evaluate energy savings EU

EMEEES PROJECT
Final Conference

NEEAP 2007: ex ante Assessment of National Policies

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The objective of the assessment

- The main objective has been to verify if, and/or to which extent, a simulation model like MURE can be used to assess the National Energy Efficiency plan and measures
- The second objective has been to concretely assess some NEEAPs and to provide the simulation results to the corresponding national teams
- The third objective includes the analysis, as far as possible, of the EMEEES bottom up methodologies
- In this framework we have decided to analyze in depth the German and the Italian National Plans and to carry out the assessment of the Austrian plan for the household sector only

The MURE Models in brief

- Mure is a simulation tool and not an optimization model
- It provides the outputs in terms of target energy consumption and energy saving on the basis of exogenous scenarios assumptions
- To this end MURE is composed by different modules for the impact policy assessment in the household, tertiary, industry and transport sectors

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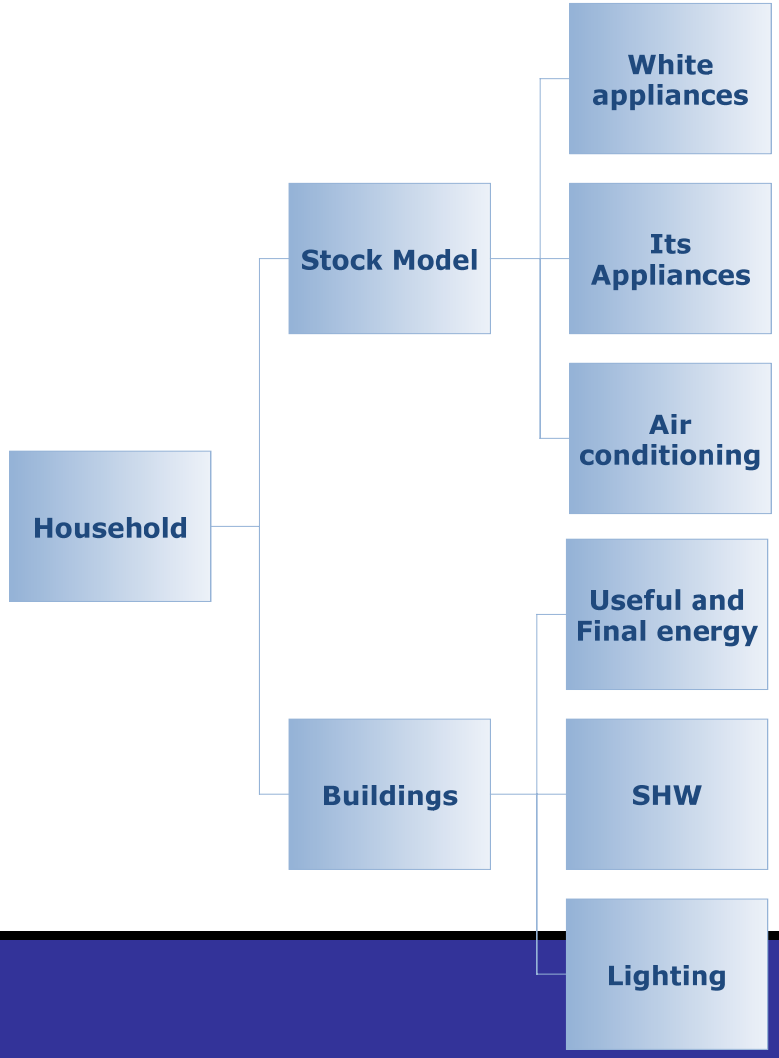
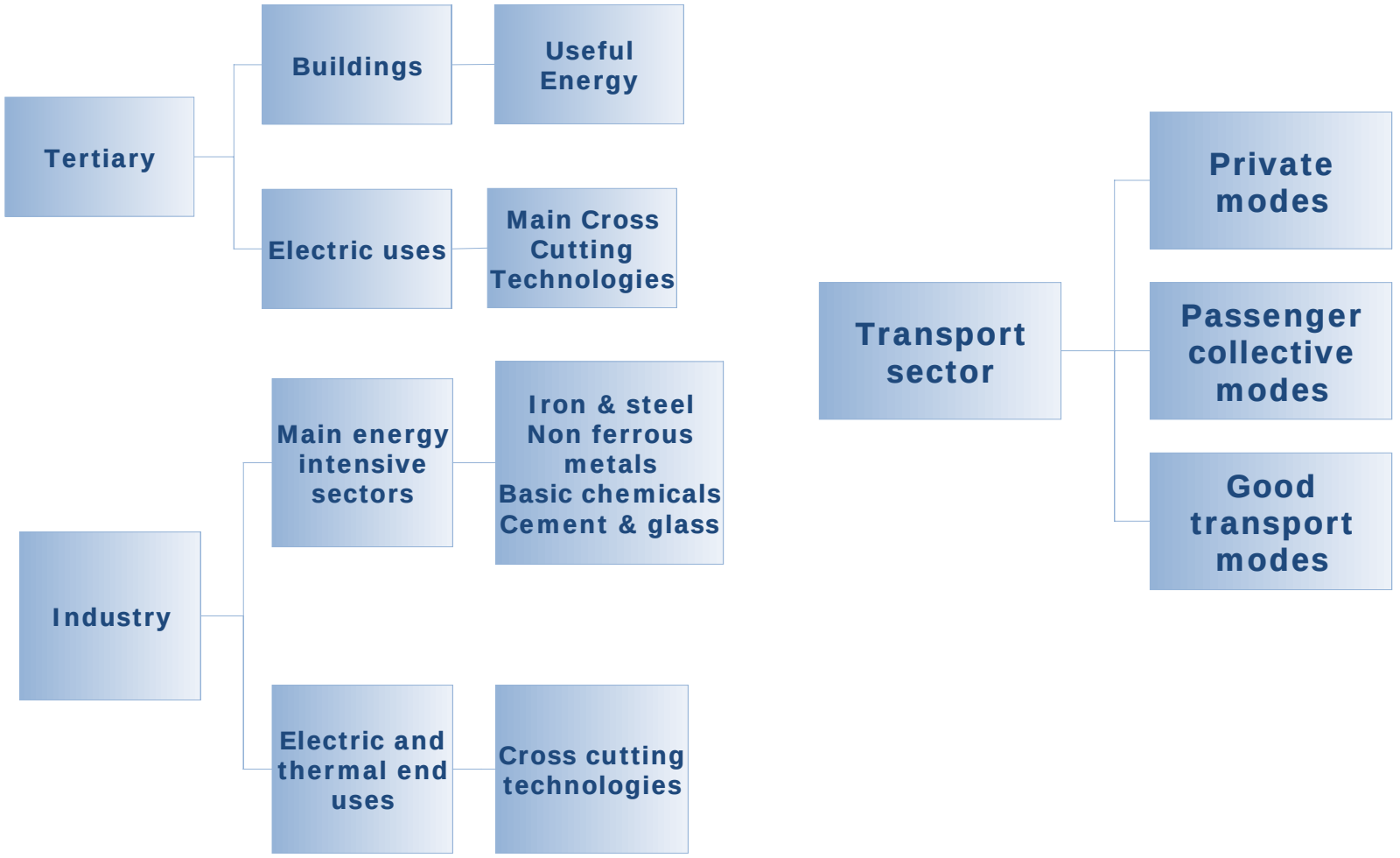
Structure of the Household sector



Structure of Tertiary, Industry and Transport sectors



The Methodology

- NEEAPS measures parameterisation:
  - Set up of the EE targets (i.e.: buildings codes, EUPs EE, CO2 emissions ...)
  - Comparison (where possible) of the reference stocks with the MURE database
  - Analysis of the starting and target involved stocks
- Parameters set up in MURE and model run
- Results comparison and analysis

Comparison limits of this simulation exercise

- 2010 targets:
  - the MURE reference data are currently set at the year 2004
  - the MURE scenarios steps are ranged in a 5 years interval (6 years for the first interval)
  - It is thus not easy to compare the 2010 outputs provided by MURE with those provided by the NEEAPS (which ex ante evaluation *should* start at the year 2006-2007)
- Reference and Scenario Drivers data somewhat different (but often comparison not possible)
- Baselines often different:
  - in general autonomous progress considered in MURE (only additional savings are calculated)
  - This is generally not clear in the German NEEAPS evaluation (but probably static approach), somewhat clear in the Italian one (generally static approach but in some cases dynamic EE trend)

Other considerations

- Early actions
  - In MURE the early actions impact is “embedded” in the reference unitary consumption figures
  - But, in principle, no evaluation of the early actions impact carried out in the MURE ex-ante simulations
  - In the German NEEAP the early actions impact is calculated separately (and plays a significant role in the NEEAP target achievement)
  - In the Italian NEEAP most of the considered measures are new actions applied in the framework of the current policy mechanisms (i.e. white certificates, incentives…) and there are not a separated impact evaluation
- Completeness of the analysis
  - Not all the measures have been simulated; The reasons have been:
    - Some NEEAP measures target to specific end uses or subsectors not (so far) covered by MURE
    - Some (few) other measures are either to vague and poorly described or have a very broad and not defined target (i.e the German measure “Special fund for energy efficiency in SMEs” that envisage financing and audit interventions to do *everything)*

Overall outputs and results comparison (PowerCoefficent =1)

Overall Results Italian Measures

Sectors	Savings 2016 PJ	
	NEEAP Italy	MURE
Household	205,5	177,8
Tertiary	88,8	88,9
Industry	77,4	42,0
Transport	83,6	74,2
Total Expected energy saving (national target)	**455,3**	**383,0**
ESD Target	**425,8**	

Overall Economic Potential from the ESD study: 671,5 PJ

Overall outputs and results comparison (PowerCoefficent =1)

Overall Results German Measures

Sectors	Savings 2016 PJ	
	NEEAP Ger.	MURE
Household	198-315	178-252
Tertiary (Measures evaluated with MURE)	13-22	16,0
Tertiary Other measures	31-44	-
Industry (Measures evaluated with MURE)	16-24	19,0
Industry (Other Measures)	29-40	-
Transport	159-231	187
Cross Cutting (Measures evaluated with MURE)	50-60	34,0
Cross Cutting (Other Measures)	6,5-9,5	-
Total Expected energy saving (national target)	**503-746**	
Early actions	**375,0**	
Total (Sectors + Early actions)	**878-1121**	
ESD Target	**833,0**	

Overall Economic Potential from the ESD study: 1193,6 PJ

Overall outputs and results comparison

Italian Measures: Household Sector - PJ	Savings 2016 NEEAP Ita.	Savings 2016 - MURE Simulation
Refurbishment 1 – Thermal insulation of opaque surfaces of pre-1980 residential buildings (walls and roofs) and	46,0	38,6
Refurbishment 2 – Replacement of single glazing by double glazing	3,3	
Replacement of incandescent lamps (GLS) by fluorescent (CFL)	17,3	5,7
Replacement of Refrigerators and Freezers by A and A+ class appliances	13,9	3,0
Replacement of clothes washing machines by superlative class A appliances	1,5	0,6
Replacement of dishwashers by class A appliances	3,8	0,3
Replacement by efficient electric water heaters	7,9	9,3
Use of efficient air conditioners	1,9	not calc.
Use of efficient heating installations	96,1	120,3
Balanced flues and wood-fired boilers	13,8	
Total household sector	**205,5**	**177,8**

Aut. Progress scenario

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Overall outputs and results comparison

German Measures: Household Sector - PJ	Savings 2016 NEEAP Ger.	Savings 2016 - MURE Simulation
M. 1: CO2 Building redevelopment programme	120-160	60* 130**
M 2: Promoting energy-efficent new buildings	5-15	6* 10**
M 3: Programme for introducing new, highly-efficient household appliances…	18-30	14*
M 4: European Top Runner Strategy		
M 5: On-Site energy advice	55-110	98*
M 6: The Federation of German Consumer Organisations: Energy advice for private consumers		
Total household sector	***198-315***	***178-252***

* = A. P. scenario

** = Static Scenario

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Overall outputs and results comparison

German Measures - Transport Sector - PJ	Savings 2016 NEEAP Ger.	Savings 2016 - MURE Simulation
M 23: Promoting mobility, communication and city logistics	4-6	6
M 24: Accelerating technical development	100-120	91
M 25: Campaign entitled "Energy efficiency and mobility"	20-65	64
M 26: Improving the infrastructure for using bicycles	34-40	26
Total transport sector	159-231	187

Similar assumptions

No possible to compare the reference data and the scenario drivers

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Overall outputs and results comparison

German Measures - Industry and Tertiary Sectors PJ	Savings 2016 NEEAP Ger.	Savings 2016 - MURE Simulation
Industry		
16 Contracting (compressed air)	5-6	5
17 Contracting (lighting)	2-3	2,6
18 Contracting (heating, ventilation and air conditioning)	3-5	4
19 Special fund for energy efficiency in SMEs	29-42	
20 European top runner strategy	6-8	7
Total Industry	45-64	19
Tertiary		
10a Street lighting	3	3
12 special fund for energy efficiency in SMEs	29-40	
13 European top runner strategy	8-15	13
9 -11 Minor measures	2-4	
Total Tertiary	44-66	16

Overall outputs and results comparison

Italian Measures - Industry and Tertiary Sectors PJ	Savings 2016 NEEAP Ger.	Savings 2016 - MURE Simulation
Industry		
Efficient lighting	8	5
Eff2 motors replaced by Eff1*	12	3
Variable speed drive*	23	12
High efficiency cogeneration	23	23
Using Mechanical Vapour Compression	11	-
Total Industry	77	42
Tertiary		0
Use of efficient heating installation	59,8	65,9
Efficient Air-Conditioners	9	15
Efficient lighting	15	5
Efficient public (street) lighting	5	3
Total Tertiary	88,8	88,9

Conclusions Modelling Approach…

- The Pros to use a structured model like MURE are:
  - Consistent evaluation method for all the measures
  - More transparent procedures and data
  - Possibility to easily carry out sensitivity analysis
  - The evaluation efforts are focussed on the measures parametrisation and not to the results calculation
- The Cons are:
  - Intrinsic rigidity of the modeling approach (trade off between the data collection and modeling costs and the end uses/subsectors coverage)
  - Not easy (and resources demanding) to frequently update the reference year

Conclusions Methodologies/Calculation Approach followed in the NEEAPs...

- Autonomous savings in the cases studied not calculated and integrated in the evaluation of the savings
- Methodologies used where, in the majority of the cases, a static approach, linking savings to the base year or frozen efficiency reference
- Documentation of drivers and assumptions partially incomplete, making it difficult for some measures to parameterize them properly.
- Uncertainties in estimates not characterized in the case studies investigated. Principles such as conservativeness or lifetime of energy savings not applied.

NEEAP 2007: ex ante Assessment of National Policies

Thank you for your kind attention!

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