EVALUATING THE CURRENT EU ENERGY EFFICIENCY POLICY FRAMEWORK AND ITS IMPACT UNTIL 2020 AND 2030

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Outline

- Background: the EU energy and climate policy targets and the study underlying this presentation
- Methodology: Modelling approach and scenario definitions
- Results with respect to the 2020 and 2030 energy efficiency targets
- Challenges and Conclusions

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The EU energy and climate policy targets for 2020 and 2030

EU 2020 target system

- Reduction in GHG emissions by **20%** compared to 1990
- Increase in share of renewables in total EU gross final energy consumption to **20%**
- Reduction of primary energy consumption by **20%** compared to a trend (PRIMES 2007) ⇨ Art. 3 EED: primary energy in 2020 should not exceed1474 Mtoe and final energy 1078 Mtoe (EU-27)

EU 2030 policy framework

- Reduction in GHG emissions by at least **30%** compared to 1990
- Increase in share of renewables to at least **27%**
- Reduction of primary energy consumption by at least **27%** compared to the same trend projection as for 2020.

Achievement of the 2020 energy efficiency target

Evaluation of energy efficiency potentials in the frame of a (possible) 2030 target system

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Underlying project: *"Study evaluating the current energy efficiency policy framework in the EU and providing orientation on policy options for realising the cost-effective energy-efficiency/saving potential until 2020 and beyond"*

Study on behalf of the European Commission / DG ENE

I. Achievement of 2020 energy efficiency (EE) target

Three methods:

- **Bottom-up investigation of EE measures** based on Art. 7 notification and NEEAPs
- **Decomposition analysis** of statistical development 2008-2012 and projection to 2020
- **Bottom-up modelling of EU-wide and national policy measures** in 4 scenarios

II. Energy efficiency potentials for 2030

Method:

- **Bottom-up modelling of EU-wide and national potentials** in the extension of the 4 measure-based baseline scenarios + 3 potentials scenarios

Bottom-up modelling approach: calculation of 3 potential scenarios

- The **INVERT/EE-Lab model** (run by TU Vienna in cooperation with Fraunhofer ISI) for residential and non-residential buildings
- The **FORECAST platform** (run by Fraunhofer ISI), including an industrial model as well as the electricity uses in the residential and service sector
- The **ASTRA model** (run by Fraunhofer ISI) providing potentials for the transport sector

Scenario	Explanation
Low policy intensity (LPI)	Barriers and high discount rates (sector and partially country specific) persisting.
High policy intensity (HPI)	Low discount rates and barriers (partially or totally) removed. The discount rates are sector specific.
Near economic (NE)	Potentials which are not economic but scenario induces costs not much higher than present level energy consumption entails.

Analysis of potentials

⇨ relative to a reference development close to PRIMES 2013 [*Base_inclEA scenario*]

⇨ compared to 2008

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Main data sources for the analysis

Statistical data (models gauged to statistical data and detailed indicators)

- Eurostat + National statistics
- Odyssee-MURE project
- Data from associations
- Data from specific surveys (e.g. tertiary sector in Germany)

Technical data

- Sectoral and branch-specific technical literature, technical information from awards,…
- Results of specific EU projects, for example ENTRANZE for buildings
- Electricity projections for several electricity suppliers
- Large number of implementation projects, e.g.:
  - Learning Networks for Energy Efficiency (700 companies)
  - Benchmarking for compressed air

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Results with respect to the 2020 gap

	Distance to primary energy target in 2020		Distance to final energy target in 2020	
	Mtoe	**%**	**Mtoe**	**%**
PRIMES 2007 projections for 2020 on which the 20% target was derived	1842	20%	1348	20%
EED target (EU27)	1474	-	1078	-
PRIMES 2013 projections	1534	3.3	1130	3.9
Bottom-up policy analysis (with "perfect" national implementation of EED)	1432	-2.3 (target overreached)	1057	-1.6 (target overreached)
Bottom-up policy analysis (with implementation gaps)	1474	0.0 (target reached)	1086	0.6
Decomposition analysis (three variants)	1504 - 1533	1.6 – 3.2	1108 - 1129	2.2 – 3.8
Modelling analysis (Reference scenario Base_inclEA)	1504	1.7	1108	2.3

The gap to the 2020 target ranges from a maximum of 3.3% in primary energy terms to a minimum of -2.3% if all bottom-up measures identified are appropriately implemented. The respective range for final energy is between + 3.9% and -1.6%.
The modelling analysis confirms these results (gap of 1.7 / 2.3% for primary / final energy).

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Final energy savings by sector in the LPI/ HPI/NE scenarios (EU27) for 2030

% compared to
Primes 2007 Baseline: **38%**
Primes 2013 Baseline: **22%**

Potentials in 2030 compared to BASE_InclEA scenario	[Mtoe]			[%]		
	LPI	HPI	NE	LPI	HPI	NE
All final demand sectors	**103**	**194**	**221**	**9.6%**	**18.2%**	**20.6%**
Residential sector	23	73	79	8.3%	25.9%	28.1%
Tertiary sector	25	47	50	13.9%	25.9%	27.7%
Transport sector	28	41	46	9.2%	13.4%	14.9%
Industry sector	26	33	46	9.5%	12.2%	16.8%
Potentials in 2030 compared to 2008	[Mtoe]			[%]		
	LPI	HPI	NE	LPI	HPI	NE
All final demand sectors	**201**	**293**	**319**	**17.2%**	**25.0%**	**27.3%**
Residential sector	52	101	107	16.7%	32.7%	34.7%
Tertiary sector	34	56	59	17.9%	29.4%	31.1%
Transport sector	80	93	97	22.1%	25.7%	27.0%
Industry sector	36	43	56	11.6%	14.0%	18.0%

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Primary energy and GHG savings in the HPI scenario in 2030

High Policy Intensity Scenario (HPI):

- Low discount rates and barriers (partially or totally) removed
- Cost-effective for the individual investor, i.e. delivers a net financial benefits over the lifetime of the energy saving measures behind the scenario calculations

⇨ reflects an ambitious, but economically feasible development of energy efficiency in the EU

Primary (economic) saving potential in 2030	2030 potentials in terms of GHG savings compared to 1990
Compared to Primes 2013 baseline: **22 – 25%**	Assuming a RES share of 27%: **45%**
Compared to Primes 2007 baseline: **38 – 41%**	Assuming a larger RES share of 35%: **50%**
Target 2030: **27%**	Target 2030: **40%**

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The discount rate dispute…

PRIMES 2013

Discount rates (in real terms)	Standard discount rates of PRIMES	Modified discount rates due to EED	
		2015	2020 - 2050
Power generation	9%	9%	9%
Industry	12%	12%	12%
Tertiary	12%	11%	10%
Public transport	8%	8%	8%
Trucks and inland navigation	12%	12%	12%
Private cars	17.5%	17.5%	17.5%
Households	17.5%	14.75%	12%

PRIMES integrates **(perceived or existing) risks** into the discount rates to a large degree. Our scenario approach essentially uses usual **capital costs, considering that there are instruments to mitigate the risks and the risk perception**

Study by Fraunhofer ISI/TU Vienna/pwc

Sector	Scenario	Discount rate
Household – space heating and hot water	All	3.1% to 3.7%
Tertiary – space heating and hot water	All	4.7% to 5.4%
Household – Appliances	Potential_2030_LPI	Typically 6% (discount rates vary between different countries, appliances)
	Potential_2030_HPI Potential_2030_NE	2% (assuming removal of barriers from 2020)
Tertiary – Appliances	Potential_2030_LPI Potential_2030_HPI Potential_2030_NE	15% 5% 5%
Industry	Potential_2030_LPI Potential_2030_HPI Potential_2030_NE	Payback up to 2 years accepted by 50% of companies; heating systems 15% Payback up to 5 years accepted by 60% of companies; heating systems 15% Companies accept longer payback periods [3] heating systems 3%
Transport	N/A	N/A

Challenges and Conclusions

- For primary energy, the gap to the **2020 target** ranges from a maximum of 3.3% to a minimum of -1.5% if all bottom-up measures are appropriately implemented.
- In our reference scenario (which misses the 2020 target by 1.7%), we assumed an ambitious implementation and further development of the key European Directives (EED, EPBD, Ecodesign, Labelling) ⇨ some policy effort is still needed to fullfil these conditions.
- Economic energy savings may reach up to 40% in 2030 in primary energy terms which by far exceeds the 27% EU **target for 2030**.
- In the HPI scenario, we assumed a removal of economic and non-economic barriers ⇨ significant policy effort is needed to remove these barriers at the EU and national level.
- In order to realize the economic potentials, substantial upfront investments are necessary despite the fact that the investments will pay largely off in the future ⇨ new financial tools apart from public financing must be used more widely in order to ensure a stable long-term financing.

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Thank you for your attention

For more information:

http://www.isi.fraunhofer.de/isi-en/x/projekte/PolicyEval_Framework_331252.php

https://ec.europa.eu/energy/en/studies?field_associated_topic_tid=45

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