
SCENARIO BASED EVALUATION OF POLICIES ADDRESSING THE GERMAN HEATING AND COOLING SECTOR

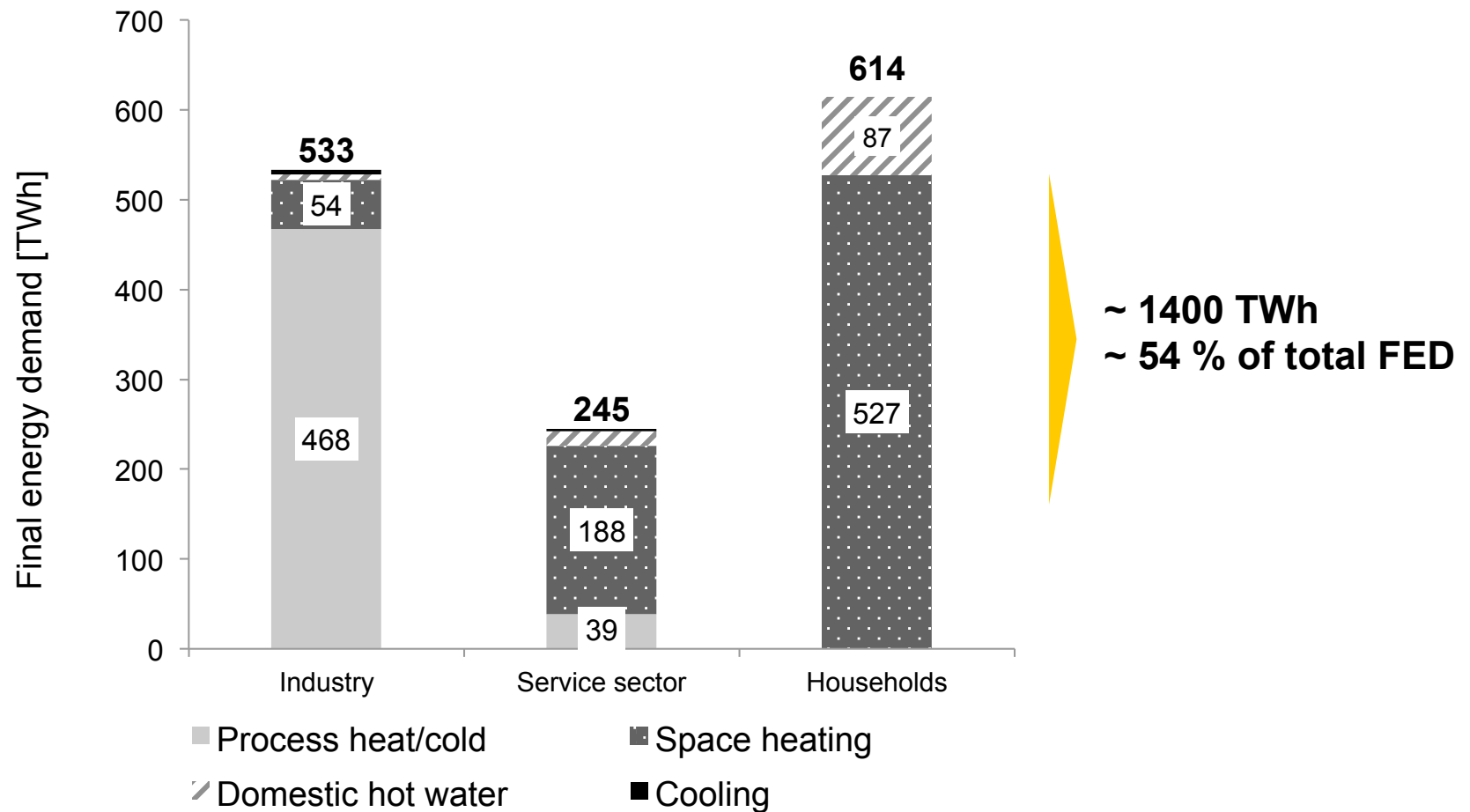
-A BOTTOM-UP MODELING APPROACH INTEGRATING BUILDINGS, INDUSTRY AND DISTRICT HEATING

ECEEE Summer Study 2013

Jan Steinbach, Fraunhofer ISI Germany

Lukas Kranzl, Andreas Müller, Marcus Hummel, Judit Kockat,
Andrea Herbst, Felipe Toro, Felix Reitze, Eberhard Jochem,
Max Fette, Wolfgang Schulz, Veit Bürger

Heating and cooling demand in Germany



Source: AG Energiebilanzen 2012, own depiction

Energy concept/Energiewende targets regarding the heating and cooling sector

All energy
sectors 2020

- Primary energy demand reduction by 20 % compared to 2008
- GHG emission reduction by 40 % compared to 1990

Heating/
cooling sector
2020

- Heating demand buildings: reduction by 20 % from 2008 to 2020
- Increase of thermal refurbishment rate to 2 % /a
- 14 % RES-H share on FED for heating



Is current energy efficiency policy sufficient to meet the targets in the heating sector?

Which additional policy instruments are required?

Integrated heating and cooling strategy for Germany

Objective

- Quantitative evaluation of policy sets targeting energy efficiency and RES-H/C in Germany

Approach

- Integrated bottom-up simulation model for heating and cooling sector
- Policy scenarios for the period 2008 to 2020 following an exploratory approach
- Design and analysis of 56 scenario-variants



Commissiomed by
the Federal
Ministry for
Environment

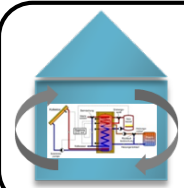
Outline

Modeling the heating and cooling sector

Policy scenarios

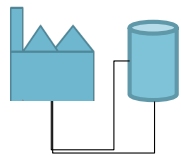
Conclusion

Integration of bottom-up sector models



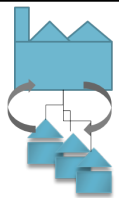
**INVERT
/EE-Lab**

- Heating/ cooling demand and supply of building sector
- Detailed representation of the building stock and technologies
- Simulation investment decisions in energy efficiency measures



**Forecast
ProcServ
ProcInd**

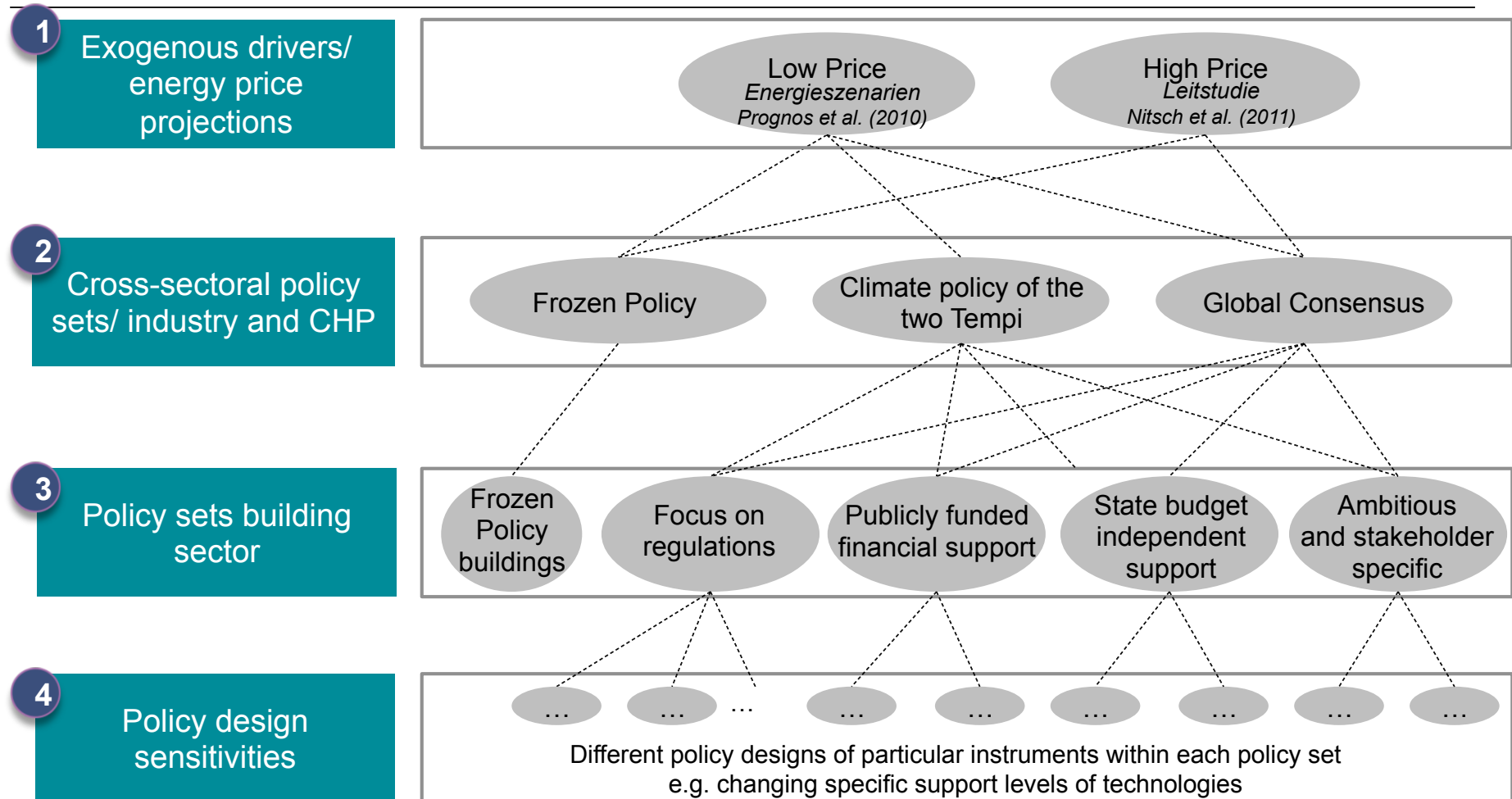
- Process heating and cooling demand and supply
- Industrial processes, branches
- Tertiary sector



**CHP-
District
heating**

- District heating networks and CHP installations
- Building and settlement type distribution for all major cities
- Spatial heating demand and existing district heating networks

Definition of policy scenarios



Current policies addressing energy efficiency and RES-H in buildings



Renewable heat Act

RES-H use obligation in new and public buildings

Energy Saving Ordinance

Max. primary energy demand
U-Values of building components



Market Incentive Program

Investment grants, soft loans for RES-H generators

KfW Energy-Efficient Refurbishment/ Construction

Soft loans/ repayment bonus for energy efficient buildings

Policy set with focus on regulation

example



Renewable heat Act

RES-H use obligation in existing buildings
(1) major renovation
(2) boiler replacement

Energy Saving Ordinance

Energy efficiency requirements
(1) U-Values
(2) Timing



Market Incentive Program

No changes

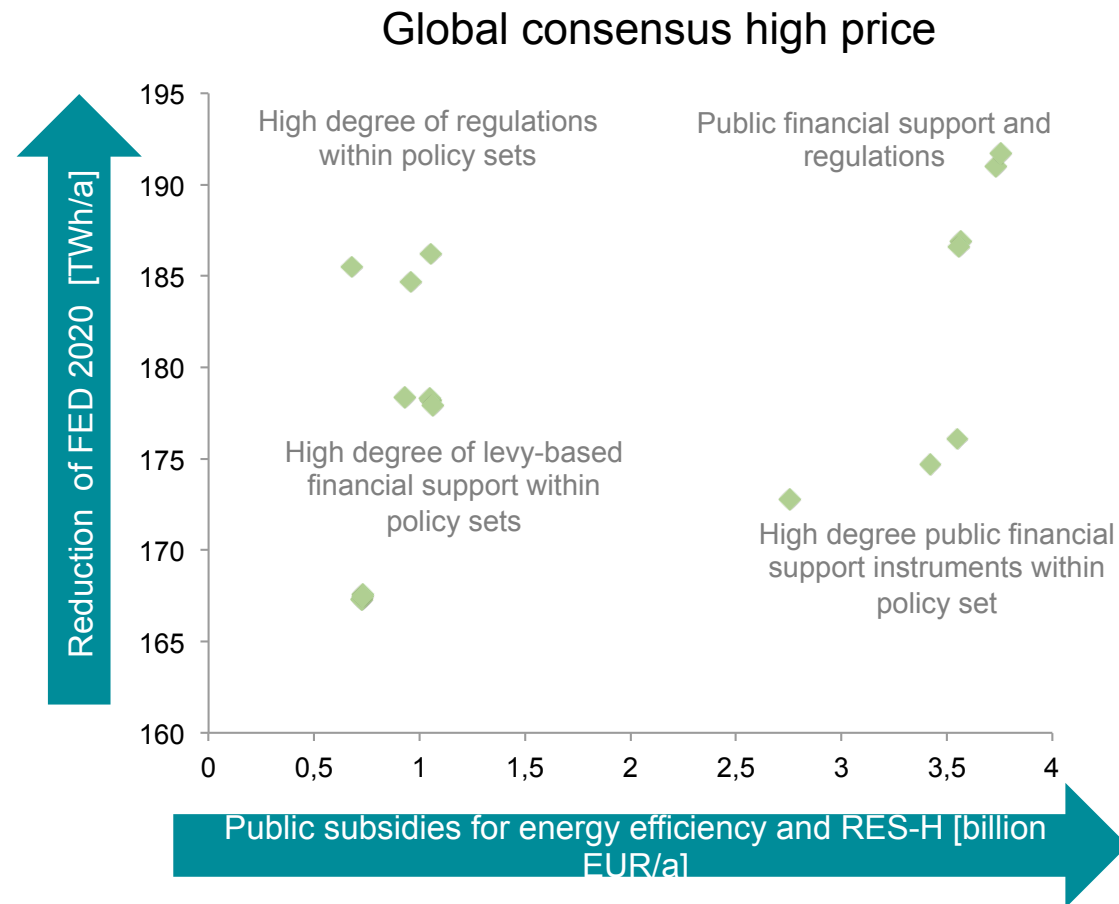
KfW Energy-Efficient Refurbishment/ Construction

No changes

Target fulfillment building sector



Reduction of energy demand and average annual public subsidies



Conclusion

Heating/ cooling sector targets

- Current energy efficiency policy is not sufficient to reach heating/cooling sector specific targets
- RES-H target can be achieved if policies are designed more ambitious and additional measures are implemented
- 20 % reduction of FED for heating in buildings is not feasible

Policy sets building sector

- Current financial programs can show a high impact if funding is increased
- Focus on deep renovation of existing buildings
- No support of market standards
- Ambitious regulations is crucial
- Largest reduction of FED with combination of regulative and financial policies

THANK YOU FOR YOUR ATTENTION

ECEEE Summer Study 2013

Jan Steinbach, Fraunhofer ISI Germany

Jan.Steinbach@isi.fraunhofer.de