COMBI
Calculating and Operationalising the Multiple Benefits of Energy Efficiency in Europe

The relevance of multiple impacts of decarbonization in policy-making and evaluation

Wuppertal Institut

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 649724.
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Project background & objectives

- Multiple benefits by EU member state & energy efficiency actions
- Common framework scenarios
- Extended Cost-Benefit analysis
- March 2015 – May 2018
- Funded by EU Horizon 2020 EE12 (GA 649724, approx 1M€)

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Partners

air pollution

Macro-economy

energy poverty/health

productivity

Resources

energy system/security

The University of Manchester

Copenhagen Economics

CE

The University of Manchester

ABUD

ADVANCED BUILDING & URBAN DESIGN

Wuppertal Institut

Universiteit Antwerpen

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COMBI project in brief:

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- Scoping
- Energy scenarios
- Quantification
- Monetization
- Cost-Benefit analysis

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Air pollution

air pollutants

health from air pollution

eco-system

Resources

material footprint

abiotic/biotic

energy/non-energy

unused extraction

Social welfare

energy poverty/health

productivity

Macro economy

employment/ GDP

public budget

Fossil fuel/ETS prices

Terms of Trade

Energy system

energy system costs

energy security

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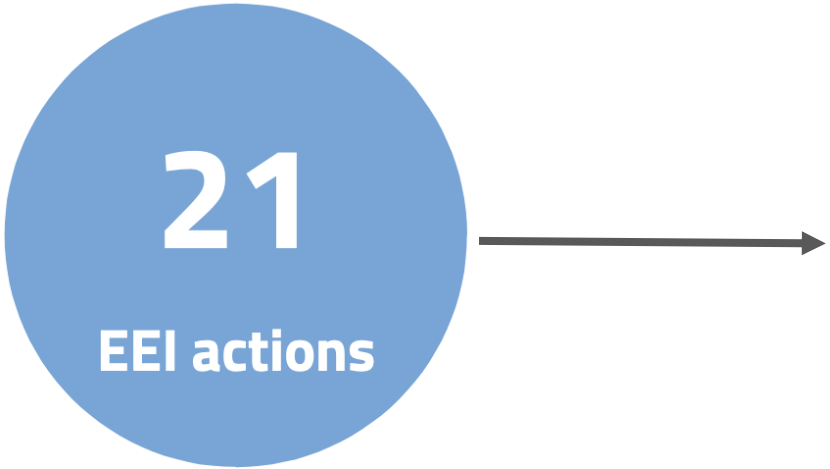

80% of EE potential in:

- Buildings
- Transport
- Industry

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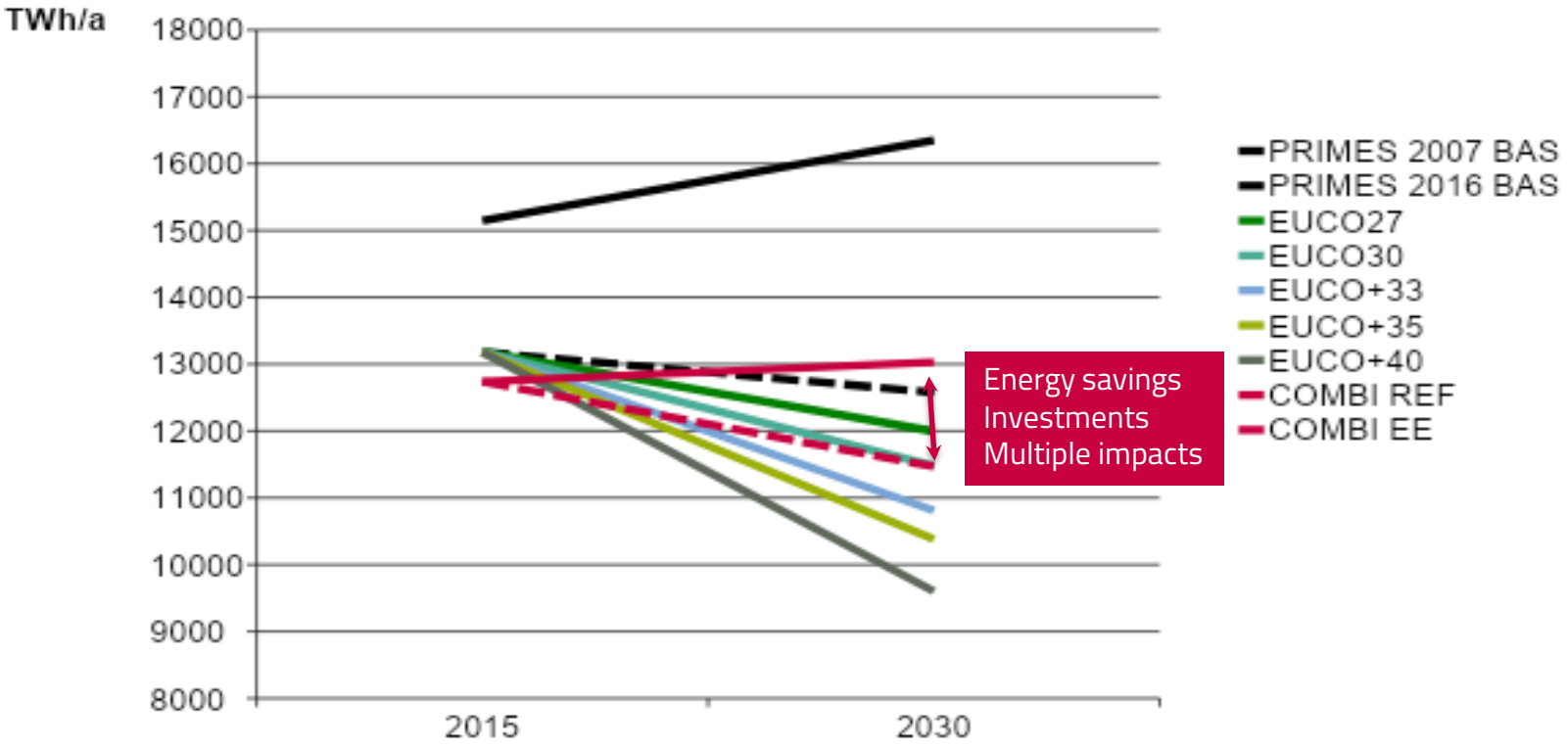
Energy scenarios

Input data



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Modelling of multiple benefits

Impact category	models
air pollution (health, eco-systems)	GAINS
resources	MIPS/ Life Cycle assessment
health (indoor air quality) productivity	Socio-economic COMBI-model
economy (short/long-term)	Input-Output CGE (CECEM)
energy system energy security	COMBI energy balance model

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COMBI key results: all EEI actions

EU-wide figures per year as of 2030

additional

Annualized investment in 2015-2030: 94.6 bn EUR/year
Energy savings: 1647 TWh/year
Avoided climate change emissions: 360–500 Mt CO_2eq/year

Air pollution	Resources	Social welfare	Economy	Energy system
>10 000 avoided premature deaths due to $PM_{2.5}$ 442 avoided premature deaths due to O_3 230 000 YOLLs of avoided life expectancy loss 300Mt avoided direct CO2eq emissions	850 Mt savings of material resources	3,000-24,000 avoided premature deaths due to indoor cold 2,700-22,300 avoided DALYs due to indoor dampness related asthma 39mn additional work days	1% rise in GDP 2.3 mn job-years +86 bn € for public budgets Decrease in fossil fuel prices (oil -1.3%; coal–2%; gas-2.9%)	Avoided generation of power from combustibles 257 TWh Improved energy security: up to 5% lower fossil fuel import costs
WP3 report	WP4 report	WP5 report	WP6 report	WP7 report

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32
impacts

- 17 monetized
- 10 included in the CBA

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COMBI key results: all EEI actions

EU-wide figures per year as of 2030

additional

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Energy savings: 1647 TWh/year
Avoided climate change emissions: 360–500 Mt CO_2eq/year

Air pollution		Social welfare	Economy	Energy system
>10 000 avoided premature deaths due to $PM_{2.5}$ (460 mn €) 442 avoided premature deaths due to O_3 (46 mn €) 230 000 YOLLs of avoided life expectancy loss (26 bn €) 300Mt avoided direct CO2eq emissions (17 bn €)	850 Mt savings of material resources	3,000-24,000 avoided premature deaths due to indoor cold (323 mn EUR-2.5 bn €) 2,700-22,300 avoided DALYs due to indoor dampness related asthma (338 mn EUR-2.9 bn €) 39mn additional work days (4.7 bn €)	1% rise in GDP (+161 bn € in GDP) 2.3 mn job-years +86 bn € for public budgets Decrease in fossil fuel prices (oil -1.3%; coal–2%; gas-2.9%)	Avoided generation of power from combustibles 257 TWh (10 bn € of avoided investment) Improved energy security: up to 5% lower fossil fuel import costs (59 bn €)
WP3 report	WP4 report	WP5 report	WP6 report	WP7 report

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COMBI - Key results

Cost-Benefit Analysis

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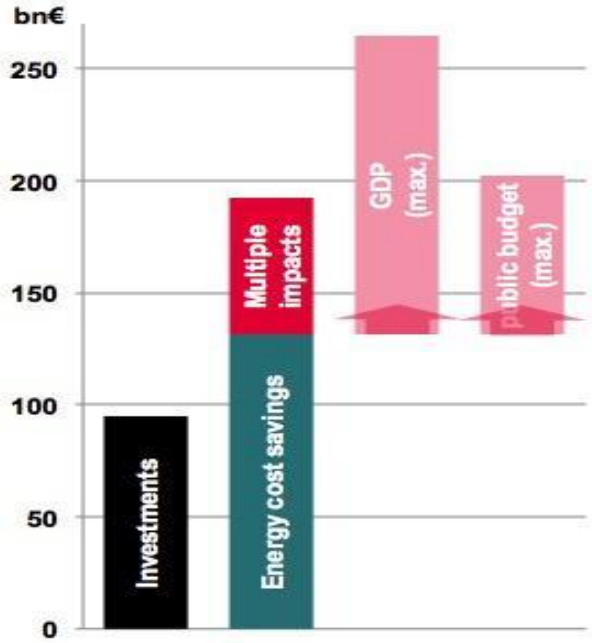
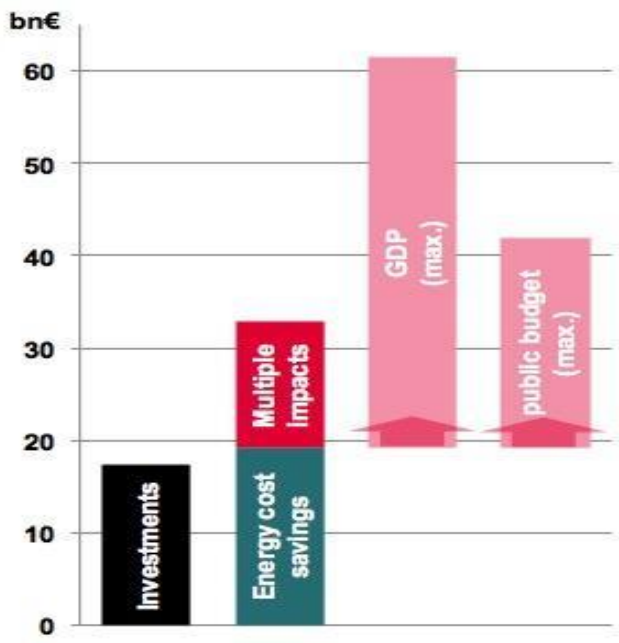
All COMBI actions a)



Residential building refurbishment



a) all EEI actions except modal shifts which cannot be included to CBA due to no availability of infrastructure investment costs and trucks due to unreliability of out-dated investment costs

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Takeaways from COMBI

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- COMBI results: https://combi-project.eu/tool/
- Inclusion of MBs in CBAs ⟶ increase in cost-effectiveness
- Policy target convergence
- Increase inter-departmental cooperation
- **Include multiple impacts in policy evaluations!**

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Next steps

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- Analysis of various EU/national scenarios
- 2050 scenarios
- Customise assessments: applicability of quantification methodologies (e.g. NECPs)
- H2020 project proposal MICAT (SC3-EC4, submitted 15 Jan 2020)

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