

newTRENDS

Informal Session
@ecee 2022



This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement no. 893311.



New Societal Trends

- arising from Megatrends
- potential impact
 - energy demand
 - cross-sectoral demand shift
- from “continuous or linear trends” to “**disruptive or non-linear trends**”
 - Consumer to Prosumagers
 - Circular Economy & Low-carbon Industry
 - Digitalisation of Economy & private Lives
 - Shared Economy

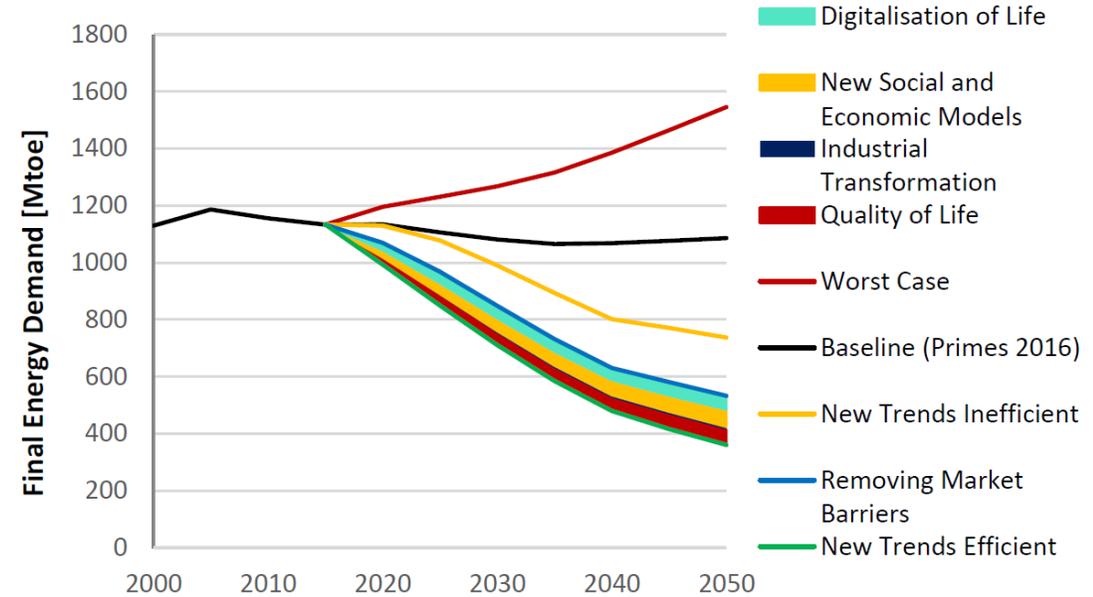
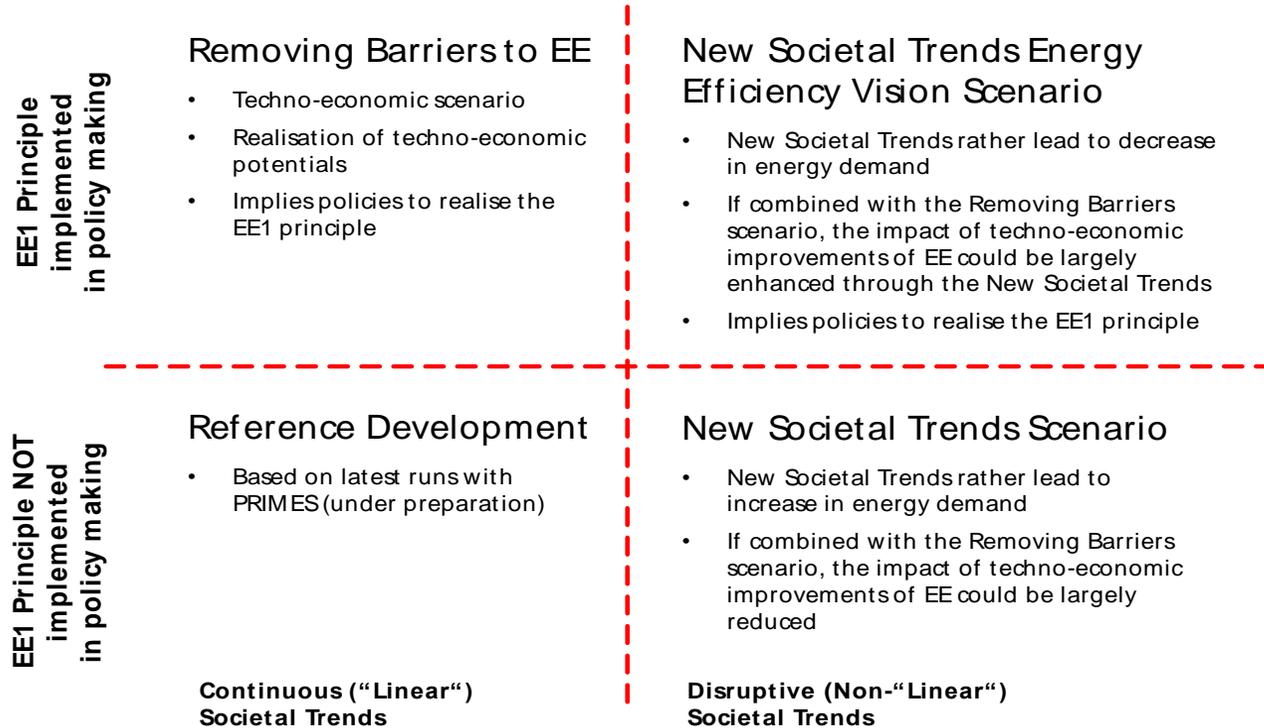


Overall Project Aim

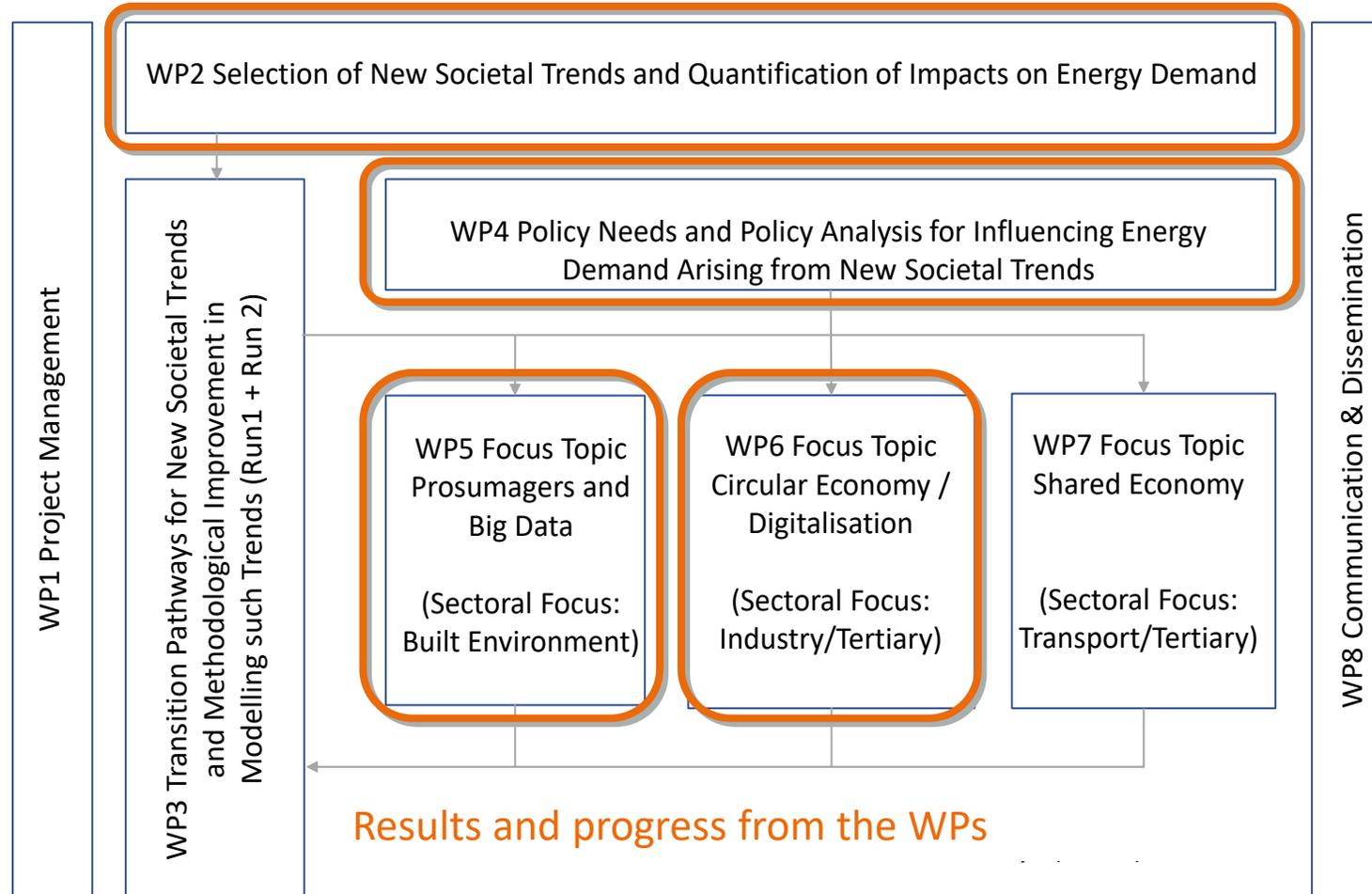
Developing the analytical basis for a
2050 Energy Efficiency Vision
taking into account these New Societal Trends

- ↪ Increase the understanding
- ↪ Improve the modelling
- ↪ Explore the future impact

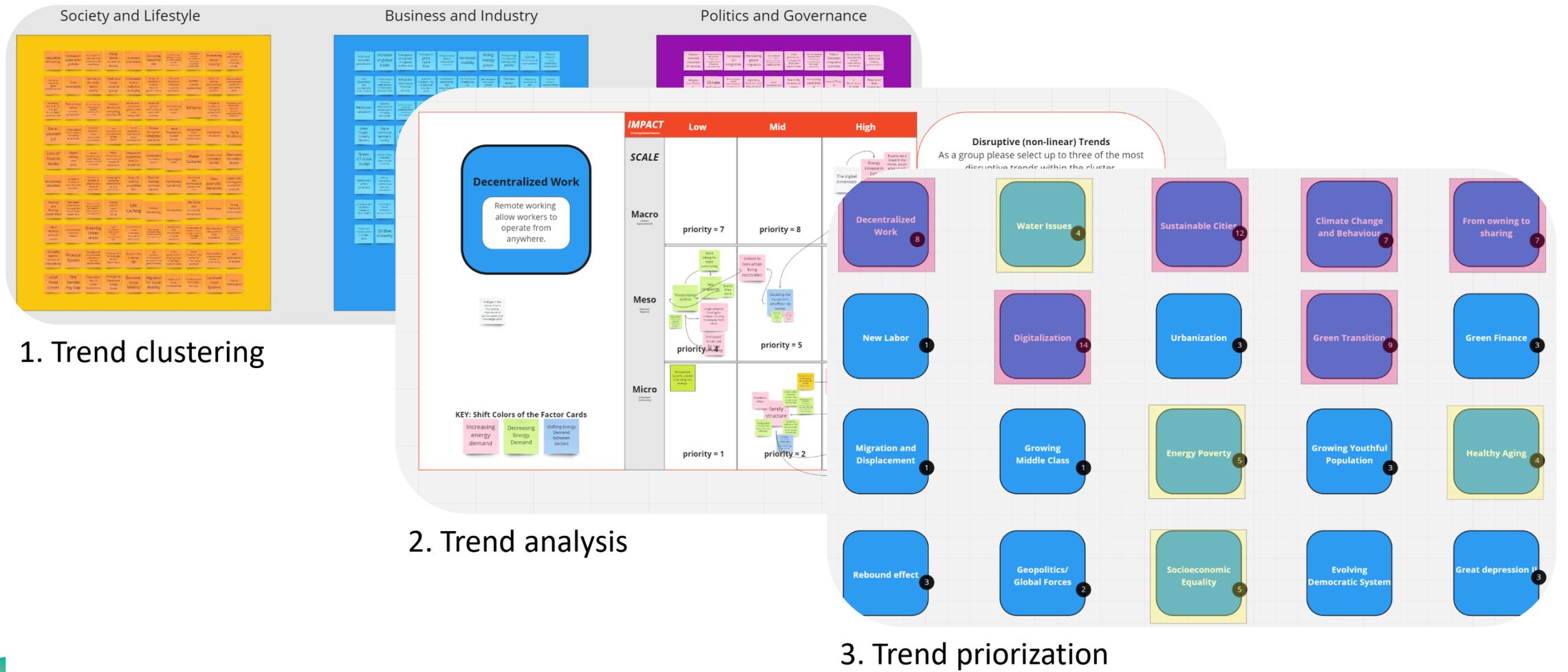
ITERATIVE MULTI-METHOD APPROACH



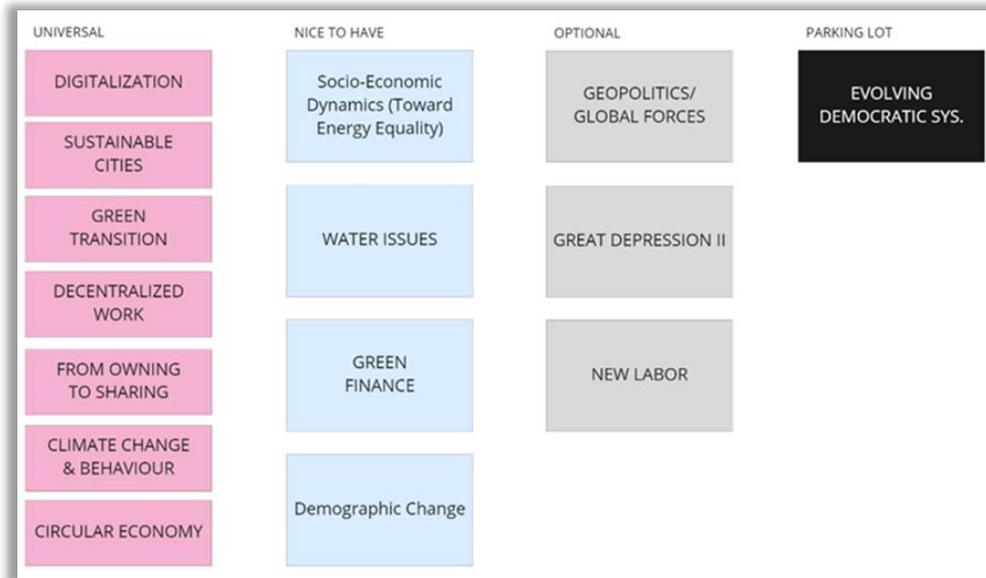
CONCEPTUAL APPROACH



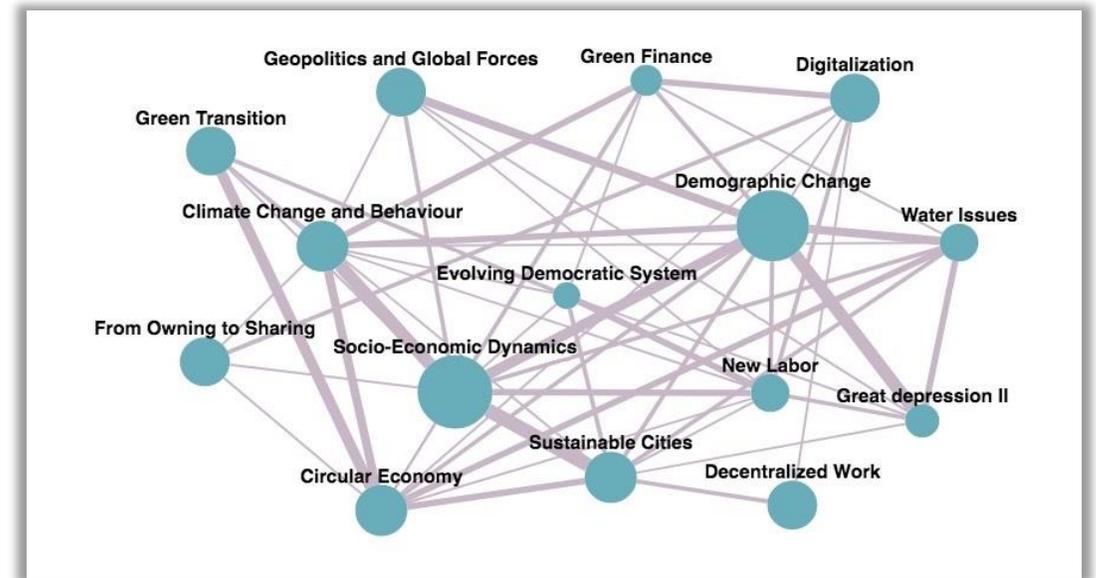
WP2 – NEW SOCIETAL TRENDS



WP2 – NEW SOCIETAL TRENDS



Final trend clusters



Linkages between clusters

Further analysis within Deliverable 2.1 - Identifying New Societal Trends impacting future energy demand

WP4 – POLICY NEEDS AND ANALYSIS

Research questions

What policies can enhance the demand decreasing trends of New Societal Trends?

What are the demand-side policy needs at European level?

Desk research

- Mapping of energy demand-side policies and instruments in the EU
- Mapping of policy makers

Semi-structured interviews

- DG ENER
- DG GROW
- DG CLIMA
- DG MOVE

Stakeholder workshop

27 invited experts

WP4 – POLICY NEEDS AND ANALYSIS

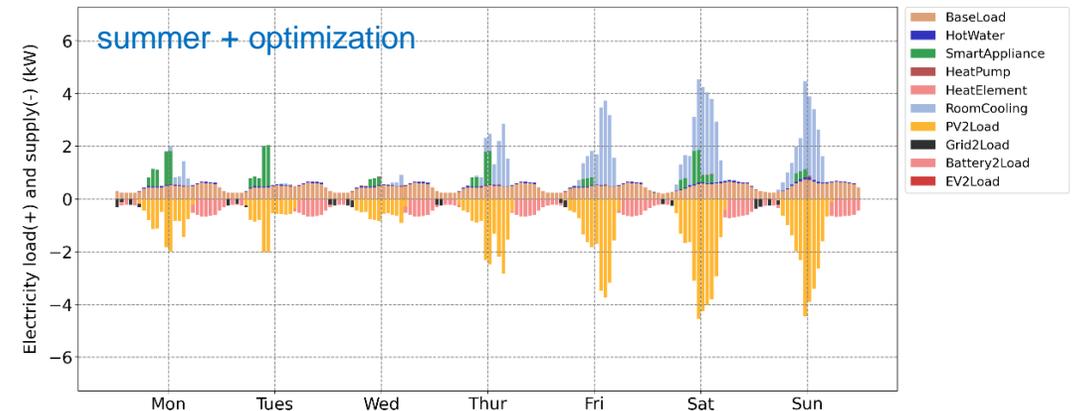
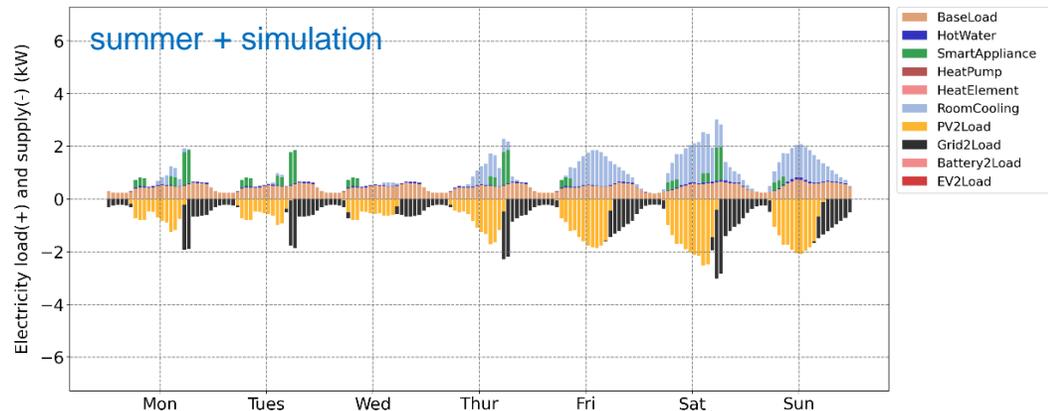
- Mapping of existing and emerging EU policies
 - Regulations, e.g. codes and standards
 - Economic and financial instruments, e.g. loans and taxes
 - Soft instruments, e.g. labels and campaigns
- Identification from semi-structured interviews and stakeholder workshop
 - Instruments particularly important to be modelled, e.g. Fit-for-55 package
 - Indicators of interest for policy makes, e.g. energy use by ICT equipment across sectors

Further information within Deliverable 4.1 - Diagnosis of energy demand-side policy needs at European level



WP5 - PROSUMAGING

- Flex models the household energy consumption and is co-developed by Fraunhofer ISI and TU Wien under the **newTRENDS** project to model the impacts of new societal trends on the energy consumption of households.
- Research question: How will household behavior change influence the energy consumption and technology adoption at both individual household/building and national level?
 - work-from-home
 - target indoor temperature
 - prosumaging behavior



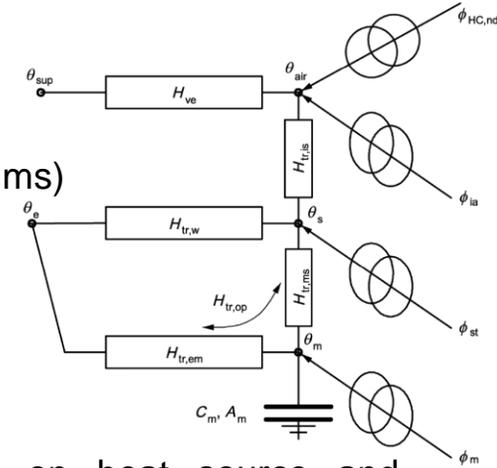
WP5 - PROSUMAGING

■ Model input

- behavior
 - indoor temperature range
 - driving behavior
 - hot water demand
 - appliance electricity demand
- energy price
- weather
 - temperature
 - radiation
- building parameters
- technology
 - boiler (incl. electric heating element)
 - space heating and hot water tank
 - space cooling technology
 - PV and battery
 - vehicle
 - smart energy management system

■ Heating and cooling demand: 5R1C approach (DIN ISO 13790)

- 1 thermal capacity
- 5 resistances
 - effective mass of walls (Htr,em)
 - whole surface mass of walls (Htr,ms)
 - Windows (Htr,w)
 - Ventilation (Hve)
 - Thermal conductance (Htr,is)



■ Heating system

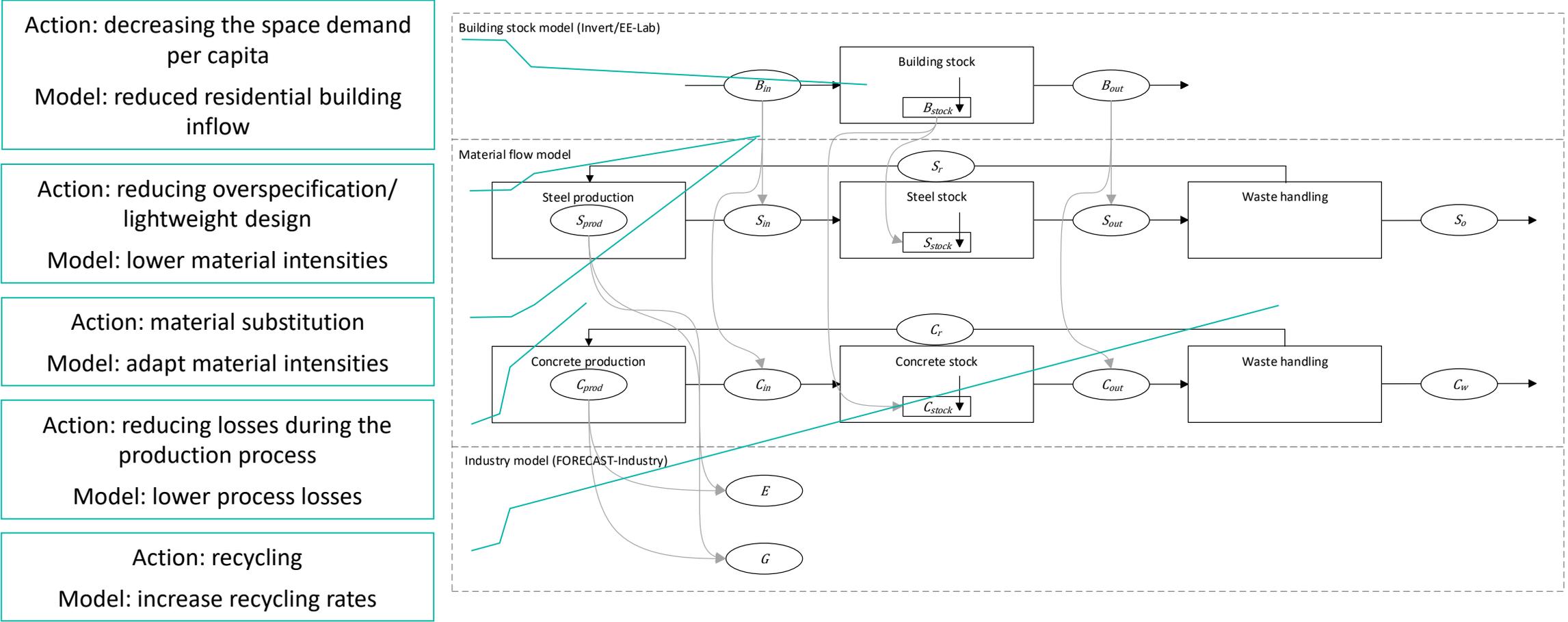
- Heat pump: dynamic COP based on heat source and temperature
- Thermal storage: space heating tank, hot water tank, building mass

■ Objective: cost minimization

$$\min Cost = \sum_{t=1}^{8760} (EP_t \times EC_{grid,t} - FiT \times ES_{pv2grid,t})$$

WP6 – CIRCULAR ECONOMY

Circular Economy affecting steel and concrete use in buildings



DISCUSSION QUESTIONS - MODELLING

Do the models cover the most important aspects?

Best-practice, information or data on the new societal trends?

What kind of policy questions should the models be able to answer?

Other projects / approaches / best practice to answer these questions?



DISCUSSION QUESTIONS - POLICIES

Do current policies already address new societal trends at a sufficient level?

Best-practice policies for steering the new societal trends?

How can policies be designed flexible enough to adapt to fast changing environments and pre-conditions?

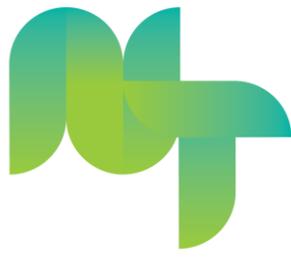
What kind of policy questions should the models be able to answer?

DISCUSSION QUESTIONS - GEOPOLITICS

Which new societal trends are able to support low energy demand in the short term, in light of the current crisis?

Which role do you think new societal trends play in the medium and long term to ensure energy security?





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Institutes:

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E3-Modelling (E3M)

Technische Universität Wien (TUW)

TEP Energy GmbH (TEP)

Politenico di Milano (POLIMI)

Research and Innovation Centre Pro-Akademia (RIC)

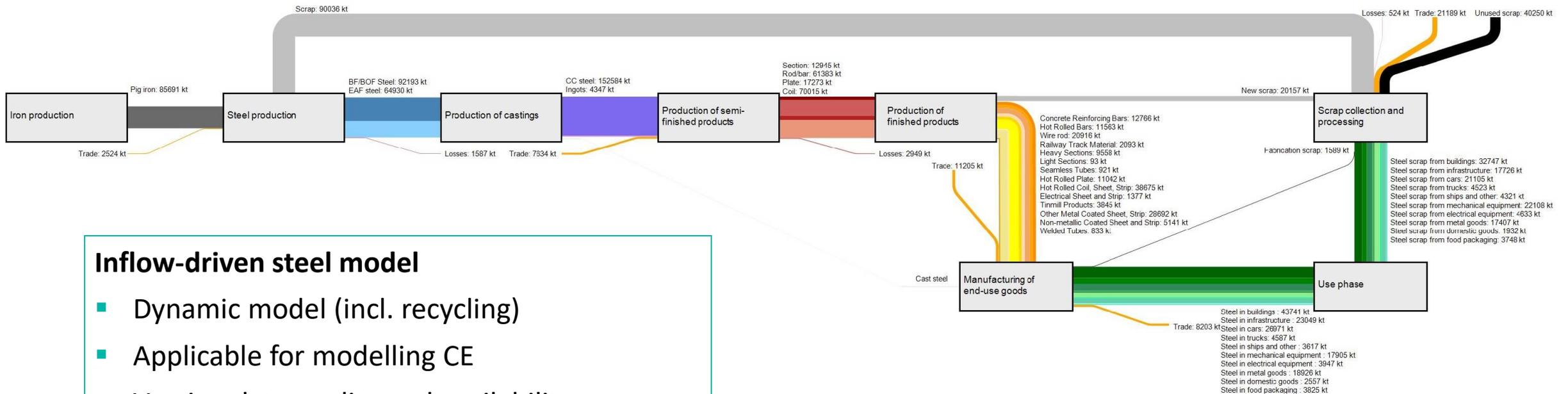
WiseEuropa – Fundacja Warszawski Instytut Studiów Ekonomicznych i Europejskich (Wise)

Zentrum für Energiewirtschaft und Umwelt (e-think)



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WP6 - CIRCULAR ECONOMY



Inflow-driven steel model

- Dynamic model (incl. recycling)
- Applicable for modelling CE
- Varying data quality and availability

Published in Lotz, M. T., Herbst, A. u. Rehfeldt, M.: Kreislaufwirtschaft für die Dekarbonisierung des Bausektors - Modellierung ausgewählter Stoffströme und dazugehöriger THG-Emissionen. Internationale Energiewirtschaftstagung an der TU Wien 12 (2021), S. 1–21

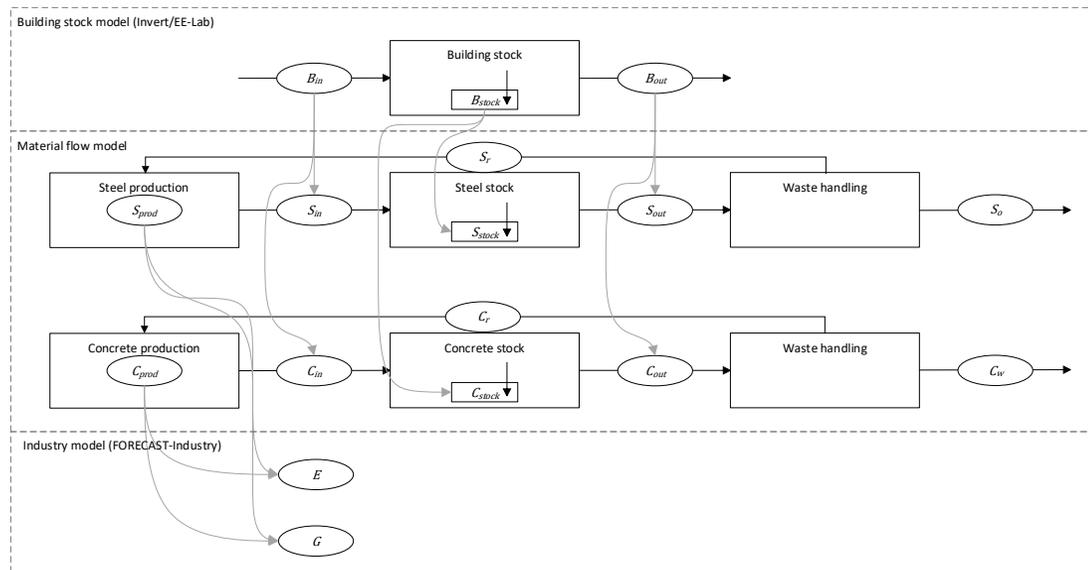


WP6 – CIRCULAR ECONOMY

Research question

What contribution can the circular economy (in the broader sense) in the building and construction sector make to decarbonising the industrial sector?

Three level model approach



Building archetypes

- 3 regions
- 6 residential and non-residential buildings
- 5 age cohorts
- Several construction characteristics