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15th IAEE European Conference 2017

'HEADING TOWARDS SUSTAINABLE ENERGY SYSTEMS: EVOLUTION OR REVOLUTION?'

3rd to 6th September 2017, Hofburg Congress Center, Vienna, Austria

Abstracts, Papers & Presentations available here!

The 15th IAEE European Conference takes place in Vienna, Austria, at the Hofburg Congress Center, 3rd to 6th September 2017. The main topic will be: "HEADING TOWARDS SUSTAINABLE ENERGY SYSTEMS: EVOLUTION OR REVOLUTION?".

In recent years, energy systems as well as Energy markets underwent remarkable changes, world-wide. Developments in oil, natural gas as well as electricity markets brought challenges of

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Scenarios for heating and cooling demand in the European residential sector until 2030

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Energy Economics Group

Introduction and Contents

Exemplary Model results for heating and cooling demand, focusing on

> ***total energy demand***, *specific heat demand*, *shares of end use categories* (space heating, cooling, hot water), *renewable shares* and *CO_2-emissions*

- Content

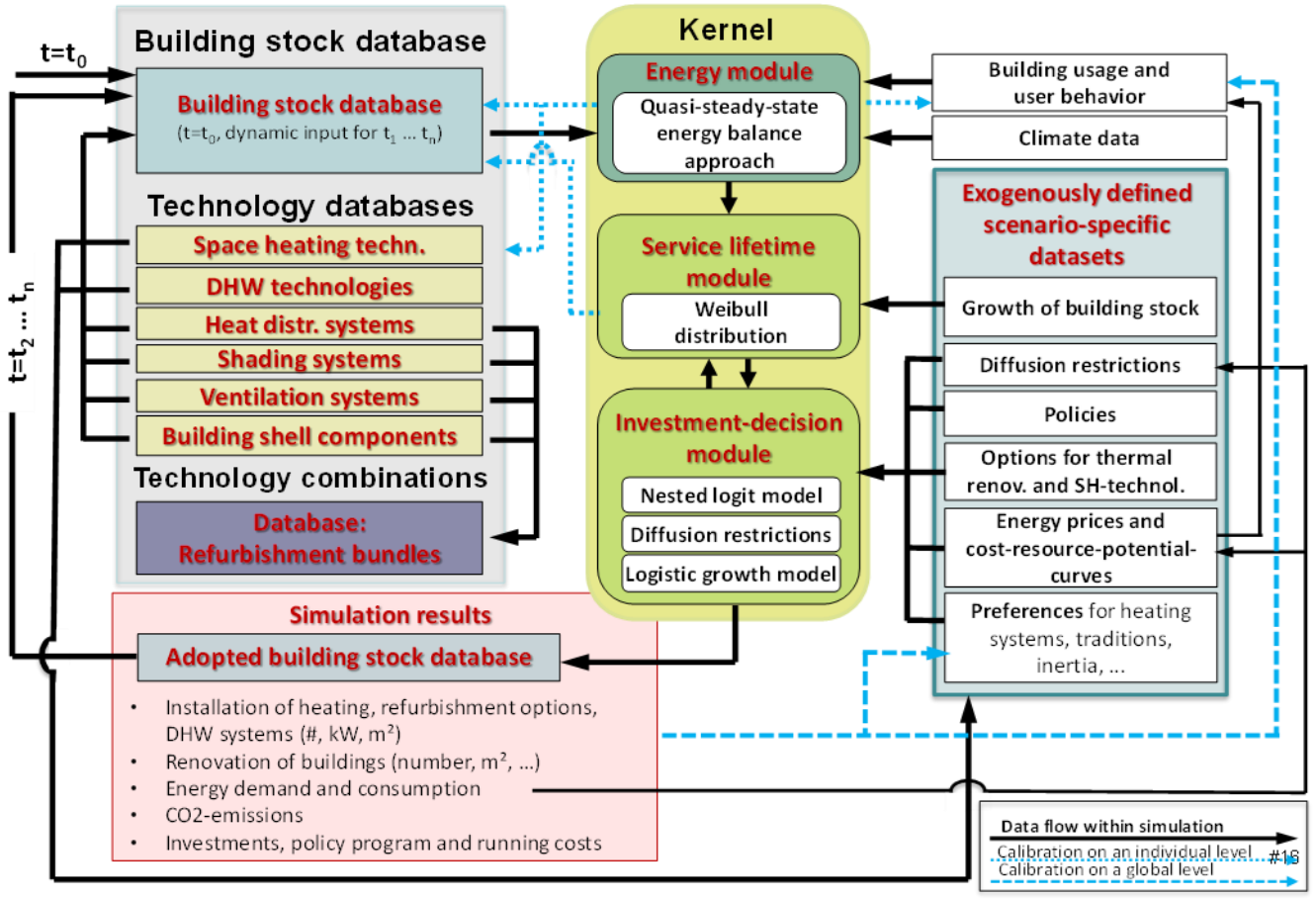
1. Introduction to building stock model **INVERT/EE-Lab**
2. **Results** for **Heating and cooling demand in the EU28 until 2030**
3. **Conclusions**

BRISKEE *Behavioural Response To Investment Risks In Energy Efficiency*, Horizon 2020 Research Project

Mapping and analyses of the current and future (2020 - 2030) heating/cooling fuel deployment (fossil/renewables), Project for the European Commission

INVERT/EE-Lab

- **Dynamic bottom-up model** that evaluates the **effects of economic and regulatory conditions** on total energy demand, energy carrier mix, CO_2-emission reduction and costs.



www.invert.at

Assumptions

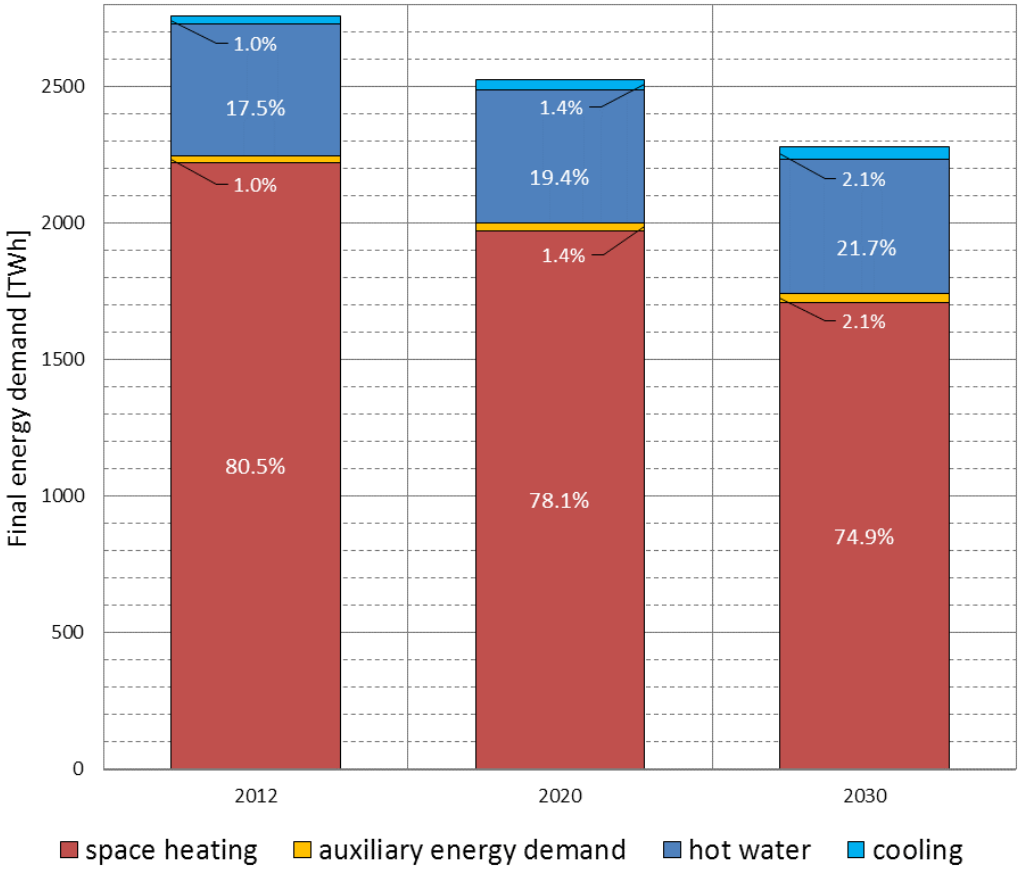
- Scenario measures
  - **Investment subsidies** for building renovation, heating supply and solar thermal systems
  - Country specific subsidy **budget restrictions**
  - **Obligations** for the installation of **renewable heating** supply systems
  - **Building codes**: improvement of technical building standards

- Current policy scenario:
  - **Decided or already implemented targets and measures** for RES-H/C and energy efficiency

  (Renewable Energy Directive, Energy Efficiency Directive, Directive on Energy Performance of buildings, Ecodesign Directive)

Results for heating & cooling scenario in the European residential sector until 2030 (1)

- Final energy demand (EU28) per end use - decreases by 17% from 2012 to 2030
- Cooling demand - expected to increase by 70%



Final energy demand [TWh]	2012	2020	2030
Space heating	2222	1973	1710
Auxiliary energy	26	28	30
Hot water	482	489	492
Cooling	28	35	47
TOTAL	2757	2524	2279

Development of average specific energy demand:

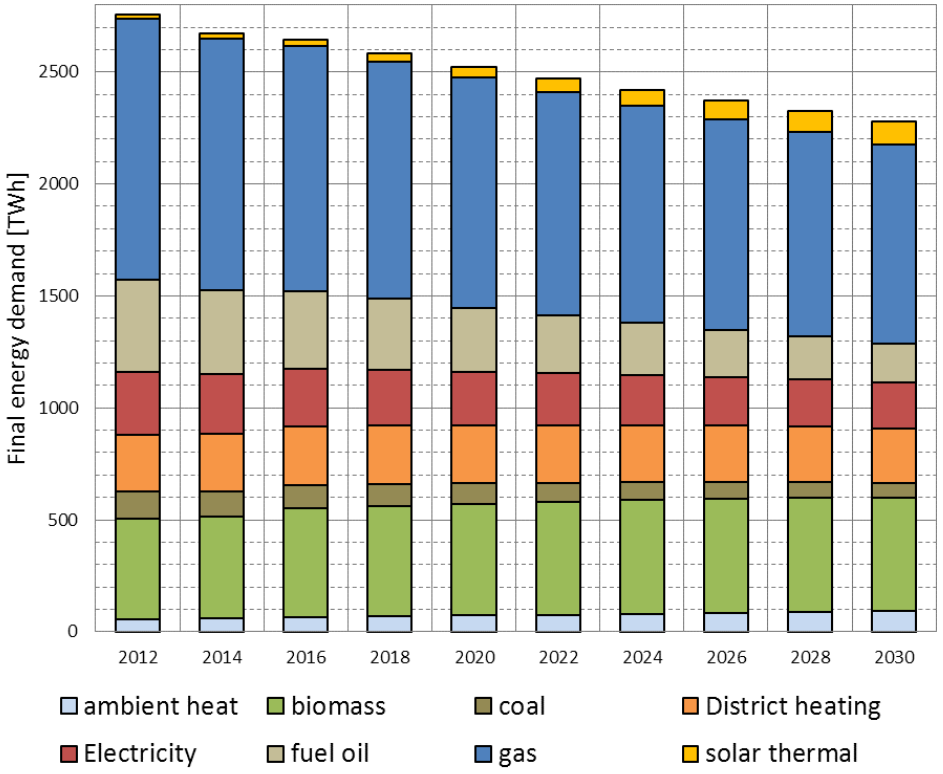
Average specific energy demand [KWh/m²]	2012	2030
SFH	180	140
MFH	100	76

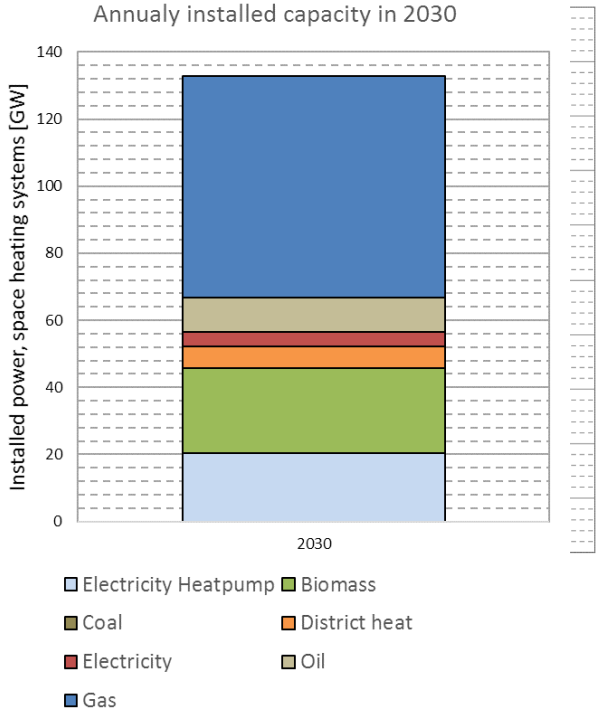
Results for heating & cooling scenario in the European residential sector until 2030 (2)

Final energy demand per energy carrier

- Share of renewables from 19% to 31%
- CO_2-emissions decline by 28%

Final energy demand [TWh]	2012	%	2030	%
ambient heat	58	2.1%	94	4.1%
biomass	450	16.3%	507	22.2%
coal	120	4.3%	65	2.9%
District heating	254	9.2%	242	10.6%
Electricity	279	10.1%	208	9.1%
fuel oil	410	14.9%	172	7.5%
gas	1170	42.4%	888	39.0%
solar thermal	17	0.6%	104	4.6%
TOTAL	2757		2279	

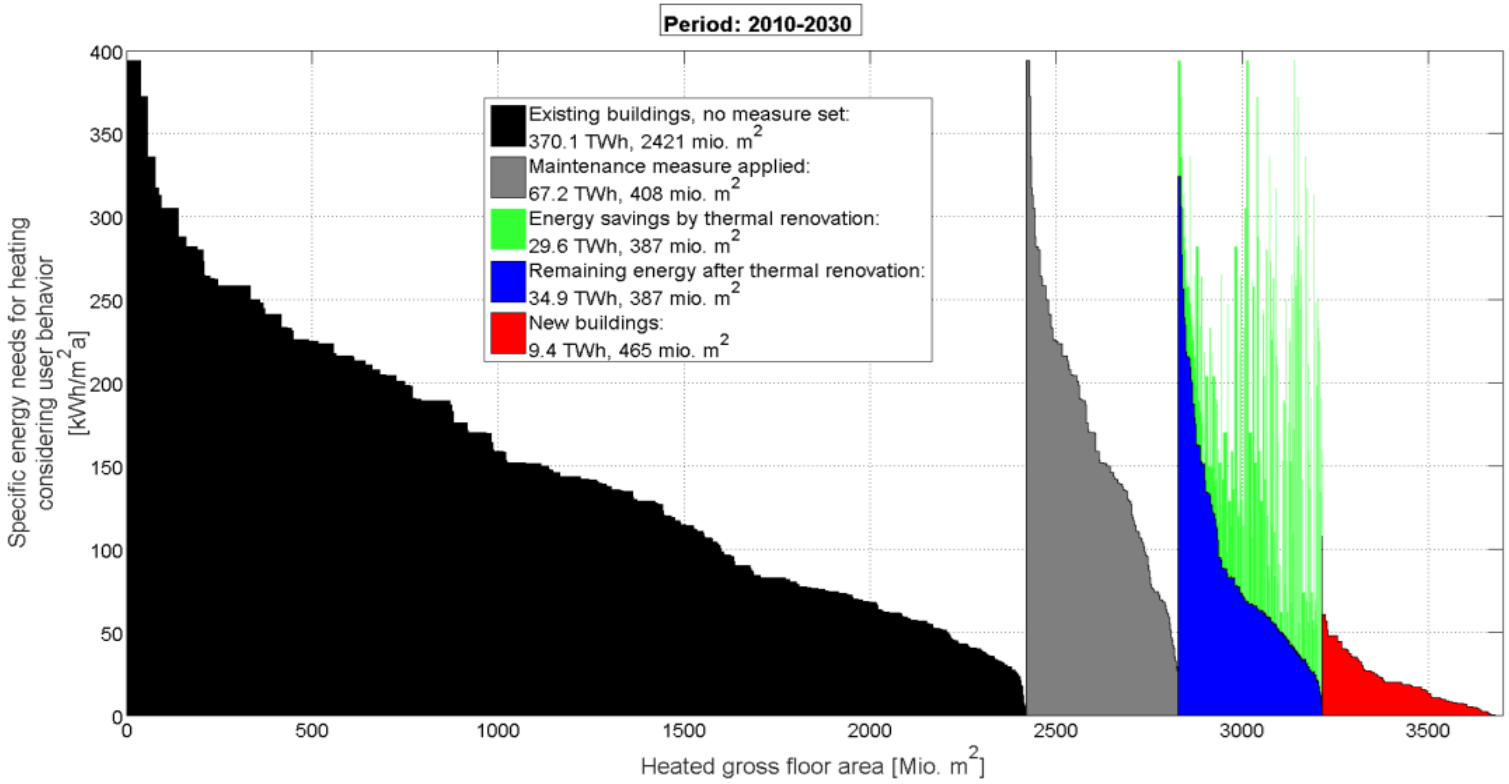




Results for heating & cooling scenario in the European residential sector until 2030 (3)

Heated gross floor area and *specific energy needs* for heating and total energy demand of building stock (existing and new buildings) for specific country

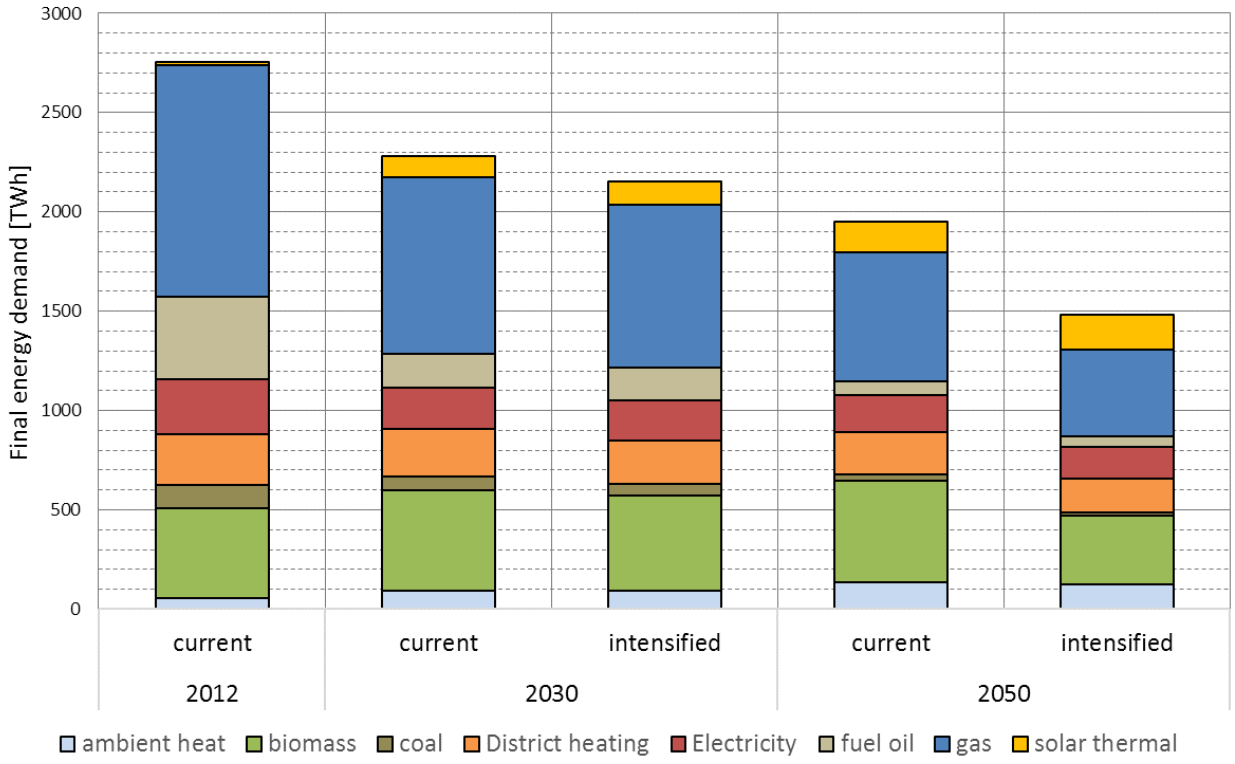
- Large share of building stock remains with no measures set



Further results:
Intensified policy measures & greater timeframe

Final energy demand for current and intensified scenario from 2012 to 2050

- Intensified Measures do not show a significant impact until 2030



Conclusions

- Heating demand in residential buildings decreases from 2012 to 2030, due to energy efficiency gains, and rising average temperatures
- Because of high inertia of heating system exchange, still high fossil share in energy carrier split (especially natural gas) in 2030
- Cooling demand is increasing, but is still expected to account for a minor share of the final energy demand only, except in southern European countries
- Split of energy usage is expected to change moderately, as a slight shift in end use categories from space heating to cooling and water heating is expected
- Considerable shift in energy carrier split from fossil to renewable energy carriers, biomass stays most important renewable energy carrier
- Under the circumstances of a current policy scenario, the Paris climate mitigation goals are unlikely to be achieved and intensified efforts seem to be necessary

Thank you for your attention!

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Orig. Photo: Patrick Stargardt

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Appendix: CO_2-Emissions from heating and cooling in residential building stock

- CO_2-Emissions are expected to decline by 28%