study. This matches the ambitious energy saving targets of the government’s energy strategy from 2010[6]. Table 1 presents the specific targets proposed.

In the building sector for example, where energy efficiency measures are considered to have an enormous potential, the refurbishment rate of buildings is to double from 1 to 2%. One of the aims of the strategy is to reduce the heating energy needs in order to have a nearly climate neutral building stock by 2050. Furthermore Germany stated it will reduce primary energy consumption by 20% by 2020 and by 50% by 2050 compared to 2008.

Even though the targets are not binding as such, they are subject to a monitoring process and should ensure a positive engagement of the German government in advancing the EU energy savings target setting policies.

TARGET IN %	2020	2030	2040	2050
CHANGE IN GHG EMISSIONS COMPARED TO 1990	-40	-55	-70	-80
SHARE OF RE IN GROSS FINAL ENERGY		30	45	60
SHARE OF RE IN ELECTRICITY CONSUMPTION	35	50	65	80
CHANGE IN PRIMARY ENERGY USE COMPARED TO 2008	-20			-50
CHANGE IN ELECTRICITY CONSUMPTION COMPARED TO 2008	-10			-25
CHANGE IN FINAL ENERGY IN TRANSPORT SECTOR COMPARED TO 2005	-10			-40

Source: Energiekonzept 28 September 2010

Table 1 Figures in the German Energy Concept

4. CONCLUSIONS

National and EU outlooks are comparable and robust for most countries

For the majority of Member States the outlooks produced by the EU model PRIMES are comparable and consistent with the nationally produced outlooks.

National energy efficiency ambitions close to cost-effective potentials but overall too low

Most Member States outline energy efficiency ambitions in their NREAPs below cost-effective end use saving potentials as predicted by the Energy Savings 2020 report. In consequence Europe's 20% saving target would be missed.

Anomaly in applying the Energy Services Directive causes problems: Supply side efficiency counted as demand side saving

The country furthest away from its cost-effective saving potential, Sweden, seem to suffer from an anomaly in applying the Energy Services Directive, by counting supply efficiency measures as final energy savings. This seems to have allowed these countries to lose control on energy demand.

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