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Making Sense of the Numbers: What does the Commission's 30% energy efficiency target by 2030 mean and is it enough?

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Introduction

In July this year the European Commission published its vision for the future of energy efficiency in the EU. The document entitled *Communication on Energy Efficiency and its Contribution to Energy Security and the 2030 Framework for Climate and Energy Policy*[1] states Europe is broadly on track to meet its 20% energy savings 2020 target – missing it by 'only' 1-2%. The Commission advises a 30% energy savings target should be adopted by the EU for 2030; this would complement the 40% greenhouse gas (GHG) and at least 27% renewable targets already proposed.

These headlines mask a complex story of what is actually happening with energy savings – a story that is made difficult in part because of the shifting baselines on which progress is measured; jumping between discussions of primary and final energy use; and the bundling of data across sectors and countries that make it challenging to see what is really going on.

The proposed 30% 2030 target while sounding ambitious is also highly ambiguous. Depending on how it is defined, it could mean final savings in the real economy as low as 12% (if rebased to what is actually happening in the economy now) or as high as 34% (if set against 1990 EU energy consumption). As such there is a urgent need to seek clarity on the terms of the target. This Q&A attempts to make sense of the numbers and draws initial conclusions on where Europe should be going next on energy efficiency.

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1 European Commission (2014) Communication on Energy Efficiency. http://ec.europa.eu/energy/efficiency/events/doc/2014_eec_communication_adopted.pdf

Q1. What are the long-term trends around energy use in Europe?

Energy efficiency works. During the period 1990 to 2012, European energy use has remained stable overall, despite an expansion of economic output. In the 18 years from 1990 to 2008, primary energy consumption grew steadily - increasing 8% during this time. In the period spanning 2008-2012 this trend has been reversed, with energy use declining back to the same level it was in 1990[2].

Q2. What is the outlook for the EU meeting its 20% energy efficiency target in 2020?

Recent European Commission analysis states the EU is on track to reach around 18-19% energy savings by 2020 and that, to date, one third of these energy savings (made since 2010) are due to collapsed economic output resulting from the 2007 financial crisis. However, two-thirds of the energy savings made have been the direct result of rising energy prices and energy efficiency policies. Projecting forward, the Commission estimates it will be possible to attribute 12-13% of the reduction in EU primary energy consumption to 2020 to genuine energy efficiency improvements in the economy[3], with the other 5-6% being delivered by the recession.

Q3. What are the most important drivers of energy savings to 2020?

The European Commission's impact assessment acknowledges that the EU Emissions Trading Scheme (EU ETS) has had a minimal effect on improving energy efficiency (with notably poor progress made in the power sector) - but that regulation and labelling have worked very well. In areas where mandatory European-led regulation has been introduced, there has been a significant impact on reducing energy use in Europe[4]. For example the CO2 in Cars Regulation has been a key driver of rising transport efficiency standards – with vehicle efficiency improving 28% since 1995[5]. In buildings, regulations on energy use in new buildings requiring house builders to fit insulation, superefficient windows, etc. mean new homes consume 40% less energy compared to 20 years ago[6]. Energy efficiency in appliances has also picked up markedly in recent years, driven by more stringent products standards and labelling. Rising energy prices have driven efficiency gains in industry - but the picture is mixed, with significant opportunities to further reduce energy use, especially in central and eastern European countries, left untapped[7].

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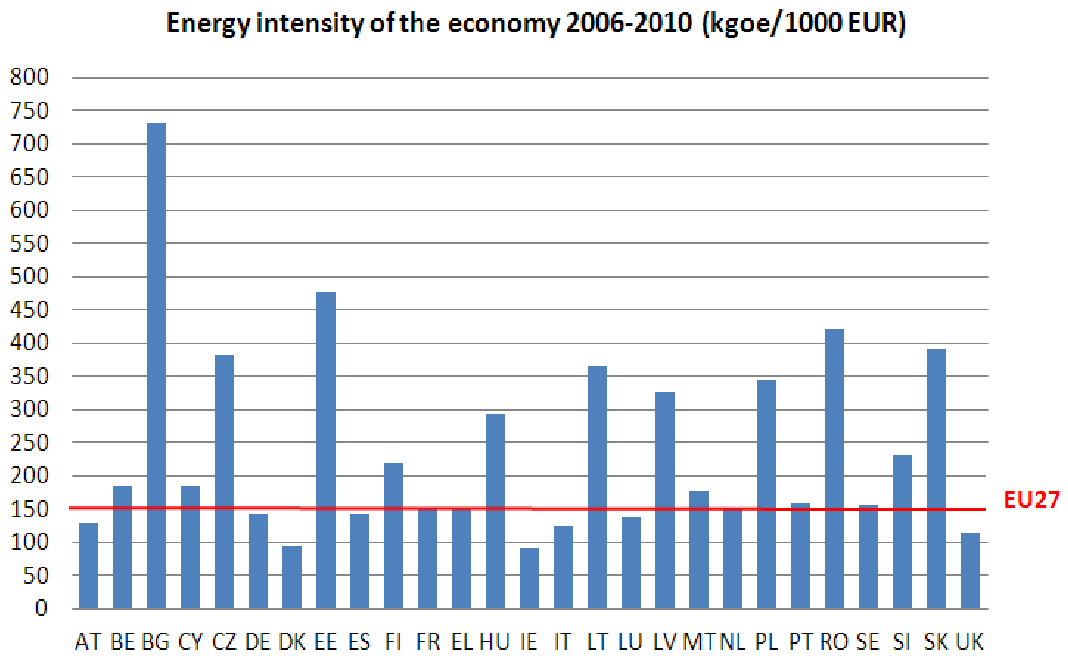
2 Data from Eurostat
3 European Commission (2014) Communication on Energy Efficiency. http://ec.europa.eu/energy/efficiency/events/doc/2014_eec_communication_adopted.pdf
4 European Commission (2014), Communication: Impact Assessment for the Energy Efficiency Review
5 European Commission (2014), Communication: Impact Assessment for the Energy Efficiency Review http://ec.europa.eu/energy/efficiency/events/doc/2014_eec_ia_adopted_part1.pdf
6 Idem
7 Idem

Q4. Is more or less intervention needed to improve European energy efficiency to 2030?

Progress on saving energy is not uniform in Europe. In a recent study, Germany has been identified as the most efficient economy in the world[8]. But in terms of recent progress, the biggest energy savings made during 2008-2012 were by Bulgaria, Denmark, Greece, Hungary and Slovakia. In contrast, progress on energy efficiency declined in Austria, Estonia, Latvia, Lithuania, Luxembourg and Poland during the same period - coincidentally this includes five Member States that are heavily reliant on Russia for gas supplies. **The true picture is that progress on energy efficiency is patchy, with the efficiency with which Member States use energy varying markedly (see Figure 1). Given that, to date, regulation and labelling have been the most effective drivers of action, an inevitable conclusion is that more not less European-led intervention to unlock energy efficiency is needed.**

Figure 1. Comparative energy intensity within the EU (data from Eurostat)[9]



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8 ACEEE (2014) The International Energy Efficiency Scorecard http://aceee.org/portal/national-policy/international-scorecard

9 Note that, of course, the intensity of energy use will also be affected by the differing structures of the Member State economies i.e. the extent to which they are based around services rather than energy intensive industry.

Q5. What is the European Commission proposing?

It is not completely clear since the Communication states simply it proposes "an ambitious energy efficiency target of 30%". This might sound simple but because of the way the Commission traditionally assesses energy efficiency (based on projections of future energy use – not on what the EU is actually using) it could imply very different real world impacts. Whether the target refers to final or primary energy also makes a difference. A primary energy target will need to be higher than a final energy target to deliver the same effect in the real economy, since it needs to take into account the conversion of raw energy resources into usable inputs (electricity, heat etc). Again the Commission does not make explicit in its Communication which it means.

Based on the methodology used in the Commission's *Impact Assessment*, the technical document accompanying the Communication on Energy Efficiency, we understand that the proposed Commission's 30% target refers to a baseline year of 2007 and to primary energy use[10].

This is not good news. 2007 is rather an odd baseline year for the Commission to have selected. The reason for this is that the projections on energy use were developed before the European economy entered recession; since 2007 the EU economy and its energy use has shrunk so that 30% no longer means 30%. **In the real world the 30% primary energy savings target being proposed actually represents a reduction of energy consumption of just 12%-13% based on latest projections by PRIMES of where the EU economy is now[11] – and is equivalent to leaving all of the potential cost effective savings available in the building and industrial sectors untapped[12].**

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10 The Impact Assessment refers to the energy savings of a target assessed using 2007 PRIMES primary energy projections. On page 32, it states that "the energy saving (calculated against the 2007 PRIMES baseline projections for 2030) achieved by the scenarios is the key metric".
11 By rebasing the 2030 target from 2007 to 2013 projections – the most recent PRIMES projections.
12 The Commission has based its proposed target for energy efficiency not on delivering absolute energy savings, but on a theoretical percentage cut of future primary energy use as calculated by a group of economists running the PRIMES model (the PRIMES model is owned by the National Technical University of Athens. It is a detailed agent based/price driven equilibrium model of the energy system covering 35 European Countries. It is extensively used by the European Commission to support policy decision-making). The projections of energy demand used by this model are periodically updated, most recently in 2007, 2009 and 2013. Choosing to base recommendations for a target on estimates made in the past of future energy use in the EU adds a layer of complication. This is because economic output (and energy use) in the EU economy changes from year to year and has shrunk significantly since the recession.

Table 1. 30% translated and compared to desirable 2030 target to deliver full cost effective energy savings.[13]

	Impact of Commission's 2007-based 30% target on EU economy when applied to different baseline projections of the economy		What 30% means in terms of absolute energy savings (compared to 1990)		Desirable 2030 target to deliver full cost-effective potential (502 Mtoe)	
PRIMES baseline	Final energy savings in 2030	Primary energy savings in 2030	Final energy savings in 2030	Primary energy savings in 2030	Final energy target	Primary energy target
2007	30%	30%	9%	17%	36%	49%
2009	19%	23%	21%	25%	42%	54%
2013	13%	12%	28%	34%	45%	62%

For a detailed discussion of the cost effective energy savings available and the effect of using different baselines and final or primary energy to describe the target, see Annex 1. A 'translation' of the various possible interpretations of the 30% target is shown in Table 1. We have included – to inject some clarity – what the various versions of 2030 targets mean with respect to absolute reductions on 1990 final energy levels (as is used for GHG levels).

Q6. Does it really matter that the Commission's target leaves cost effective energy savings untapped?

Yes – and for three key reasons: retaining competitiveness, ensuring secure energy supplies and ensuring all citizens have access to affordable energy.

Competitiveness – **Collectively, the EU is the most energy efficient region in the world. A recent analysis by ACEEE confirmed this position, ranking Germany top, Italy second and the EU as a region third. However, China is rapidly catching up with the EU on efficiency, now ranking just one place behind the EU as a whole in fourth position.** Indeed, China ranked above the EU when it came to building efficiency. The US economy ranked just 13th overall[14].

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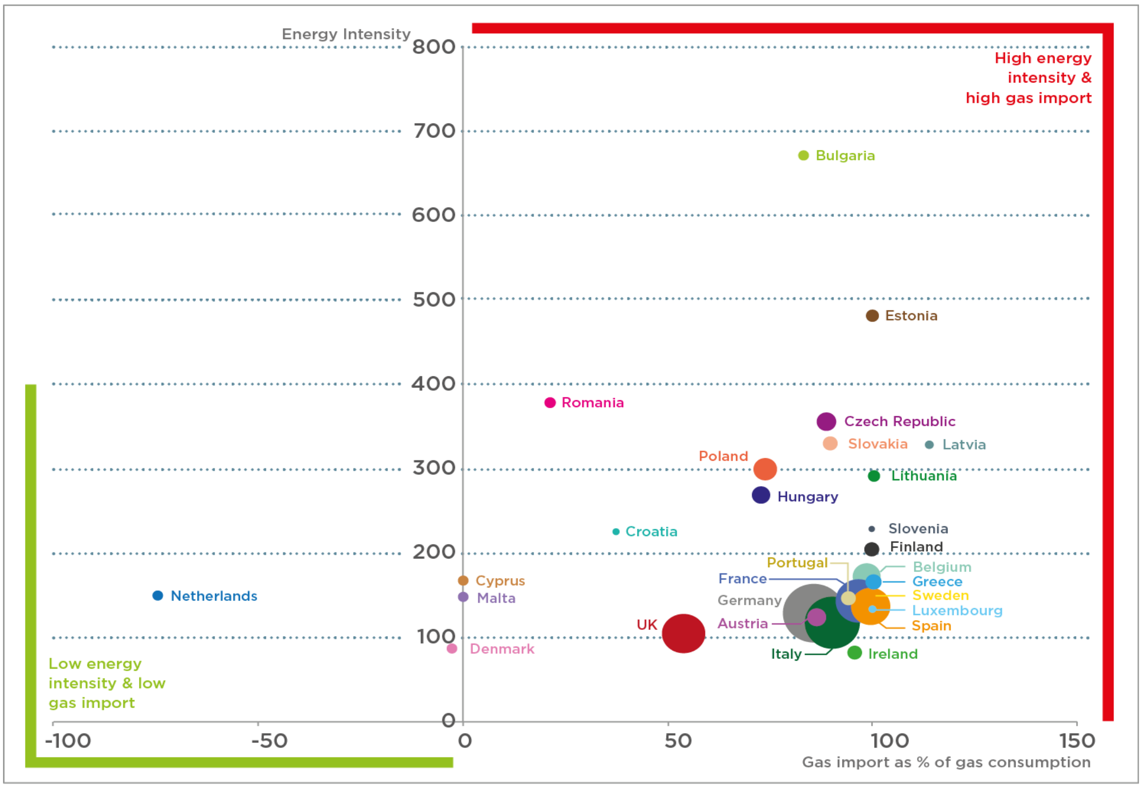
13 See Annex 1, 2 and 3 for details of how these numbers are calculated.
14The performance metrics used are a measure of energy use and provide quantifiable results. Examples of performance metrics include average miles per gallon of on-road passenger vehicles and energy consumed per square foot of floor space in residential buildings. The metrics are distributed across the three primary
sectors responsible for energy consumption in an economically developed country: buildings, industry, and transportation. http://www.aceee.org/files/pdf/summary/e1402-summary.pdf

Despite its strong performance on efficiency, the EU remains the largest importer of energy in the world. In 2011 imports stood at 54%[15] with the ~900 ktoe of energy imported, equating to 6.2% of EU GDP[16]. Added to this EU industry faces gas prices which are 3-4 times higher than the US and 12% higher than China and electricity prices that are double those of the US and 20% higher than China[17]. EU companies operate in globalised market and faces competitors with cheaper energy costs. As such – to retain global competitiveness – it will be important that the EU works to continuously improve its record on the efficient use of energy. If not, EU companies will risk losing the comparative advantage they have. Since 2004, China has decreased its industrial energy intensity by 20%, while the EU's has roughly stayed the same[18]. Some EU energy intensive industries are already equipped with older and less efficient plants than its Asian competitors. For example, the most efficient cement production currently occurs in India and China and most of EU steel production facilities are often worse than the global average[19].

Figure 2. Energy intensity of EU economies (calculated as Mtoe/unit GDP) mapped against gas imports as a percentage of overall gas use. The size of the bubble is proportionate to the volume of total gas imports of each Member State.



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15 See http://www.iiea.com/blogosphere/eu-energy-import-dependence and http://ec.europa.eu/energy/observatory/countries/doc/key_figures.pdf

16 Calculated using $111 bbl (average spot price of Brent in 2011). Data sources Eurostat, European Commission Economic and Financial Affairs, EIA, BP

17 European Commission (2013) Questions and answers on the price report http://europa.eu/rapid/press-release_MEMO-14-38_en.htm

18 IEA (2014), Energy Technology Perspective

19 Climate Strategies (2014), Staying with the leaders - Europe's path to a successful low-carbon economy http://personal.lse.ac.uk/dechezle/staying_with_the_leaders.pdf

Security – The Commission's own Impact Assessment shows a clear correlation between increasing the level of the energy efficiency target and increasing energy security and economic benefits for the EU[20]. **Without a strong push on energy efficiency, it has been estimated that EU gas imports will increase by at least 5%, and energy import dependency will remain as high as today (54%) for the next 40 years[21].** With the EU importing around 30% of its gas from Russia, recent events in Ukraine have highlighted the vulnerability of Europe resulting from its high levels of energy imports. There are significant energy security benefits to be gained from a strong focus on energy saving – especially among those EU Member States that are heavily reliant on Russian gas imports (see Figure 2). In the industrial sector Germany has implemented only 7% of internationally established policies and France only 5%[22]. Through the implementation of cost-effective measures in the industry sector alone Germany could decrease its import dependency from Russian gas by 20% within the next 10 years[23].

Access to affordable energy – EU households spend on average 6.4% of their disposable income on home-related energy use, about two-thirds for heating and one-third for other purposes[24]. **The European Commission has estimated that 11% of EU citizens (56 million people, about the size of Italy) were unable to adequately heat their homes in 2012 and as such are living in fuel poverty. In a world of inevitably rising energy prices, energy efficiency will offset rising prices that would otherwise exacerbate fuel poverty.** Without a focus on addressing this issue at its core − by improving the thermal performance of homes − increasing numbers of households will fall into fuel poverty.

Q7. What should the European Council do?

Table 2 shows the targets that would be needed to deliver the full cost-effective potential and gives an indication of why what the Commission is proposing is not in the EU's best interests.

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[20] See ANNEX II for a detailed overview of the economic impact of different targets by 2030.

[21] European Commission (2014), Communication: Impact Assessment for the Energy Efficiency Review;
European Commission (2013), EU energy, transport, and GHG emissions: Trends to 2050 – Reference scenario 2013

[22] Idem. As for 2011.

[23] Ecofys (2014) , Energieabhängigkeit von Russland durch Energie-effizienz reduzieren http://www.ecofys.com/files/files/ecofys-2014-energieabhaengigkeit-durch-effizienz-reduzieren.pdfn

24 European Commission (2014) Communication on Energy Efficiency. http://ec.europa.eu/energy/efficiency/events/doc/2014_eec_communication_adopted.pdf and European Commission (2014) Energy Efficiency Impact Assessment http://ec.europa.eu/energy/efficiency/events/doc/2014_eec_ia_adopted_part1.pdf

Table 2. Targets needed to deliver full cost-effective energy savings in 2030

	Desirable 2030 target to deliver full cost-effective potential	
PRIMES baseline used	**Final energy target**	**Primary energy target**
2007	36%	49%
2009	42%	54%
2013	45%	62%

The Commission's Communication contains significant ambiguity: as Table 1 showed previously, depending on how the text is interpreted the 30% target is indeed ambitious – or not. For example, interpreted as a 30% final energy savings target by 2030 compared to 1990 energy use, it would be ambitious because it equals most of the 502 Mtoe final (or 714 Mtoe primary) cost effective energy savings available in the EU. But interpreted as a 30% primary energy saving target based on the 2007 baseline year it is not – since it ignores almost 40% of the EU's cost effective energy saving potential[25]. Unfortunately it appears the Commission's proposal is based on the second, less ambitious, interpretation.

The Commission's own impact assessment shows that the difference between choosing a 30% and a 40% energy saving target (even if based on 2007 projections) are very significant in terms of missed opportunities. For example, by introducing a final energy saving target of 40% in 2030 the EU could reduce EU gas imports by at least 42% to 2030. In contrast, the 30% target proposed by the Commission would deliver only a 25% reduction of gas imports and increase the costs of fossil fuels imports by 28% compared to a target level of 40%[26]. Similarly, due to the local nature of jobs related to energy efficiency investment and the industrial and technological leadership the EU companies still have in terms of energy efficient and low-carbon technology, a low target misses key opportunities to deliver growth and jobs in the EU. According to the Commission's own analysis a 30% target would increase EU GDP by 1%; but a 40% target would increase EU GDP by 4.5% GDP in 2030 (or around €457 billion). Sectoral employment in the construction sector in particular would increase 20% if a 40% target is adopted – compared to a meagre 4% increase if a 30% target is adopted[27].

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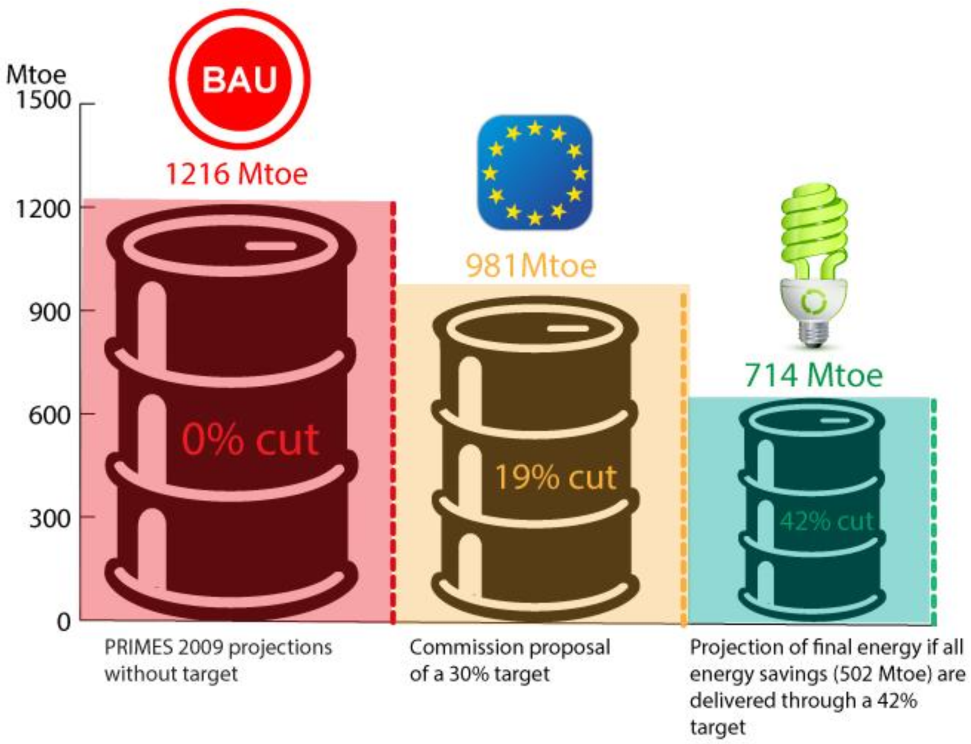
25 See Annex 3
26 See Annex 4 and European Commission (2014), Communication: Impact Assessment for the Energy Efficiency Review
27 Idem

As Member States consider their positions on the 2030 package ahead of the European Council, the security crisis in Ukraine deepens and significant concerns about the economic health and worsening social conditions of the Eurozone continue. Against this backdrop, an increase in European-wide ambitions on energy efficiency has clear merits as it is the only long-term structural response to these dual threats to European security and prosperity.

The first step should be for the Council to inject some common sense into the decision-making process by clarifying exactly how the energy saving target will be defined. We recommend as a first choice moving from using the PRIMES projections as a baseline to calculate the targets to using a fixed historic baseline of 1990 final energy use and select a target of 30%. This would bring the metrics in line with those used for GHG targets and avoid future ambiguity on what targets will deliver. As a second best option - more in line with the entrenched tradition - we recommend using the 2009 PRIMES projections as a baseline year[28] and select a target of 40% final energy target (or at least 50% primary energy saving target) to deliver the full cost-effective energy saving potential. As such, see Figure 3 for a visual of what this target means compares to BAU energy projections and the Commission's proposals.

Figure 3. Impact of different energy efficiency targets mapped against PRIMES 2009 projection of EU final energy demand to 2030



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28 The rationale is that this baseline is a more accurate reflection of current energy use in the economy; it is also consistent with the set of projections used by Fraunhofer to assess the technical potential for energy savings in Europe.

Q8. Isn't this too expensive to deliver the full cost-effective potential?

At the moment there are no estimates available to assess the level of investment expenditures needed to realise the identified final cost-effective energy savings potential in Europe. **The Commission warned in its Communication of a "hefty increase in overall system costs" if the target level is raised higher than that currently proposed. But this is not only a very narrow view that doesn't factor in the energy cost savings resulting from this investment, and largely ignores wider macroeconomic, security, geopolitical, social and environmental considerations. The assessment is also flawed because it is unpinned by a set of assumptions that does not reflect experience in the real world, ignoring for example the technology cost reductions that will inevitably result from the scale up of energy efficiency measures[29] or the overall lowering of system costs resulting from demand side technologies being substituted for more expensive supply side options. There are other issues with the discount rates applied in the analysis which do not reflect the current and future state of energy efficiency developments and lead to an over-estimation of the costs of delivery that could be as large as €280 billion.[30]**

This failure to factor in wider systems savings is a particular concern given the ongoing poor economic performance of the EU (and Eurozone in particular) and the massive infrastructure investment needed over the coming decades. **Continuing to prioritise supply side over demand side options repeats the mistakes of the past which have failed to incentivise demand and supply side investment equally, driving up energy costs while failing to address security concerns and pushing more EU citizens into energy poverty. The political implications of this cannot be underestimated – and there is a need now to focus not just on costs but on the benefits of making Europe as energy efficient as possible in 2030.**

If Member States work together to raise ambition on energy efficiency there are huge broader net economic and political gains to be made. Analysis by Fraunhofer shows that if all the cost effective savings are implemented by 2030 (equalling a ~40% final energy target using the PRIMES 2009 baseline), each European citizen will save on average €500 in annual energy costs. The wider overall benefits by sector are shown in Figure 4.

As Figure 4 shows, offsetting investment costs, energy cost savings amount to €275 billion by 2030 (€116 bn in transport, €75 bn in buildings, €44 bn in industry and €40 bn in services).

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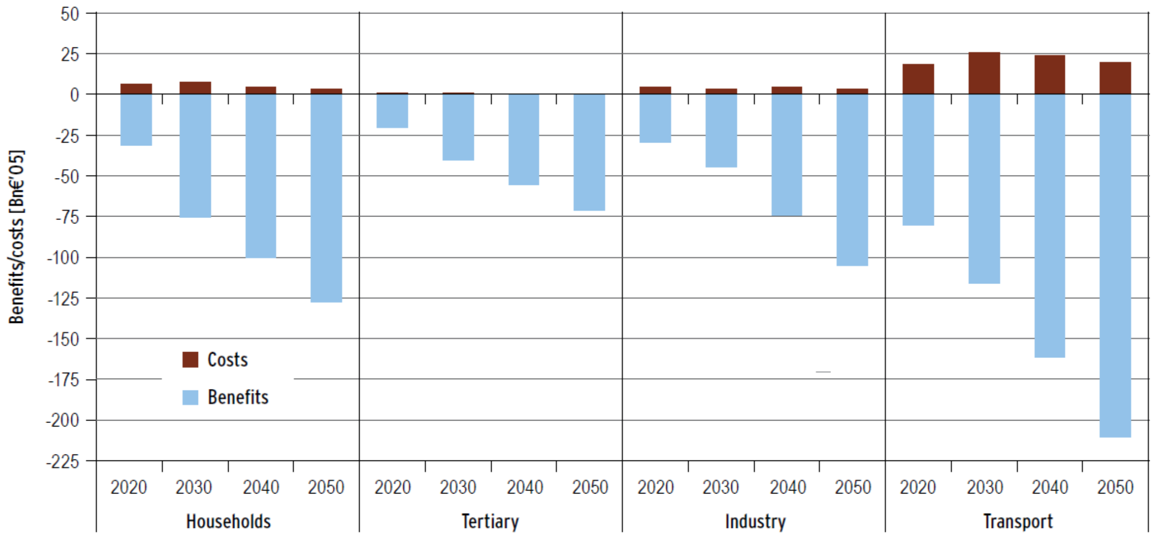
29 As an example the costs of superefficient LED lights have fallen 98% during 2001-2011.

30 See analysis by the Coalition for Energy Savings (2014) Inflating the costs of energy efficiency. The Commission analysis of total system costs is misleading because of a fundamental flaw in the financial assessment of energy efficiency measures. In order to calculate the costs of capital needed to carry out efficiency improvements, the Commission's Impact Assessment assumes static (i.e. not changing over time) and overly high discount rates, especially for the building sector. This does not reflect the current and future state of energy efficiency developments. Latest analysis available shows that applying dynamic and lower discount rates (i.e. rates that change over time as progress and innovation are made) lead to radically different results. Delivering a target of 30% energy savings assuming real discount rates would produce no extra costs for the EU compared to business as usual. As such, a target level of 40% assuming real discount rates would cost €280 billion less than the Commission's proposed 30% target which uses unrealistic discount rates.

The Commission's latest analysis states that a target level of 40% would increase costs by 27% compared to a 30% target - but this ignores the fact that the higher the target, the higher too are the security and macroeconomic benefits achieved[31]. At the end of the day the size of the target is a simple choice about how we spend our money in the EU – on power generation and fossil fuel imports or on investment at home to reduce energy use and create jobs.

Figure 4. Aggregated sectoral net energy cost savings from cost-effective (blue) and additional investment costs for near-economic (red) efficiency measures



Source: Fraunhofer ISI

Concerns about Member States' differing records on energy efficiency, ability to afford the investment needed to deliver cost savings and energy security exposure can be addressed through targets that incorporate burden sharing and through financing agreements. Countries with the highest energy intensity and the highest share of energy-intensive industries are the Central and Eastern European countries[32]. At the same time, they are the most dependent on natural gas imports from Russia, as imports cover all or almost all their energy needs.[33] This means that they have the largest untapped potential for energy savings and would benefit most from decreased import dependency. In return for undertaking targets to improve their energy security record – thereby benefitting all of Europe – financial support will need to be offered.

31 European Commission (2014) Energy Efficiency Impact Assessment
http://ec.europa.eu/energy/efficiency/events/doc/2014_eec_ia_adopted_part1.pdf
32 Idem
33 Idem

Q9. Will a higher energy efficiency target mean a higher greenhouse gas target?

The Commission's analysis indicates an efficiency target of 25-40% against a PRIMES 2007 baseline would deliver between 40-44% of GHGs reduction by 2030[34]. If, as we argue above, the more appropriate PRIMES 2009 is used as baseline, a 40% efficiency target would deliver between 49% and 61% GHGs reductions compared to 1990, with the exact level depending on economic growth and the share of renewables in the energy mix[35]. The impacts of increasingly frequent extreme weather events, and their threat to European prosperity, are becoming more visible in Europe now. Just this year unprecedented flooding has ranged from the UK through Italy and Germany out to the Balkans. Costs are largely localised but addressing extreme weather caused by climate change will require global action[36]. **Targeting a higher level of GHG reduction through a 40% efficiency goal would restore the EU's credibility as a climate diplomacy leader and could act as a game-changer in terms of the EU's ability to influence a positive and ambitious outcome in the UNFCCC climate negotiations in Paris in 2015.**

Q10. But won't this cause the carbon price to crash?

No. 70% of the 502 Mtoe of possible cost-effective energy savings are in non-ETS-traded sectors, of which 187 Mtoe in building and 156 Mtoe in transport[37]. Focusing the target on reductions in the buildings and transport sectors and on SMEs (non-traded sectors) will avoid any impact on the carbon price. However, given competitiveness concerns, it will also be desirable to focus on industry – which is regulated and traded under the ETS. However, the proposed Market Stability Reserve will be specifically designed to mitigate any effect on the carbon price. This automated mechanism will remove allowances from the system when there is oversupply and put them back into the system in the event of under supply, rather like a central bank regulates the money supply.

Q11. Are binding targets really needed?

Improving European security and competitiveness has a collective benefit for all Member States that will require a collective response to deliver. For example, gas wasted in inefficient factories and heating draughty homes in one Member State has a direct impact

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34 See Annex 4

35 Fraunhofer ISI (2013), Analysis of a European Reference Target System for 2030 http://energycoalition.eu/sites/default/files/Fraunhofer%20ISI_ReferenceTargetSystemReport.pdf

36 http://blogs.lse.ac.uk/lsee/2014/05/19/devastating-floods-in-bosnia-and-serbia-call-for-implementation-of-eu-supported-extreme-weather-adaptation-policies-in-the-region/ and http://www.newstatesman.com/staggers/2014/06/counting-1bn-cost-winter-floods

37 German Environment Ministry/Fraunhofer ISI (2012), Policy Report: Contribution of Energy Efficiency Measures to Climate Protection within the European Union until 2050 http://www.isi.fraunhofer.de/isi-wAssets/docs/e/de/publikationen/BMU_Policy_Paper_20121022.pdf

on access to secure gas supplies in other Member States. Yet, as noted earlier, progress on energy efficiency – driven by non-binding 2020 targets - is patchy and in recent weeks the European Commission has taken out infraction proceedings on 24 or 28 Member States for failure to transpose the 2012 Energy Efficiency Directive into law. Off the record, many Member State officials have complained about the complexity of the Directive which perhaps explains the poor collective record on transposition. Shifting to a target-based system is the simplest way to drive forward collective momentum to reduce energy use across the EU.

Targets are also important for businesses investing in the energy efficiency goods and services supply chain as they signal the potential size of the market. This is important when considering whether to invest in a skilled workforce and in factories. Targets also help signal ambition on climate action globally. December 2015 is the deadline for a new global climate deal with legal force and ambition. The EU needs to provide an ambitious offer through demonstrated actions in order to catalyse the shift in country stances on climate action to the point where the global community can avoid dangerous climate change.

Q12. How should the Council move things forward?

An ambiguous 30% target is not enough. The Council should be require clarity to be injected into the discussion through use of a more sensible baseline year and a target that will deliver the majority of the cost effective energy savings potential to 2030. As such a 2009 baseline and a 40% final energy saving target is recommended as both pragmatic and ambitious.

The 40% target should be binding ideally at Member State level but otherwise at EU level to create credibility with the business and investment community that the right frameworks to create investment opportunities will be delivered politically[38]. These targets will then need to be combined with a systematic programme of reforms to remove the multiple market, economic, financial and institutional barriers that prevent companies and consumers from investing in energy efficiency measures.

The European Council should request the Commission to drive this agenda forward by bringing forward a new energy efficiency framework in 2015 that includes a range of supporting legislative proposals aiming to unlocking these systemic barriers including but not limited to the following proposals:

> **Economic reforms** – On the grounds that the energy security threat is exceptional, grant a temporary exemption from State Aid rules for energy efficiency investments undertaken over the next 3 years. Commit to review the State Aid General Block Exemption Regulation and permanently increase energy efficiency exemptions to 100%

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38 Euroactiv (2014), Time to make energy efficiency core to Europe's security http://www.euractiv.com/energy/time-energy-efficiency-core-euro-analysis-534235?utm_source=Energydesk+Daily+Email&utm_campaign=f5184bdd68-Energydesk_Dispatch5_9_2013&utm_medium=email&utm_term=0_ad1a620334-f5184bdd68-118150149

of eligible energy efficiency costs (matching exemptions to those for infrastructure and renewable). Energy efficiency funds should be redefined under State Aid rules as economically-sound entities pursuing a goal of economic viability and cost recovery rather than profit making.

> **Using conditionality over access to European funding for shared energy infrastructure to drive prioritisation of investment in energy efficiency** – Creating new conditionality around access to funding through the Connecting Europe Facility by requiring Member States to develop plans to identify and submit financing plans to deliver all cost-effective energy savings in their economy to 2020 before access to European funding for other more expensive energy security options will be granted[39].

> **Enhanced access to financing** – €1 billion to be allocated from the European Commission budget to an Energy Security Fund to be held by the European Investment Bank (EIB) and topped up, from 2015, by annual European Budget underspend. This should be used by the EIB to support development, financing and delivery of those energy efficiency plans in the most vulnerable Member States. The EIB should provide top up financing worth €1 billion in the first instance. All energy efficiency projects should be permitted to access up to 75% co-financing via European funds/EIB financing.

> **Energy Efficiency Directive Review -** Directing the European Commission to consider the role of structural reforms in addressing systemic barriers to energy efficiency, including delivering single demand side electricity and goods and services markets.

> **Review of options for delivering a single demand side market for efficient goods, services and buildings** - European Commission to undertake a comprehensive review of the remaining barriers to an internal market for energy efficient goods, services and buildings– including reviewing the standardisation of energy performance ratings and how energy performance data is accessed and used in Europe, and a commitment to bring forward legislative proposals by June 2015 to achieve further harmonisation if required.

> **Commitment to have demand side markets for electricity established by 2018** – with the European Commission due to start work on this issue from June 2015 as part of the Internal Energy Market Reforms.

> **Review of options for accelerating demand in the EU energy efficiency market** - European Commission to publish a Communication on options – focusing on a range of measures including tightening provisions in existing legislation (for example, increasing renovations), new institutional capacity and use of additional regulation – by the end of 2014.

> **Review of the Eco-design Directive** – European Commission to undertake a further review of options to include more dynamic standards in the Directive that move beyond products toward system-wide energy savings.

> **Proposal for binding national schemes for delivery of 2020 targets** – European Commission to explore options for placing Member State Governments under

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39 E3G (2014), Energy Security and the Connecting Europe Facility

commitment to deliver the 2020 target for energy savings – for example, Member State governments to come forward with binding schemes to deliver the 2020 target – to form part of a ‘pledge and review ’ process. Once National Plans have been agreed between the Commission and Member State they then become binding.

ANNEX 1

What is possible?

The easiest way to understand the numbers is to start by looking at the feasible and cost effective potential in terms of European energy savings. The most detailed and credible assessment of this potential was undertaken by Germany's Fraunhofer Institute[40]. It indicates that a final energy saving potential of 502 Mtoe is possible by 2030[41]. This consists of 37% energy saving in buildings (187 Mtoe), 31% in transport (156 Mtoe), 17.5% in industry (88 Mtoe) and services 14.5% (71 Mtoe). See Annex 3 for more details of how these potential savings are calculated.

Figure A1 shows what happens when you 'map' this absolute energy saving potential (the 502 Mtoe, shown as the red line) onto the energy saving targets implied by the different baseline projections produced by the PRIMES model in 2007 (i.e. before the EU economy collapsed)[42].

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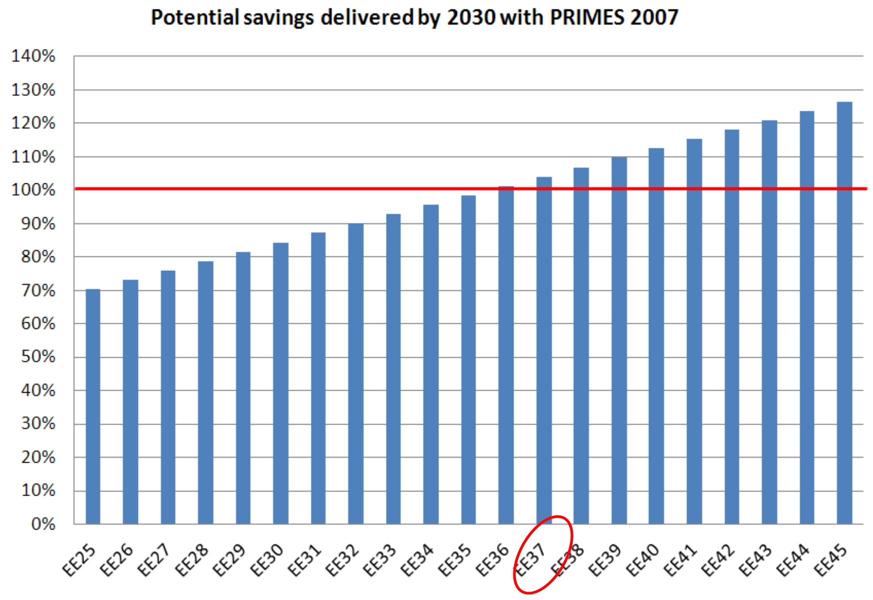
40 The assessment takes a conservative approach to assessing the potentials by considering: The investment cycles follow normal, historical patterns and drivers, and only commercially available technologies are applied; The cost effectiveness of each type of intervention, e.g. the replacement of equipment and materials with more efficient commercially available alternatives, new industrial processes or building refurbishment; The removal of key market and non-economic barriers, e.g. lack of information and access to financing. Of the 502 Mtoe of potential described as cost effective, 390 Mtoe pay back the cost of investment in a few years. The remaining 112 Mtoe is technical potential of at or near market technologies that are cost effective compared to supply side options and will also fall in price as technology deployment is scaled up. As the global population keeps growing, expected to rise by an extra 1 billion by 2030, and the desire for better living standards across emerging economies increases, fossil fuels price will likely reach new record highs while efficiency technologies will benefit from economies of scale driven by new and bigger markets.

41 German Environment Ministry/Fraunhofer ISI (2012), Policy Report: Contribution of Energy Efficiency Measures to Climate Protection within the European Union until 2050 http://www.isi.fraunhofer.de/isi-wAssets/docs/e/de/publikationen/BMU_Policy_Paper_20121022.pdf

42 Note that in the Figures A1-A3 the primary energy savings numbers are converted into final energy saving numbers to enable comparison between what is optimal in terms of cost effective energy savings in EU and what the Commission is proposing.

Figure A1. "Least accurate scenario": potential for final energy savings in the EU (the red line) mapped onto the Commission's 2007 PRIMES projections. Using 2007 as a baseline year implies a 36% 2030 final energy saving target is needed to deliver an energy efficient Europe.



Does it make a difference if it is final or primary energy use?

Yes. Measuring energy saving in final/end use terms rather than primary energy/energy inputs is preferable because it makes it easier to distinguish energy savings that result from increased efficiency in the building, transport, industry and service sectors (which are driven by energy efficiency policies and energy prices) from those resulting from these policies but also improvements in the process of converting energy inputs into electricity due to shifts to a more efficient renewables based energy system (which are driven by restructuring of the energy sector).

Choosing to define the target is terms of final or primary energy use also affects the final number selected. In absolute terms, achieving the full cost effective potential of 502 Mtoe final energy savings translates to primary energy savings of 608 Mtoe or 916 Mtoe[43] and so the percentage target will also need to be higher for a primary energy saving target compared to a final one.

In our view the approach taken by Fraunhofer (which measures energy savings in final/end use terms) is preferable to that taken by the Commission (which uses primary energy/energy inputs). This is because it makes it easier to untangle and quantify the effects of energy efficiency policies and energy price rises on EU energy use from efficient savings resulting

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43 As an aside, if you include the 308 Mtoe of conversion savings that Fraunhofer predicts can be achieved by 2030 through a shift to a highly-efficient, mainly renewable-based energy mix, the numbers are even higher – at 916 Mtoe by 2030.

from restructuring of the energy sector. One conclusion to draw from this is that it is more pragmatic to define the 2030 energy savings target in terms of final rather than primary energy use.

In terms of projections – what happens to targets if different baseline years are used?

The Commission has based its proposed target for energy efficiency not on delivering absolute energy savings from a fixed baseline (as calculated for GHG reductions for example), but on a theoretical percentage cut of future primary energy use as calculated back in 2007 by a group of economists running the PRIMES model. We refer to this as the "least accurate scenario" for energy use for reasons outlined further below.

As noted in the main Q&A the Commission has not yet explicitly stated whether its proposed target is based on primary or final energy savings. However, given that the calculation is based on the PRIMES 2007 figures, which are all in relation to future primary energy use, it seems logical to assume that it is intended to be a primary energy saving target based on PRIMES 2007.

Using the Commission's methodology to calculate the target level needed to deliver all primary energy savings potential (916 Mtoe), a 49% target would be required for 2030. If instead a final energy target is used, achieving savings of 502 Mtoe would translate to a 36% final energy saving target for 2030. This corresponds to a 17% reduction in final energy consumption compared to the energy used in 1990[44]. See Figure A1.

PRIMES 2007 predictions are described as the "least accurate scenario" because they do not include the impact of the economic recession and of the latest EU policy measures. They also rely on overly optimistic assumptions about future EU economic growth and future fossil fuel prices, assume high and static discount rates that distort the assessment of real costs of new technology and ignore dynamic aspects of energy efficiency potentials – such as the 98% reduction in LED lighting costs between 2001-2011[45]. As a consequence the real energy consumption in 2030 is likely to be significantly lower than that projected by the 2007 baseline being used by PRIMES[46]. Supporting this point, in 2013, real GDP turned out at the end of the year to be 3% lower than that used in the PRIMES 2013 projections[47]. This means that if the target for 2030 is set using the "least accurate scenario" 2007 baseline, it will fail

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44 See the Efficiency Charts in Annex 2 and Annex 3
45 See Peter, L. & Wright, M (2012) 'LED lighting market to grow while LED component market goes flat', LEDs Magazine, March cited in http://www.theclimategroup.org/_assets/files/LED_report_web1(3).pdf
46 The Commission's forecasts, updated in 2009 and 2013, show much lower final energy consumption for 2030 (16% and 26% respectively). See European Commission (2010), EU energy trends to 2030: Update 2009 and European Commission (2013), EU energy, transport, and GHG emissions: Trends to 2050 – Reference scenario 2013
47 European Commission (2014), Communication: Impact Assessment for the Energy Efficiency Review

to see the full potential for cost-effective energy savings unlocked because much of the energy savings will be delivered as a result of structural changes to the EU economy resulting from the recession – not from renewed and lasting measures to reduce energy use.

In recognition of this, the energy savings potential calculated by Frauhofer ISI was based on PRIMES 2009, i.e. adjusted projections of EU growth and energy usage that take into account changes in both energy efficiency policy and energy price developments between 2007-2009.

A more appropriate approach would be to base an energy savings target on the baseline produced in 2009, when the financial crisis had started to fully affect the EU28 economy. This is referred to as the "moderately accurate scenario". Even better would be to use the baseline produced in 2013 - referred to this as the "most accurate scenario". If a PRIMES 2009 baseline projection is used, to achieve final energy savings of 502 Mtoe, a 2030 target of 41% is needed (54% in primary energy terms) – see Figure A2. This corresponds to a 34% reduction of final energy consumption against 1990. If a PRIMES 2013 baseline is used, to achieve final energy savings of 502 Mtoe, a target of 45% is needed in 2030 – see Figure A3 (62% in primary energy terms). This corresponds to a 43% of absolute energy saving compared to 1990 levels.

Figure A2. "Moderately accurate scenario": Potential for final energy savings in the EU (the red line) mapped onto the Commission's 2009 PRIMES projections. Using 2009 as a baseline year implies a 41% final energy saving 2030 target is needed to deliver an energy efficient Europe.

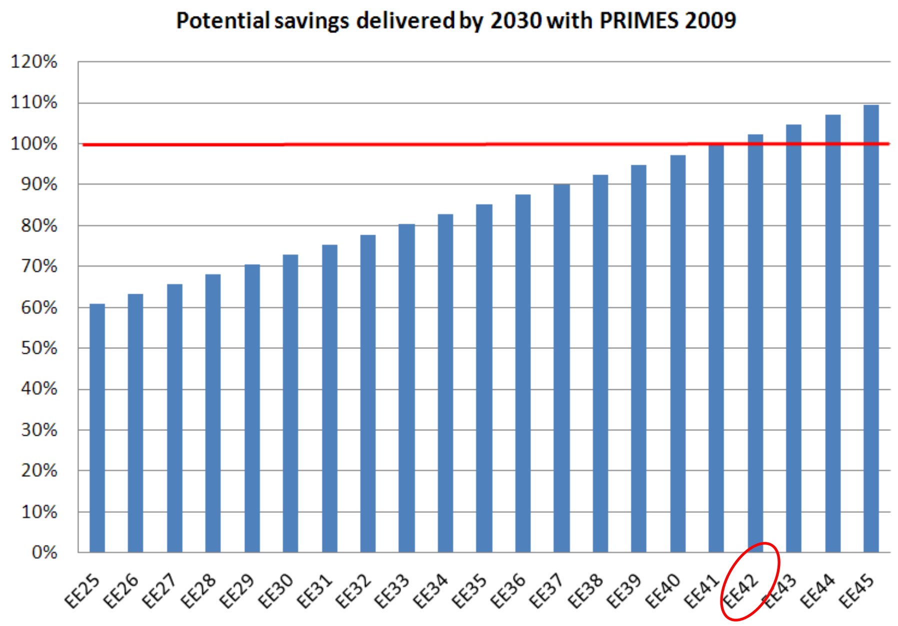
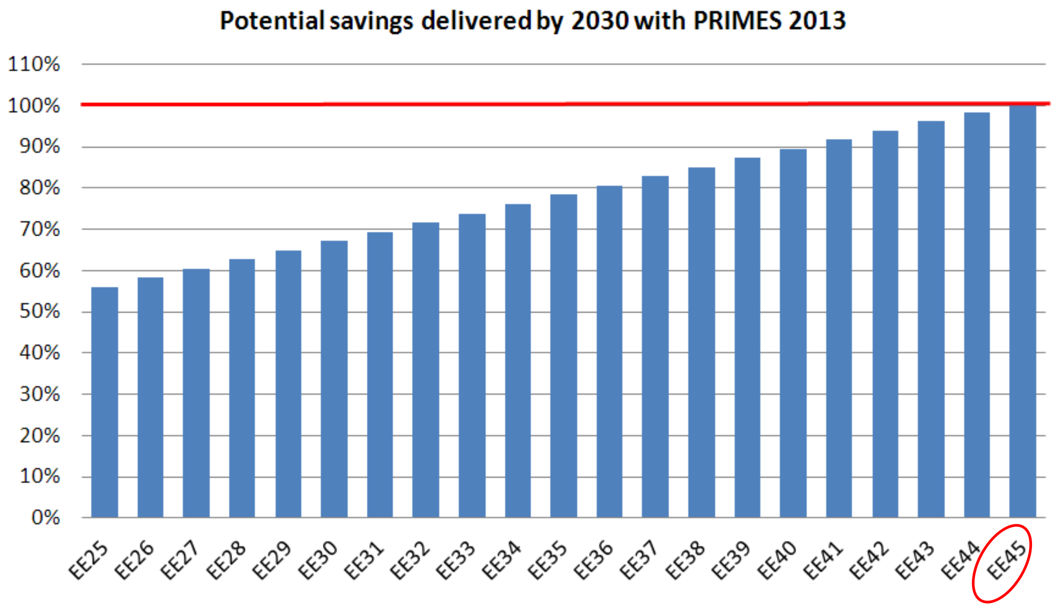


Figure A3. "Most accurate scenario": Potential for final energy savings in the EU (the red line) mapped onto the Commission's 2013 PRIMES projections. Using 2013 as a baseline year implies a 45% final energy saving target is needed to deliver an energy efficient Europe.



ANNEX 2

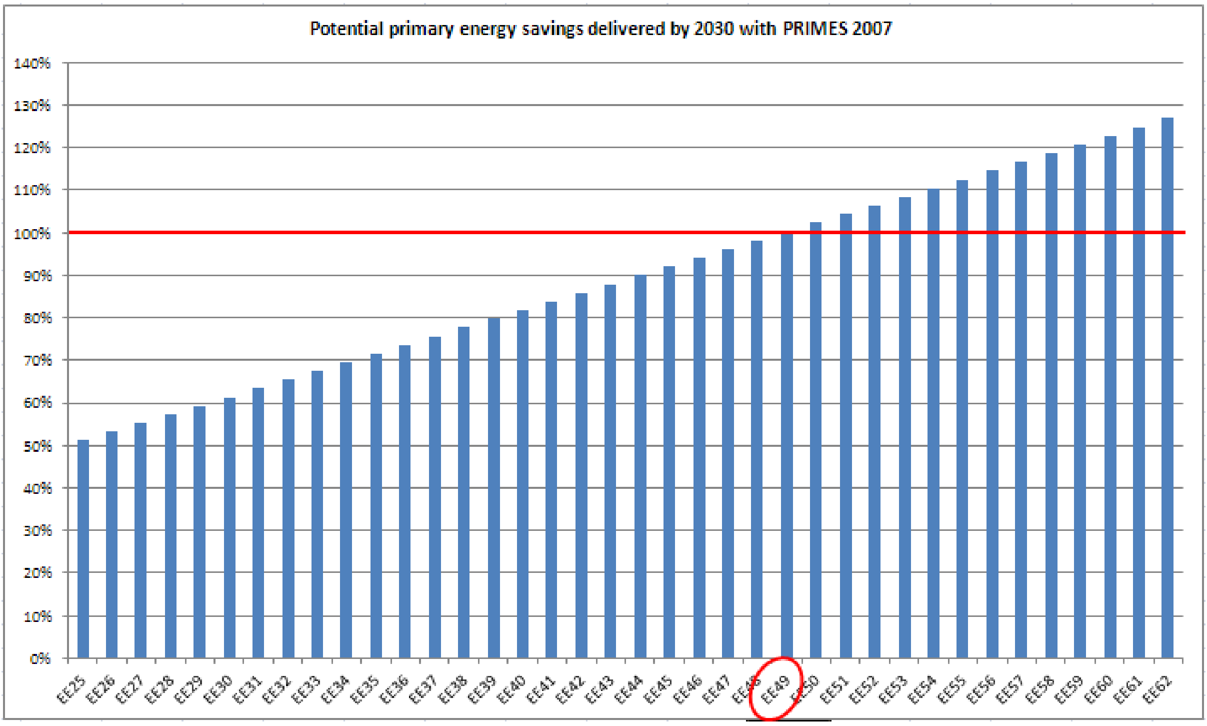
The Energy Efficiency Translation Chart showing the impact of different targets on final energy savings delivered by 2030 compared to 1990 and compared to existing potentials depending on which future is used.

Energy Efficiency (EE) Target Level By 2030 in %	PRIMES 2007		PRIMES 2009		PRIMES 2013	
	Final energy savings delivered compared to 1990	Final energy savings delivered compared to potentials by 2030 (502 Mtoe)	Final energy savings delivered compared to 1990	Final energy savings delivered compared to potentials by 2030 (502 Mtoe)	Final energy savings delivered compared to 1990	Final energy savings delivered compared to potentials by 2030 (502 Mtoe)
EE**25**	0%	70%	16%	61%	22%	56%
EE**26**	4%	73%	17%	63%	23%	58%
EE**27**	5%	76%	18%	65%	24%	60%
EE**28**	6%	78%	19%	68%	25%	62%
EE**29**	8%	81%	20%	70%	26%	65%
EE**30**	9%	84%	21%	73%	28%	67%
EE**31**	10%	87%	22%	75%	29%	69%
EE**32**	11%	90%	23%	78%	30%	71%
EE**33**	13%	92%	25%	80%	31%	74%
EE**34**	14%	95%	26%	82%	32%	76%
EE**35**	15%	98%	27%	85%	33%	78%
EE**36**	17%	101%	28%	87%	34%	80%
EE**37**	18%	104%	29%	90%	35%	82%
EE**38**	19%	106%	30%	92%	36%	85%
EE**39**	21%	109%	31%	94%	37%	87%
EE**40**	22%	112%	32%	97%	38%	89%
EE**41**	23%	115%	34%	99%	39%	91%
EE**42**	24%	118%	35%	102%	40%	94%
EE**43**	26%	120%	36%	104%	41%	96%
EE**44**	27%	123%	37%	107%	42%	98%
EE**45**	28%	126%	38%	109%	43%	100%

ANNEX 3

The Energy Efficiency Translation Chart showing the impact of different targets on primary energy savings delivered by 2030 compared to existing potentials depending on which future is used. See also primary energy savings mapping against PRIMES 2007 projections and optimal target level (49%) identified to deliver all cost effective potentials.

Energy Efficiency (EE) Target Level By 2030 in %	2007 Primary energy savings delivered compared to potentials by 2030 (916 Mtoe)	2009 Primary energy savings delivered compared to potentials by 2030 (916 Mtoe)	2013 Primary energy savings delivered compared to potentials by 2030 (916 Mtoe)
EE25	51%	46%	40%
EE26	53%	48%	42%
EE27	55%	50%	44%
EE28	57%	52%	45%
EE29	59%	53%	47%
EE30	61%	55%	19%
EE31	63%	57%	19%
EE32	65%	59%	20%
EE33	68%	61%	20%
EE34	70%	63%	21%
EE35	72%	64%	57%
EE36	74%	66%	58%
EE37	76%	68%	60%
EE38	78%	70%	61%
EE39	80%	72%	63%
EE40	82%	74%	25%
EE41	84%	76%	25%
EE42	86%	77%	26%
EE43	88%	79%	27%
EE44	90%	81%	27%
EE45	92%	83%	73%
EE46	94%	85%	74%
EE47	96%	87%	76%
EE48	98%	88%	78%
EE49	100%	90%	79%
EE50	102%	92%	81%
EE51	104%	94%	83%
EE52	106%	96%	32%
EE53	108%	98%	33%
EE54	110%	100%	33%
EE55	113%	101%	34%
EE56	115%	103%	35%
EE57	117%	105%	92%
EE58	119%	107%	94%
EE59	121%	109%	95%
EE60	123%	111%	97%
EE61	125%	112%	99%
EE62	127%	114%	100%


Potential primary energy savings delivered by 2030 with PRIMES 2007
140%
130%
120%
110%
100%
90%
80%
70%
60%
50%
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30%
20%
10%
0%
EE25
EE26
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ANNEX 4

Impact of different targets level (based on PRIMES 2007) on the EU economy. Data is from the European Commission Impact Assessment for Energy Efficiency Directive.

Selected indicators	**EE25-27**	**EE28**	**EE30-32**	**EE35-36**	**EE40**
Gas import reductions *(compared to 2010)*	9%	16%	22%	33%	40%
Fossil fuels import bill savings *(cumulative 2011-2030, bn € '10)*	285	311	395	503	549
Investment expenditures *(annual 2011-2030, bn € '10)*	851	868	886	905	1,147
➔ Industry	29	30	34	45	49
➔ Residential	45	54	73	115	190
GDP	0.5%	0.8%	1.0%	2.0%	4.5%
Sectoral impacts ***(EU28 output)***					
➔ Construction	1%	4%	8%	18%	42%
➔ Engineering and transport equipment	1%	2%	3%	6%	15%
➔ Basic manufacturing	1%	1%	1%	3%	8%
➔ Communications, publishing and television	1%	1%	1%	2%	5%
Sectoral employment					
➔ Construction	1%	2%	4%	9%	20%
➔ Engineering and transport equipment	1%	1%	1%	2%	4%
➔ Basic manufacturing	0.3%	0.3%	0.5%	1%	2.0%
➔ Communications, publishing and television	0.2%	0.3%	0.4%	0.6%	1%
GHG	40.1%	40.2%	40.1%	41.1%	43.9%