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Ex-post evaluation of Europe's 2020 energy savings target: providing lessons for the fit-for-55 package

"the vital role of the target definition in the evaluation of a target"

Robert Harmsen, EEE2020, Paris, 28-30 Sept. 2022

euobserver

NEWS / HEADLINE NEWS

ANALYSIS

Why is EU off track for 2020 energy efficiency target?

By ELENA SÁNCHEZ NICOLÁS

BRUSSELS, 11. FEB 2020, 07:06

11 Feb 2020

26 Oct 2020

NEWS

EU achieves 20-20-20 climate targets, 55 % emissions cut by 2030 reachable with more efforts and policies

The European Union (EU) achieved its three main climate and energy targets by 2020, according to a new European Environment Agency (EEA) assessment, published today. The 2030 target of a 55 % reduction in net greenhouse gas emissions can be reached if additional efforts are made and new policies are adopted and implemented.

Published 26 Oct 2021 — Last modified 26 Oct 2021 — 3 min read — Photo: © Andreas Gücklhorn on Unsplash

The EEA report 'Trends and Projections in Europe 2021' estimates that the **EU achieved its three 2020 climate and energy targets** of reducing greenhouse gas emissions by 20% compared to 1990 levels, increasing the share of renewable energy use to 20%, and improving energy efficiency by 20 %.

Achieving a **20 % reduction in energy consumption** seemed unlikely for many years, but the widespread lockdowns in 2020, due to COVID-19, appear to have pushed EU's primary and final energy consumption below target levels, by 5 % and 3 % margins,

2006 *Energy Efficiency Action Plan*
Key message: 20% extra savings by 2020 = possible

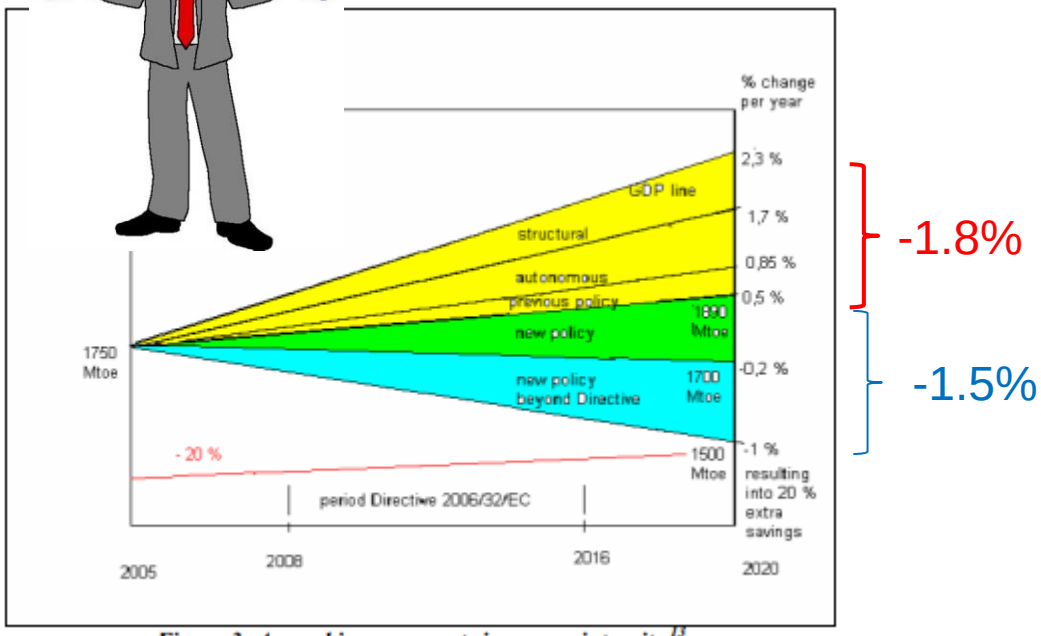


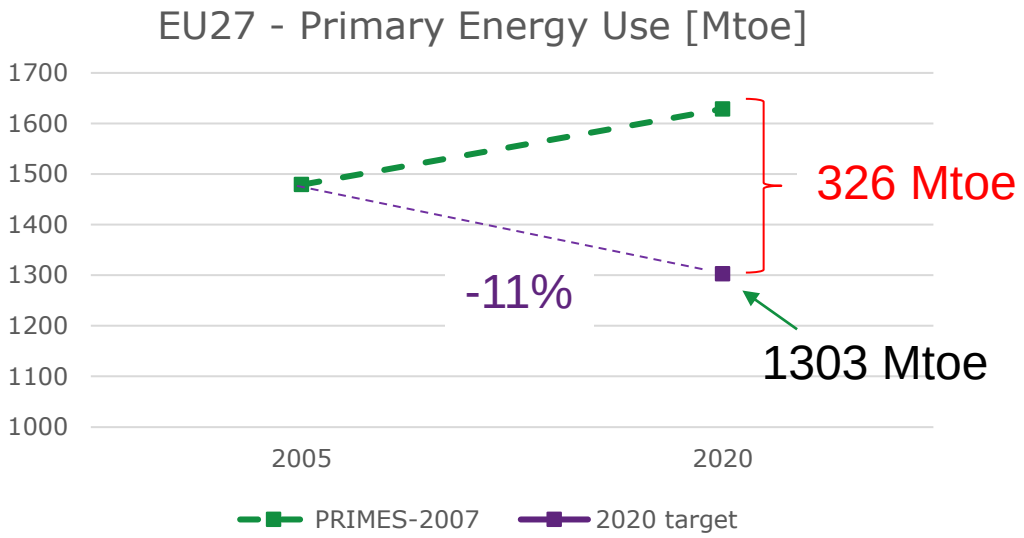
Figure 3: Annual improvements in energy intensity [13]

Action Plan for Energy Efficiency: Realising the Potential (EC, 2006)

The key for understanding the graph:

- Without EE improvement: 2.3 % annual growth of energy (GDP line)
- Because of structure change, autonomous EE and existing (<2006) policies, "only" 0.5% annual growth (aggregate effect of -1.8% annually)
- New policies lead to -0.7 - 0.8 = -1.5% reduction of energy use per year
- $1-(1-0.015)^{15}$ = 20% savings
- $1750 * (1.005)^{15} * (0.985)^{15}$ = 1500

Definition of the 2020 energy savings target: 20% reduction of primary energy use relative to the 2020 projection of PRIMES-2007



How to interpret:

- NOT: a fixed policy effort of 326 Mtoe (i.e., independent from the actual energy use in 2020)
- BUT: a primary energy consumption cap of 1303 Mtoe
- OR: 11% primary energy savings compared to 2005

What lens to use when ex-post evaluating the contribution of policies to the savings target?

- Approach 1: Analyzing what happened in the period 2005-2020
- Approach 2: Analyzing the difference between the 2020 projection (PRIMES-2007) and the actual 2020 data (statistics)
- Important question: Would the choice between approach 1 or 2 alter the conclusions of the evaluation?
- General decomposition identity for both approaches:

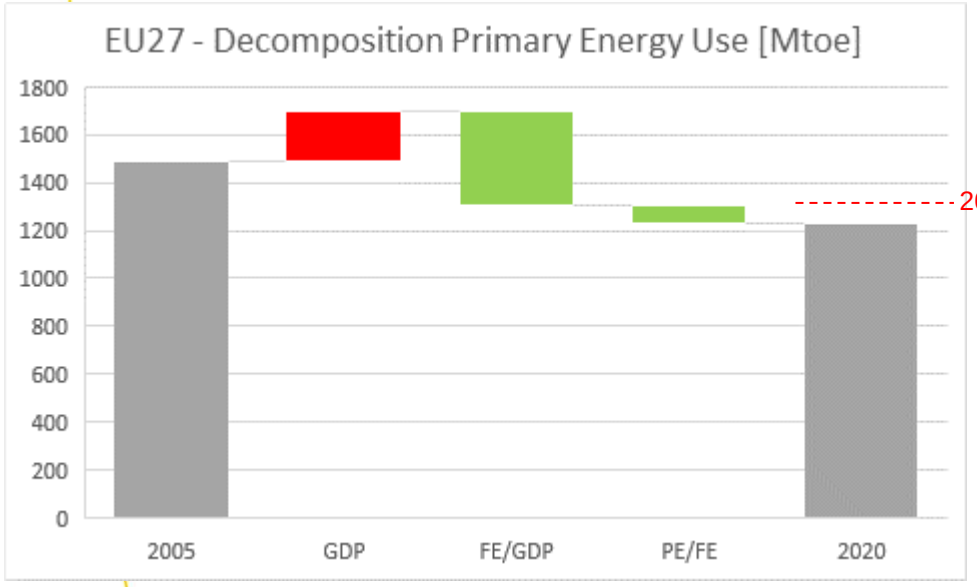
$$PE = GDP \times \frac{FE}{GDP} \times \frac{PE}{FE}$$

PE = primary energy use
GDP = Gross Domestic Product
FE = final energy use

This presentation:

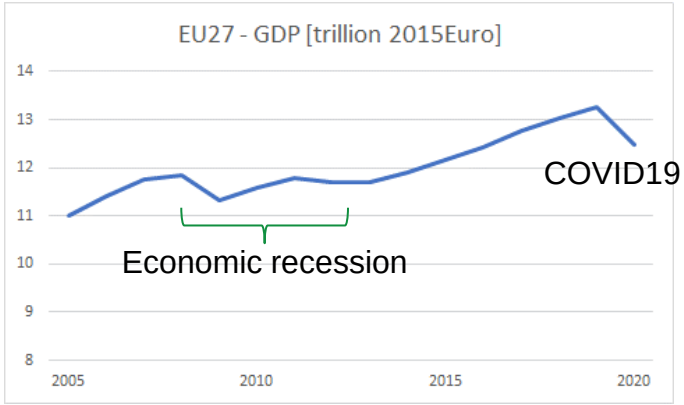
- EU economy-wide analysis only
- See my paper for the analyses of Power & Heat, Industry, Services and Residential

Economy-wide: Approach 1 – analyzing ΔPE 2005-2020



Data source: Eurostat

- Growth of GDP led to an increase of energy use
- However, a decrease of energy intensity (FE/GDP) and improvement of the economy-wide efficiency (PE/FE) compensated this *(~policy impact)*
- Overall: energy use decreased and the 2020 target was overachieved.
- The policy contribution seems significant!



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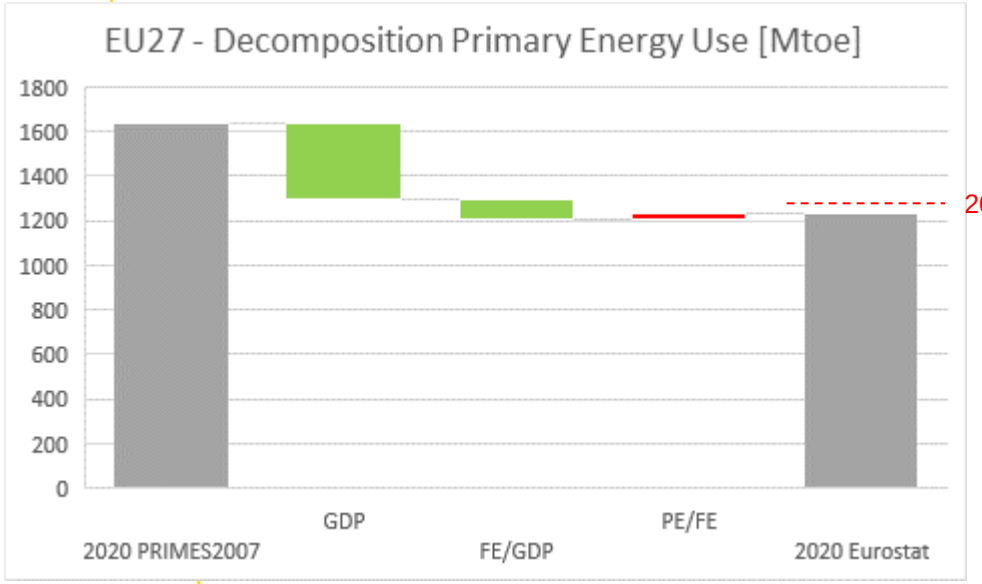
Economy-wide: Approach 2:

comparing the PRIMES-2007 2020 projection and the actual energy use in 2020 (Eurostat)



- Lower growth of GDP (compared to PRIMES-2007) led to lower energy use
- Actual 2020 energy intensity (FE/GDP) is somewhat lower than projected in PRIMES-2007 (*impact of additional policies*)
- Efficiency effect (PE/FE) leads to a small increase of energy use (i.e., *actual* improvement of efficiency did not go as fast as projected in PRIMES-2007??)
- Target still overachieved
- But the policy impact seems very small

What explains the difference in policy impact between approach 1 & 2?

- Approach 1 neglects the PRIMES-2007 projection in its assessment. The policy impact is, therefore:
  - The impact of existing and new policies together (and also including autonomous efficiency improvement)
  - *It does not inform the European Commission about the success (or failure) of the >2006 EE policies!*

- Approach 2 acknowledges that a lot of EE policies are already embedded in the 2007 projection. This means that:
  - The targeted 20% savings are on top of the existing policies embedded in projection
  - *The analysis excludes the impact of <2006 policies*
  - *But where is the impact of the >2006 policies?*

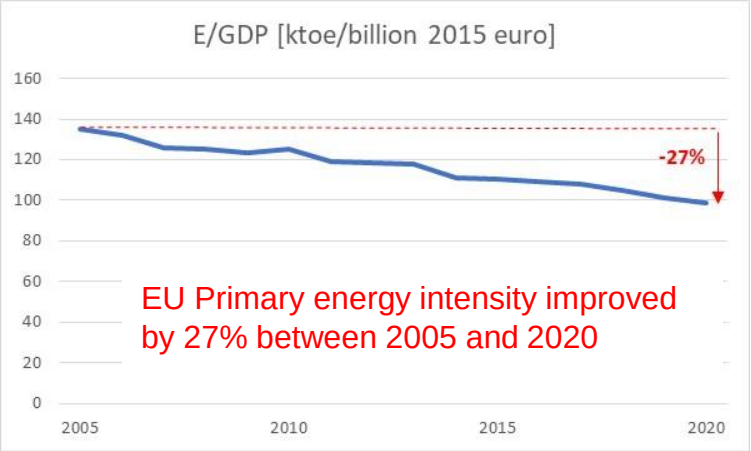
EE policies (or policies with EE relevance) in PRIMES-2007	**Additional** EE policies (or policies with EE relevance) that had an impact on 2020 energy use
SAVE Directive (1993)	Eco-Design Framework Directive (2005)
Building Directive (2002)	+ 29 Eco-Design Implementing Measures
Labelling Directive – household appliances (1992)	End-use Energy Efficiency and Energy Services Directive (2006)
Energy Star Program – office equipment (2003)	Energy Efficiency Directive (2012)
Directives on energy efficiency for boilers, refrigerators and ballasts for fluorescent lighting	Energy Performance of Buildings Directive (2010)
ETS Directive (2003/2004, €20/ton in Kyoto period)	Energy Labelling Directive (2010)
IPPC Directive (1996) / Large Combustion Plant Directive (2001)	IPPC Directive (2008) / Industrial Emissions Directive (2012)
CHP Directive (2004)	ETS Directive (2008/2009)
Energy Taxation Directive (2003)	Effort Sharing Decision (2009)
ACEA/KAMA/JAMA Agreement (1998/99)	Cohesion Policy – ERDF, ESF and Cohesion Fund
Car Labelling Directive (1999)	Regulation on CO_2 from cars (2009) and vans (2011)
	Labelling of Tyres Regulation (2011)
	Directive on the Promotion of Clean and Energy Efficient Road Transport Vehicles (in public procurement) (2009)
	Directive establishing a single European railway area (Recast, 2010)
	IMO Resolution Inclusion of regulations on energy efficiency for ships
	Directive on Alternative Fuels Infrastructure (2014)

Conclusions

- Approach 2 is the valid method to evaluate the target
- The 2020 target was mainly achieved due to lower GDP growth, rather than a successful EE policy package
- COVID only does not explain the lower GDP growth; it is also the remaining impact of the 2008-2012 recession!
- This does not mean that newly implemented EE policy instruments did **not** have a significant impact
- However, their impact is not visible in the results because of "lost" energy savings (savings in PRIMES-2007 that did not materialize) and other effects
- Choosing an already rich EE policy baseline (in this case: PRIMES-2007) as reference for target setting imposes all kinds of complexities in the policy impact evaluation of the target
- The European Commission has not learned from it: the 2030 energy efficiency target is defined as a % savings of the 2030 projection of PRIMES-2020

For discussion (lessons for 2030 targets and beyond)

- Europe already has a GHG reduction target (headline target) defined as a cap and being prone to fluctuations in the economy
- Is an energy consumption cap (fossil + RES) most adequate to support such headline target?
- Or would an intensity target (e.g., E/GDP) not be more supportive as it keeps focus on efficiency and structure change, also during times of economic downturn?



If the 2020 target was defined as an intensity target (with the same outcome as the original target), energy intensity should have improved by 44% =>
Target would not have been achieved