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Enabling the Energy Transition: Understanding the drivers of energy choices in Europe

Thursday 26 September 2019

Thon Hotel EU, Rue de la Loi 75
Brussels, Belgium

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INVOLVING CITIZENS IN ACHIEVING THE ENERGY TRANSITION

Session moderated by Lidia Puka-Kjøde, Energy Analyst at the Polish Institute of International Affairs (PISM)

@PISM_Poland @ENABLE_EU

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 727524.

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Participatory tools in research: ENABLE.EU Foresight Exercise

Carlo Sessa, Research Director at ISINNOVA, Italy

With citizen insights from the UK shared by **Melanie and Alun Williams**

@ISINNOVA @ENABLE_EU

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 727524.

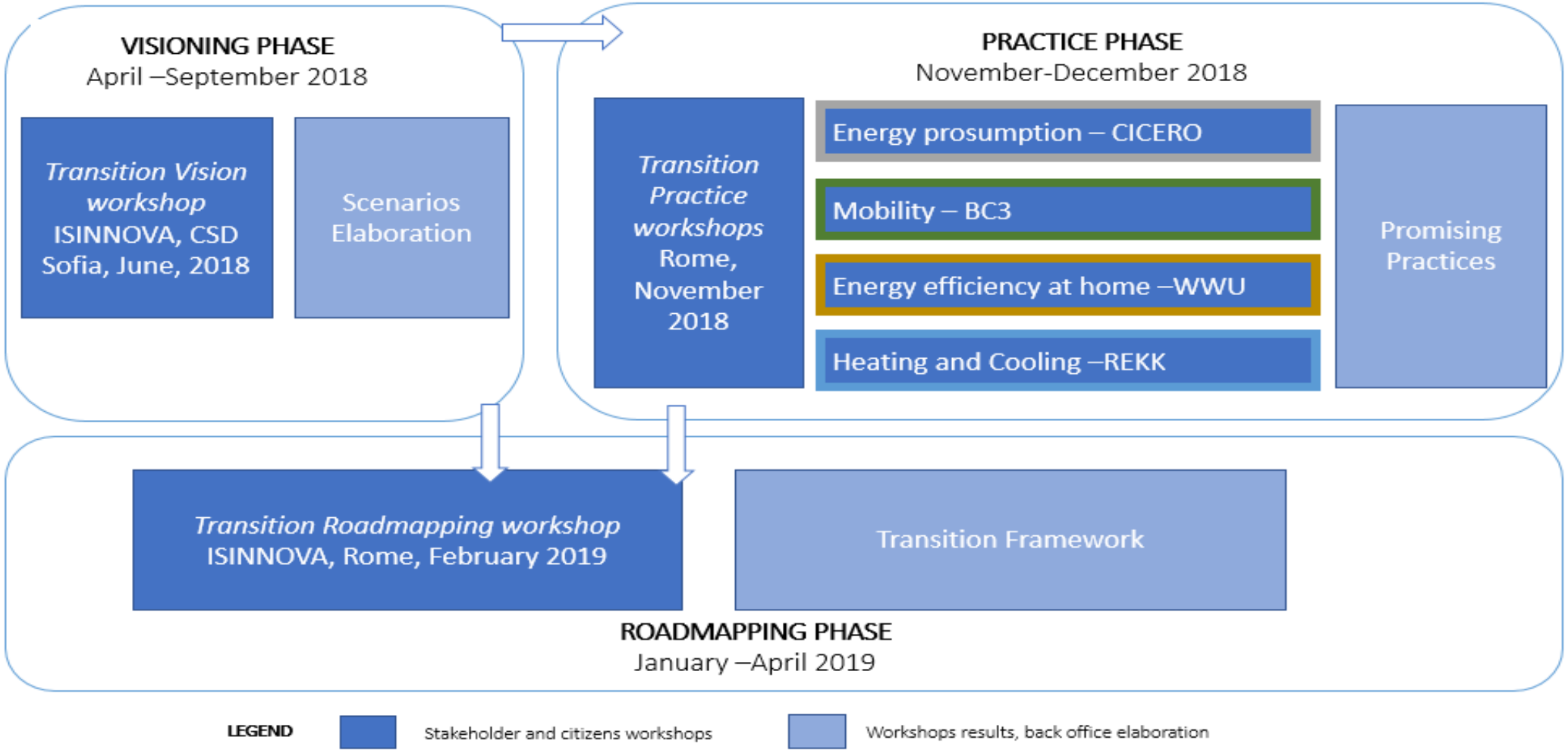
Participatory foresight aims

1) **Engaging key stakeholders and selected groups of households** to discuss and devise trends (e.g. lifestyle and attitude changes) and instrument/policies enabling the transition to a low carbon energy system in Europe.

2) To elicit **visions and insights useful to factor in assumptions about energy-related change and enabling policies**, especially from the low carbon pioneer citizens perspective.

3) To embed those insights in the modelling-based Energy Union scenarios and **policy recommendations delivered as final outcome of the project**.

Participatory foresight organization

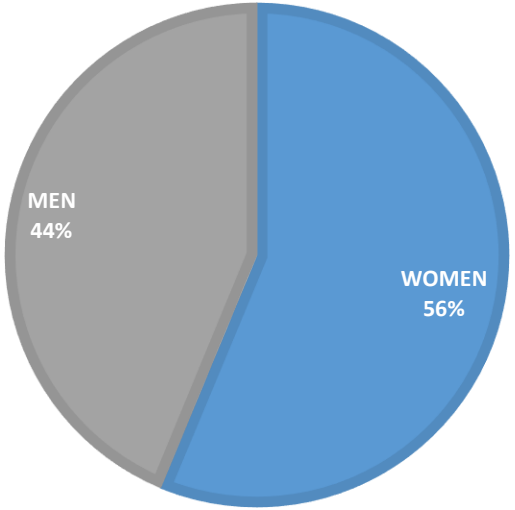


Transition Practice Workshop participants

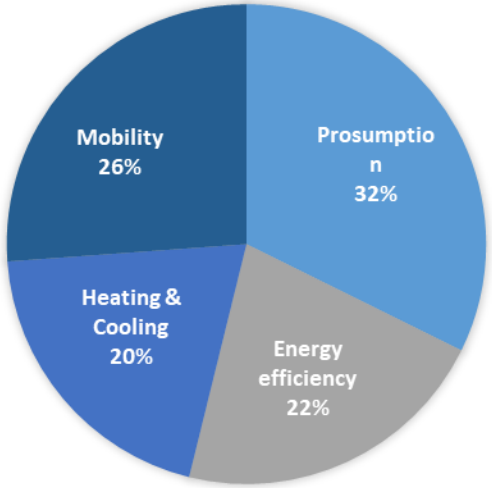
- **64 households coming from 11 countries**

Bulgaria	3
France	4
Germany	5
Hungary	6
Italy	5
Norway	9
Poland	3
Serbia	6
Spain	5
Ukraine	9
United Kingdom	9

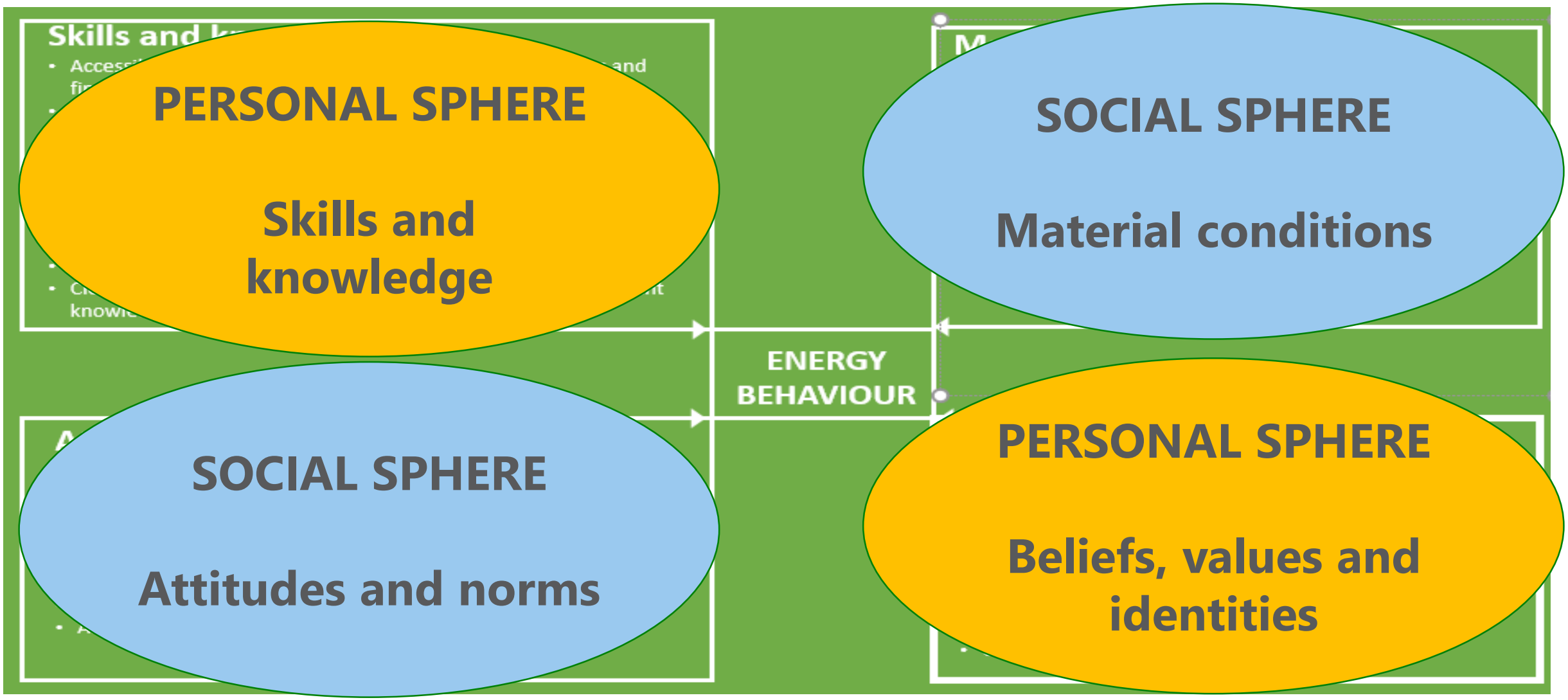
GENDER



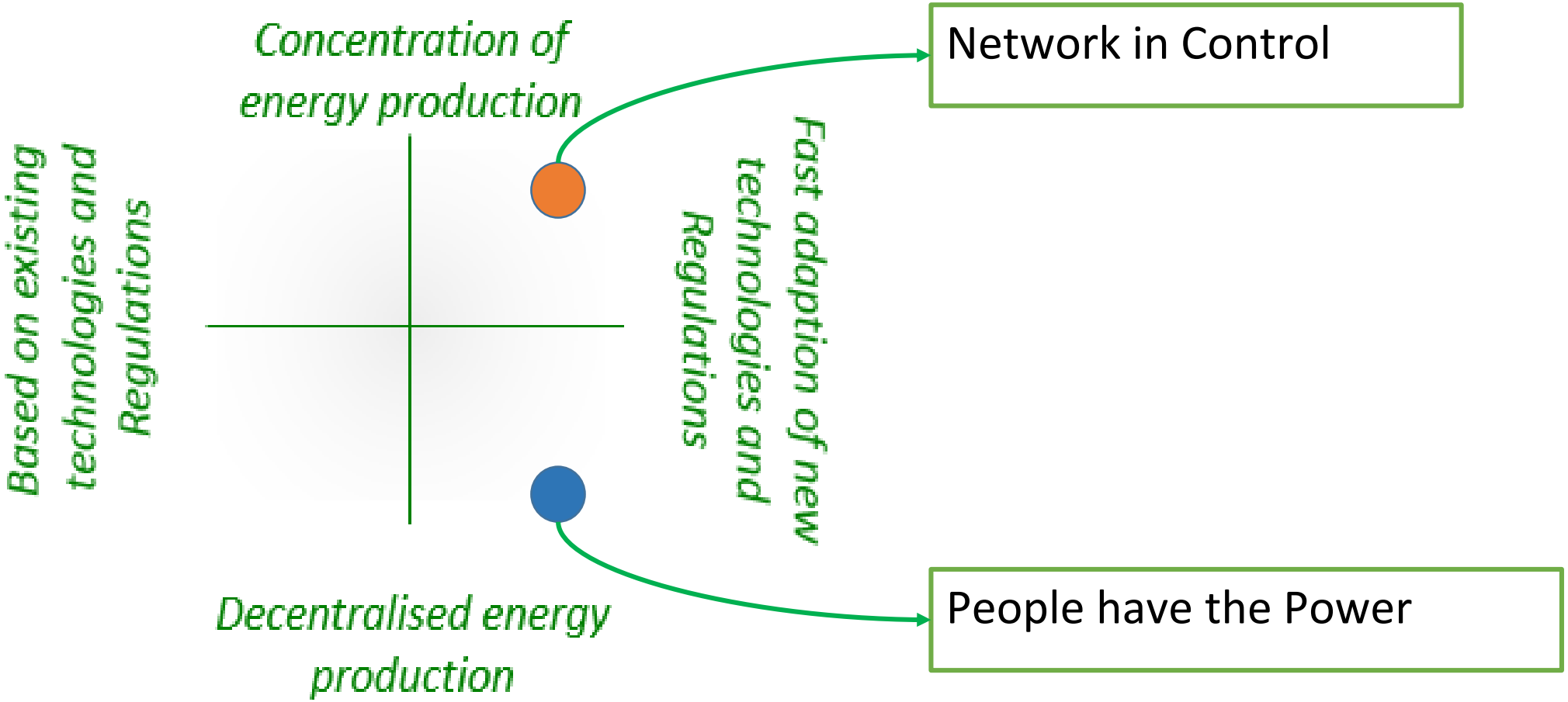
TOPIC



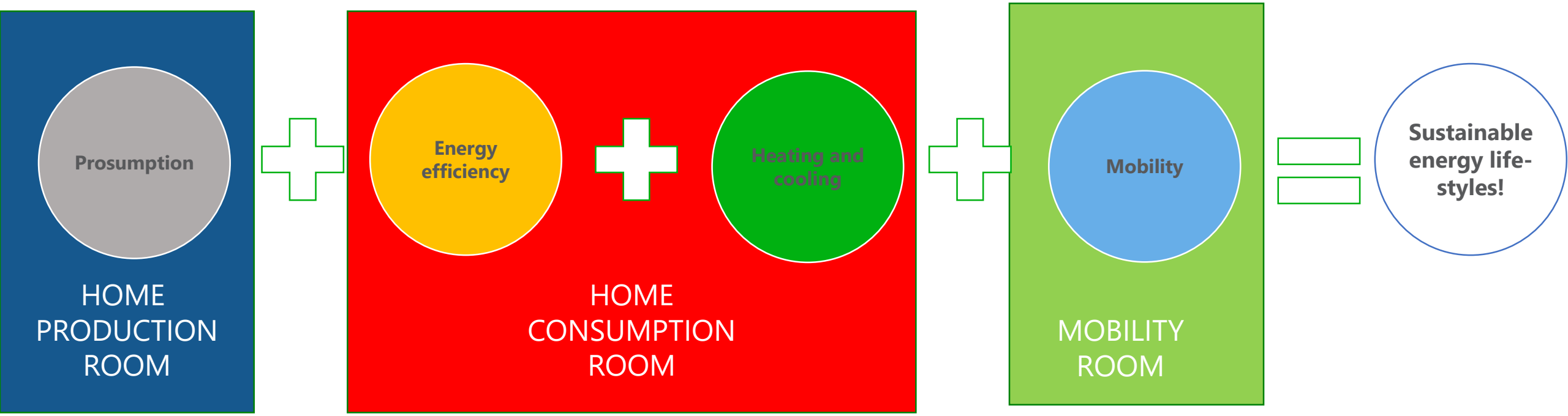
A shared multi-disciplinary framework to analyse energy behaviour



Looking forward to two (extreme) energy transition scenarios



Questions for the World Cafè exercise



- What do you want to see in the future, and what will you do in your own daily practice? (10 to 20 years from now, what will you do in your daily life to change your energy consumption at home?)

- What will you need, and how can decision-makers/politicians make it easier for you to adopt these practices?

More free trade of energy

“The future energy market could be more transparent and diversified, a market-place with many actors and services, and this will allow citizens to buy – for instance - only energy produced by renewable energy sources. The blockchain technology could be a big opportunity to enable the energy trade, with all transactions being recorded on a shared ledger without needing a third party (energy utility) intervention. The option is especially valuable for managing exchange of available energy among neighbourhood households connected through a micro-grid. This may give for instance the opportunity to trade the excess of energy that solar panels installed in second houses could offer to the local net when the house owner are outside (i.e. living at their principal home elsewhere), thus consuming no energy.”

Better incentives for multi-apartment settings

"We need promoting right incentives for the tenants of apartments to install solar panels or other devices, e.g. regulating the sharing of investment costs with the owners or conditional subsidies (e.g. by means of tax reductions for the owners renting apartments equipped with solar panels). By the same token, there is the need to better regulate and create incentives for the multi-apartment settings (e.g. condominiums), where the decision cannot be taken by a single household."

Better communication to the citizens

"We need better and simpler communication about the concrete way new energy installations can work and the benefit they can deliver. This is mostly a public service that governments or energy authorities should deliver to the citizens. The messages should be consistent with the reality of the gains citizens may have in migrating to prosumption, for instance by fixing convenient feed-in tariffs for the energy sold on the grid."

More education to energy saving, since the early age

“The very practice of producing energy could lead to a more conscious energy consumption. Even more important, energy saving education for children is perhaps the most effective and easy to implement measure to improve the awareness and energy behaviour of future generations. One participant – holding solar panels in his home – launched the idea to play as show-case for the schools in the neighbourhood, by organizing classroom visit at his premise to disseminate the experience.”

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The dialogue value added …

More dialogue

"Using solar panel technology enables me to put my desire for change into action, but it is the **face to face discussions** with fellow human beings in a peaceful, creative environment that has most influenced me to make the changes."

@melten (Enable-EU Forum participant)

Ursula von der Leyen

President-elect of the European Commission

Mission letter to Kadri Simson, Commissioner for Energy

Dear Kadri,

"What we do now will determine what kind of world our children live in and will define Europe's place in the world"

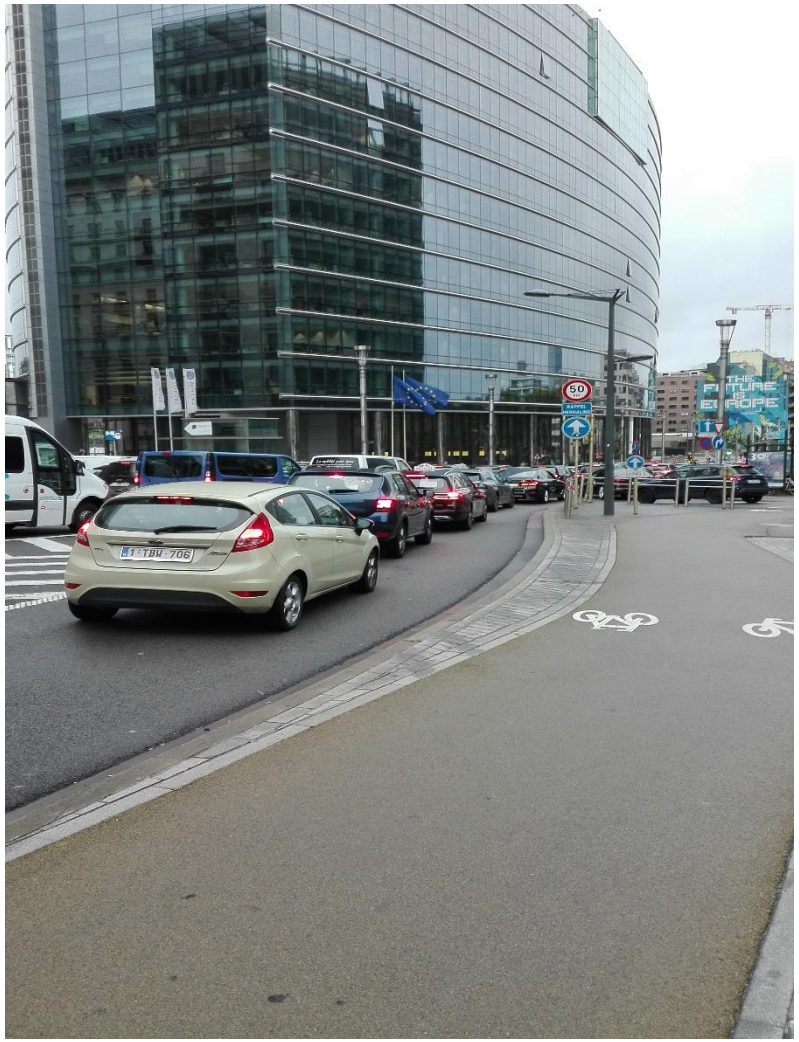
"We must send a clear signal to citizens that our policies and proposals deliver and make life easier for people and for businesses"

"We must engage with all Europeans, not just those who live in the capitals or are knowledgeable about the European Union"

"I want you to focus on putting **consumers at the heart of our energy system**, notably through the full implementation of the revised electricity market design"

"You should seek to empower citizens and cooperatives to play an increased role in the take-up of renewables through **self-consumption**"

Now, what Greta would tell them?



Brussels – Rue de la Loi
Just aside the European Commission Building
26° September 2019 – 8.50 am

- ✓ Traffic jam
- ✓ Empty bike lane
- ✓ Main metro line underground (Schuman-Maalbeek)

Is this really the future of Europe?

Thank you

Carlo Sessa
csessa@isinnova.org

'Transition Network' visioning session at 'The Green Backyard' in Peterborough

ENERGISE

EUROPEAN NETWORK FOR RESEARCH, GOOD PRACTICE AND INNOVATION FOR SUSTAINABLE ENERGY

CHANGING HOUSEHOLD ENERGY-RELATED PRACTICES USING A LIVING LAB APPROACH

EVIDENCE FROM 8 COUNTRIES ACROSS EUROPE

Dr Gary Goggins,
National University of Ireland Galway

ENABLE FINAL CONFERENCE, SEPTEMBER 26 2019, BRUSSELS

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 727642.

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NUI Galway

INTRODUCING ENERGISE

ENERGISE Living Labs around reduced heating and laundry in 8 European countries, approx. 300 households.

Implemented in Denmark, Finland, Germany, Hungary, Ireland, Switzerland, the Netherlands and the United Kingdom; Q4 2018.

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 727642.

ENERGISE OBJECTIVES

- Understand household energy usage in its **social dimension**
- **Assess and compare** energy-using practices across households in Europe
- Identify opportunities for **transforming energy usage** (towards reductions), and which work across different contexts
- Provide input into **policy debates**

Pictures taken by consortium members presented in D5.2

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 727642.

TAKING A SOCIAL PRACTICE PERSPECTIVE ON CHANGE

- Social practice approaches target the social organisation of society:
  - Practice as performance
    - (observed behaviour)
  - Practice as entity
    - (practices as underlying conditions)

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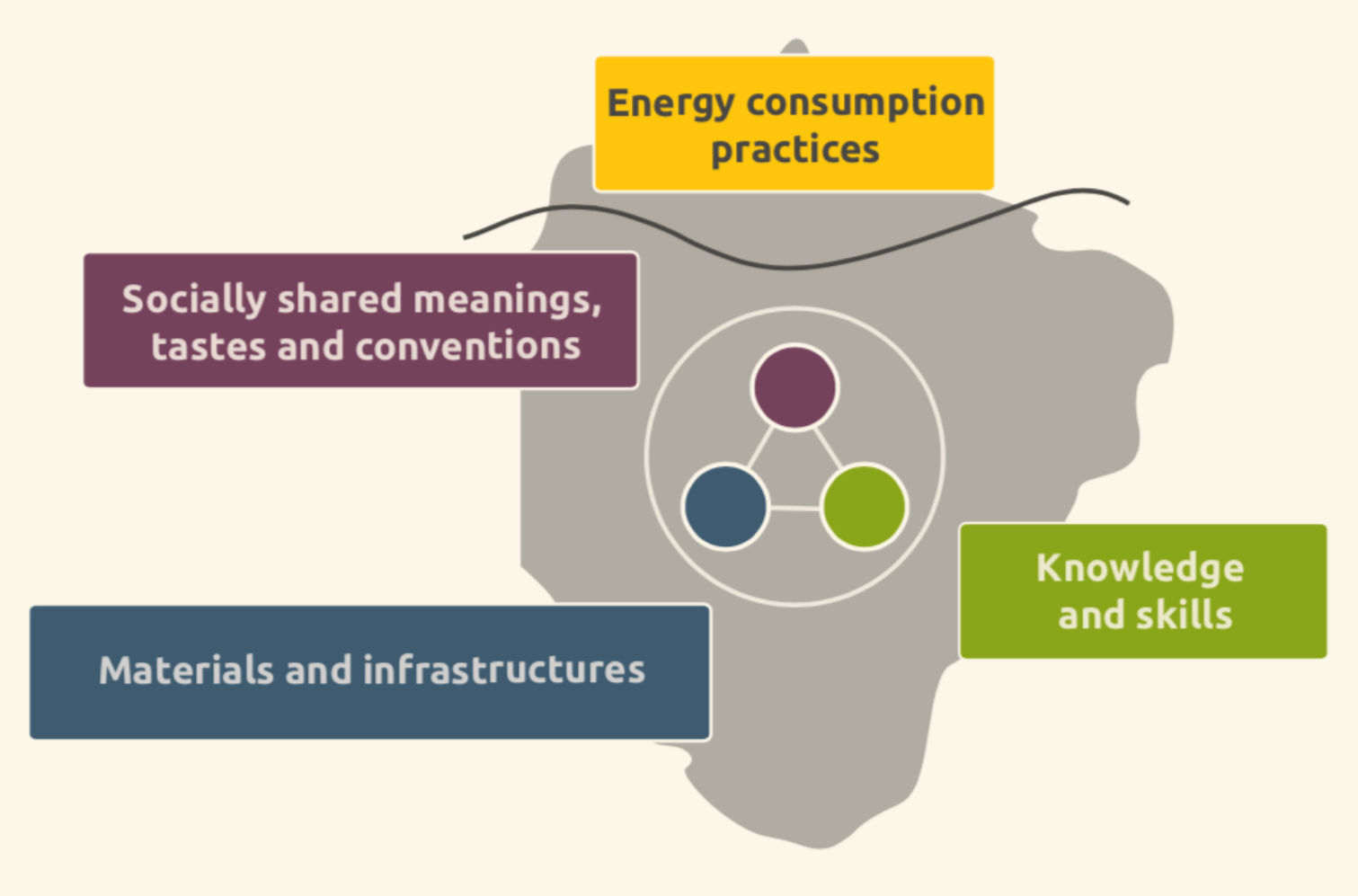
WHAT CAN SOCIAL PRACTICE APPROACHES DELIVER?



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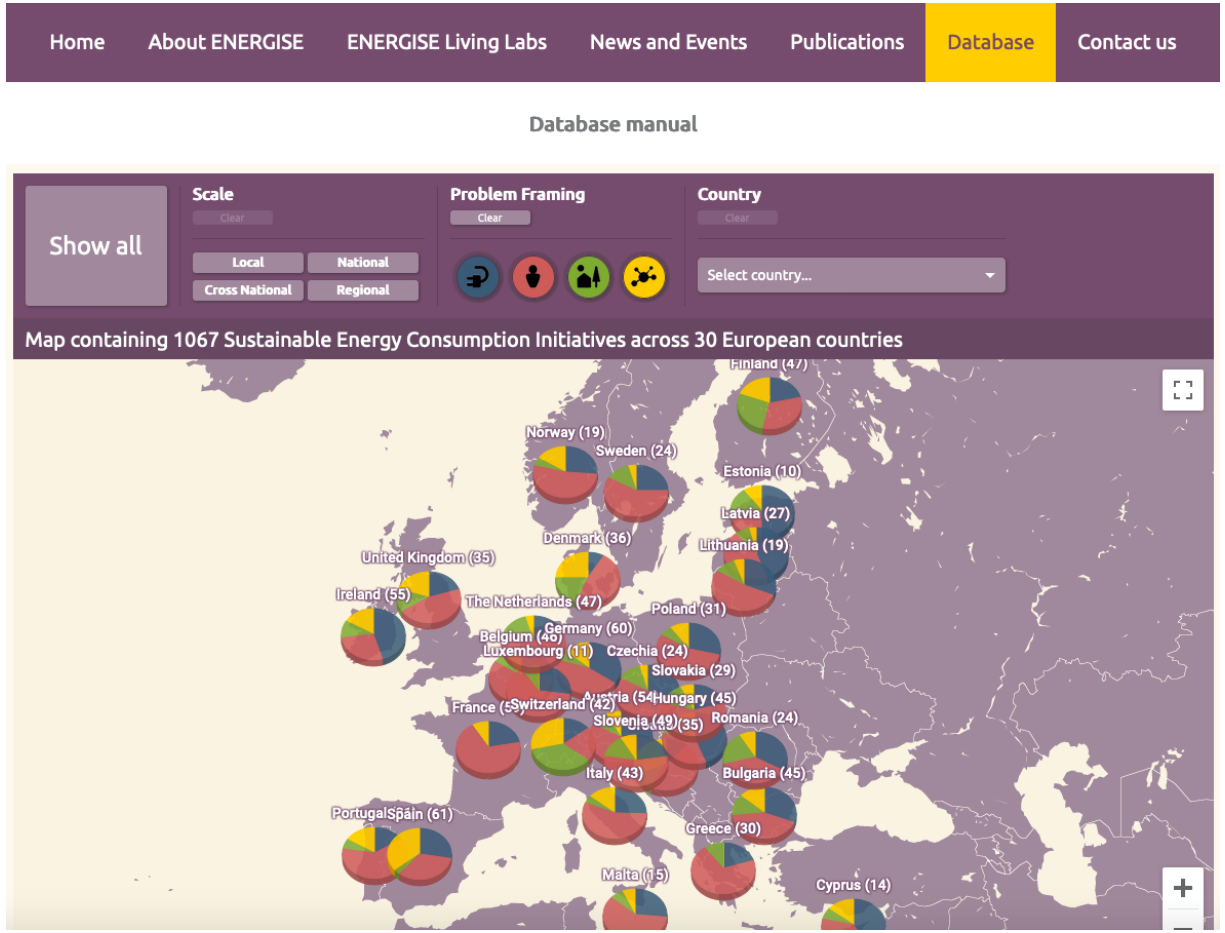
ENERGISE DATABASE OF SUSTAINABLE ENERGY INITIATIVES

Online database of 1067 initiatives, available on the ENERGISE website: www.energise_project.eu

Further reading on database methodology:

Jensen et al. (2018) Towards a practice-theoretical classification of sustainable energy consumption initiatives: Insights from social scientific energy research in 30 European countries. *Energy Research & Social Science,* 45, p297-306. https://doi.org/10.1016/j.erss.2018.06.025



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A CALL FOR NEW PROBLEM FRAMING

Problem Framing Typology and frequency of occurrence among 1000+ initiatives:

Increased complexity

Changes in technologies and products	26.4 %
Changes in individual behaviour	48.2 %
Changes in everyday life activities	11.7 %
Changes in social and material organisation	13.7 %

74.6 %

Source: Jensen et al. (2019) Achieving sustainability transitions in residential energy use across Europe: The importance of problem framings. *Energy Policy, 133*. https://doi.org/10.1016/j.enpol.2019.110927

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URBAN-BASED SUSTAINABLE ENERGY INITIATIVES

- Frequency of initiatives and initiator according to typology:

70%		Local gov.	Other gov.	Research institution	Non-profit	Community group	Private sector
Enhancing	140 (56%)	39	39	2	21	21	18
Directional	34 (14%)	22	12	-	-	-	-
Experimental	39 (16%)	4	16	6	7	3	3
Responsive	36 (14%)	6	-	1	13	13	3
Total	**249**	**71**	**67**	**9**	**41**	**37**	**24**

Source: Goggins et al. (2019) Sustainable transitions in residential energy use: Characteristics and governance of urban-based initiatives across Europe. *Journal of Cleaner Production, 237*: https://doi.org/10.1016/j.jclepro.2019.117776

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ACCOUNTING FOR DIFFERENT CONTEXTUAL CONDITIONS

TABLE 3: Summary of how contextual conditions might inform RwL choice of household engagement format.

CONTEXTUAL CONDITIONS		BEST FITTING CONTEXTUAL CONDITIONS FOR THE RWL ENGAGEMENT APPROACH	
target group	heterogeneous	NB, LbD, P2P, PP, CCG	homogeneous
participants have pre-existing environmental motivation	nonessential	NB, CCG, LbD, P2P, PP	essential
time commitment required from participants	negligible	NB, P2P, LbD, CCG, PP	significant
dependence on institutional and physical characteristics of the built environment	low	NB, PP, CCG, P2P, LbD	high
support for participants from external actors (tech experts, service providers)	nonessential	P2P, CCG, LbD, PP, NB	required
existence and nature of relevant social networks among participants	nonessential	NB, CCG, PP, LbD, P2P	required
diffusion relies on	external support	NB, CCG, PP, LbD, P2P	existing social networks

NB: needs-based tailored support, LbD: learning by doing, P2P: peer-to-peer learning, PP: pioneering practices, CCG: challenge, competition, game

Source: Heiskanen et al. (2018) Designing Real-World Laboratories for the Reduction of Residential Energy Use: Articulating Theories of Change. *GAIA*, *27*/SI, 60-67: https://doi.org/10.14512/gaia.27.S1.13

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WHAT IS THE ISSUE WITH TECHNOLOGICAL EFFICIENCY?

- Scientific research and public policy in the field of energy use has largely focused on drivers towards greater carbon efficiency
- However….**short-term efficiency gains may be wiped out by increasing overall consumption** over time.
- Efficiency approaches do not question **fundamental needs** or challenge **social norms**

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SO, HOW TO DESIGN FOR CHANGES IN EVERYDAY LIFE?

- Understanding of **'dynamics of consumption':** "…energy demand is embedded in shared practices and activities that make up the ongoing flow of society" (Hui, Day and Walker 2017: 2).

- Understanding **opportunity for change**: "…how do conventions around energy services evolve, how do they alter over time, and how can they be changed once they are cemented?" (Sovacool 2014: 19).

Grapple with **social norms** and **household practices** which use energy services.

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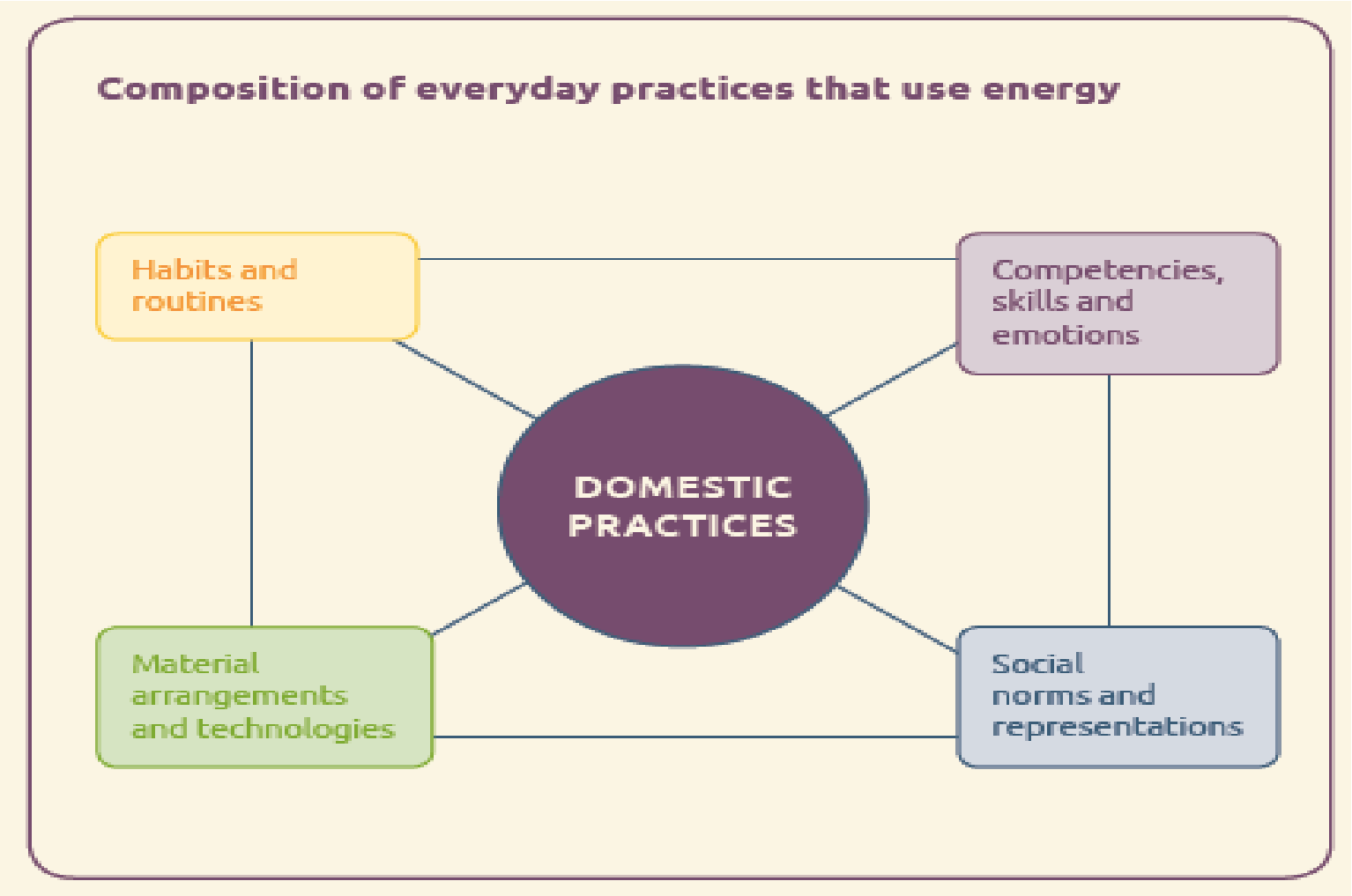
SOCIAL PRACTICE FRAMEWORK



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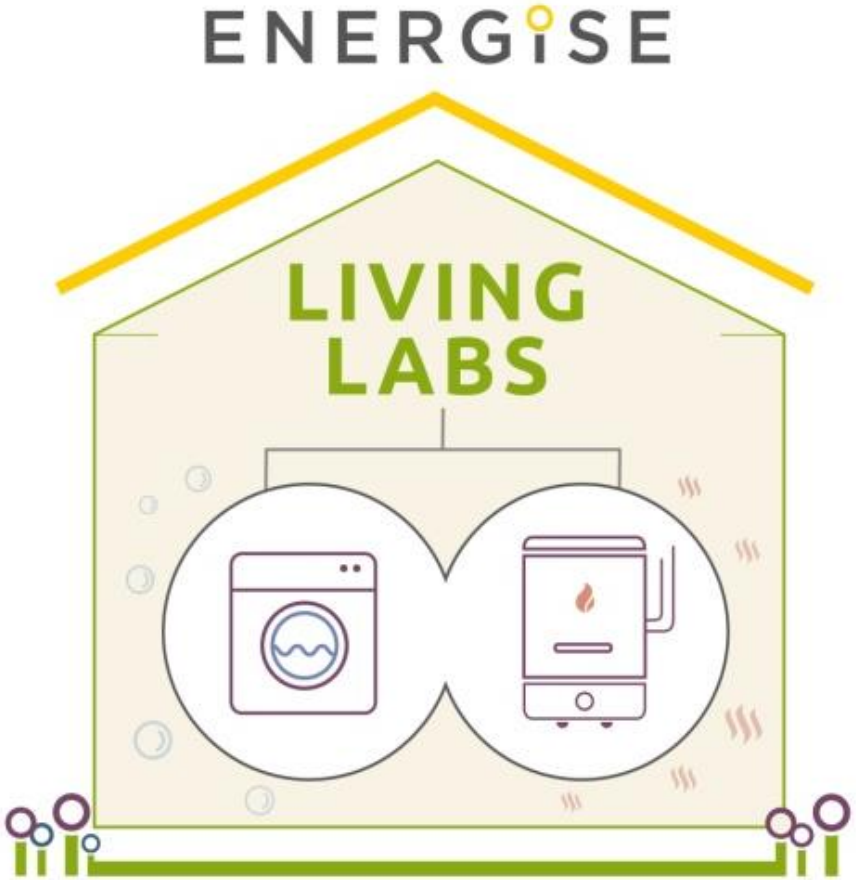
LIVING LAB APPROACH

- Citizens, associations, and researchers coming together to co-create new approaches/knowledge/competencies
- In a bounded space and time: people's homes, approx. 11 weeks
- Emphasis on learning and experimenting
- Avoiding prescriptions, aiming to guide and support
- Both individual *and* collective living lab design



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TWO CONSUMPTION DOMAINS, TWO TARGETS

- Heating challenge: Absolute reduction to 18 degrees, for 4 weeks
- Laundry challenge: Relative reduction to halve laundry cycles, for 4 weeks

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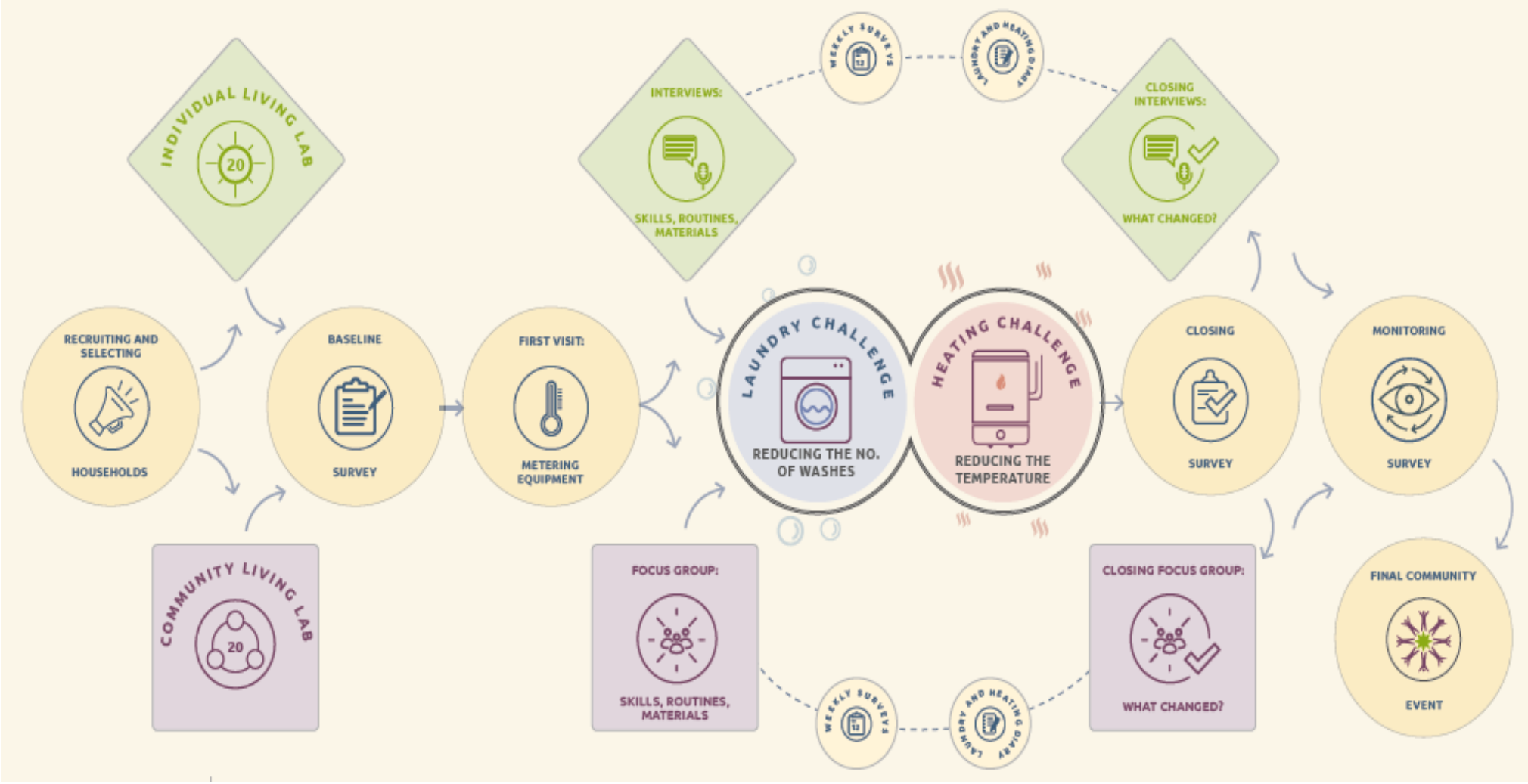
ENERGISE LIVING LAB DESIGN: INDIVIDUAL AND COLLECTIVE



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CHALLENGE KITS: TIPS & TOOLS, RATHER THAN PRESCRIPTIONS

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CHALLENGE KITS: TIPS & TOOLS, RATHER THAN PRESCRIPTIONS

DID YOU KNOW...

... that the ancient Greek were the first to use central hearths for indoor heating? The ancient Romans advanced indoor heating systems by developing hypocausts: ducts and pipes carrying furnace-heated air through the floors and walls of homes and public baths.

... that it took a lot of time and ingenuity to develop modern indoor heating systems? It still takes the constant work of engineers, manufacturers, installers and maintenance personnel to turn indoor heating into a service that we hardly give a second thought to.

... that the average indoor temperature in Britain in the 1950s was 18°C while it is 22°C today? The main reason why people felt just as comfortable in their homes then as we do now is clothing. Social norms around indoor clothing in winter time have changed.

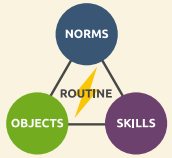
... that about two thirds of all energy consumed by a European household is used for space heating?

... that outer space is constantly cooling by about 1°C every three billion years – but will never quite reach 0°C due to the background radiation left over from the Big Bang? (In case you are wondering: 'universal cooling' has no effect on 'global warming'. The effects of accumulating greenhouse gases in the earth's atmosphere dwarf the overall cooling of the universe.)

THANK YOU!

We are thrilled that you agreed to be part of the **ENERGISE Living Labs** as one of 40 households in Ireland!

With the overall goal to explore change in everyday life, the **ENERGISE** energy initiatives ***challenge social norms and invite you to experiment with new habits and routines using new objects and skills.***



You are not alone!

Across Europe, **320 households** are participating in the energy challenges organised by the ENERGISE project. The eight countries involved are: Denmark, Finland, Germany, Hungary, Ireland, Switzerland, the Netherlands and the United Kingdom.

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EUROPEAN NETWORK FOR RESEARCH, GOOD PRACTICE AND INNOVATION FOR SUSTAINABLE ENERGY

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WELCOME TO THE ENERGISE HEATING CHALLENGE

As it is getting colder outside, the second four-week challenge of the ENERGISE Living Labs targets energy used for heating.

Standards of thermal comfort have changed considerably over time – and can change again! **Let's find out together how change can be feasible and fun at the same time!**

Our heating challenge focuses on **heating bodies instead of heating homes**. We all know that people prefer different indoor temperatures and have their own ways to keep warm in winter time. A common strategy is setting indoor temperatures somewhere in the range of 20-24°C.

We invite you to challenge yourself to heat your home to a lower temperature. To get started, please read through this leaflet and take a look at the content of your 'heating challenge kit'.

If you do not remember the exact temperature you have agreed for this challenge, please consult the challenge card you filled in a few weeks ago or contact your local research team.

Thank you in advance for continuing to fill in the weekly surveys and the laundry and heating diaries!

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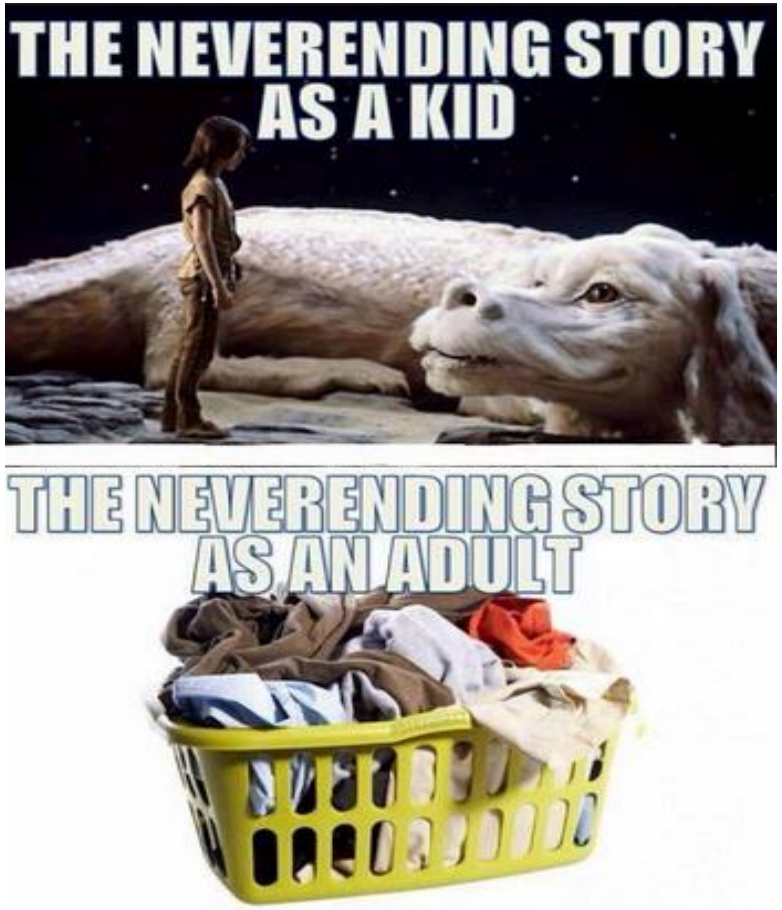
DELIBERATION PHASE: CONTESTING NORMS THROUGH PHOTO ELICITATION



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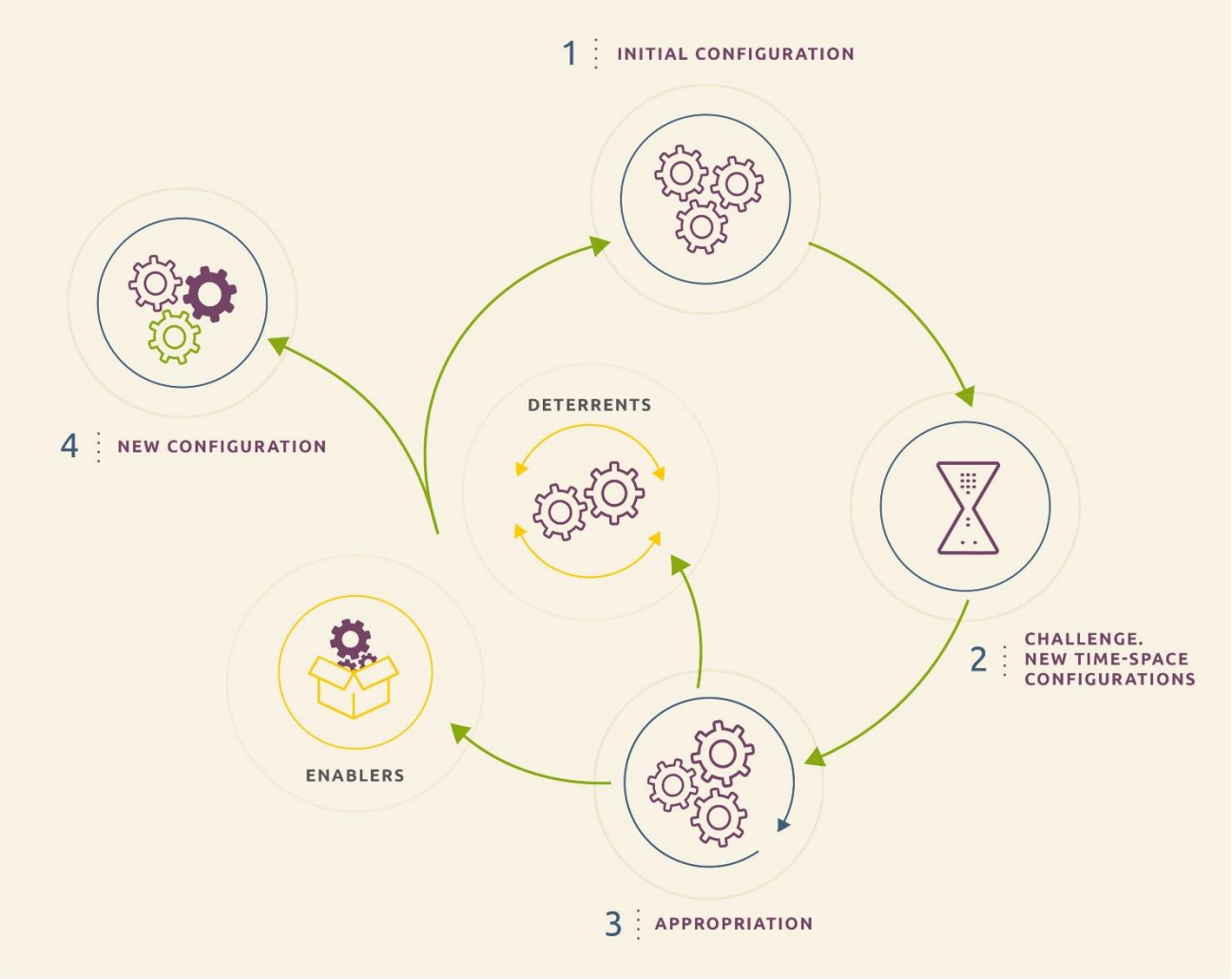
STAGES OF LIVING LAB APPROPRIATION BY HOUSEHOLDS



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HEATING CHALLENGE: RESULTS FROM ENERGISE LIVING LABS

- The ideal temperature doesn't exist and depends on the room (and associated activity), life stage of people (children, elderly), and social relations (guests)
- People's bodies are excellent 'sensors' and are also adaptable.
- Reducing the temperature results in an intensification of existing practices, rather than new ones (wear warmer clothes).
- The ability to adapt the temperature and understand how the heating works is a critical first step.
- Lower heating in bedrooms is desirable!

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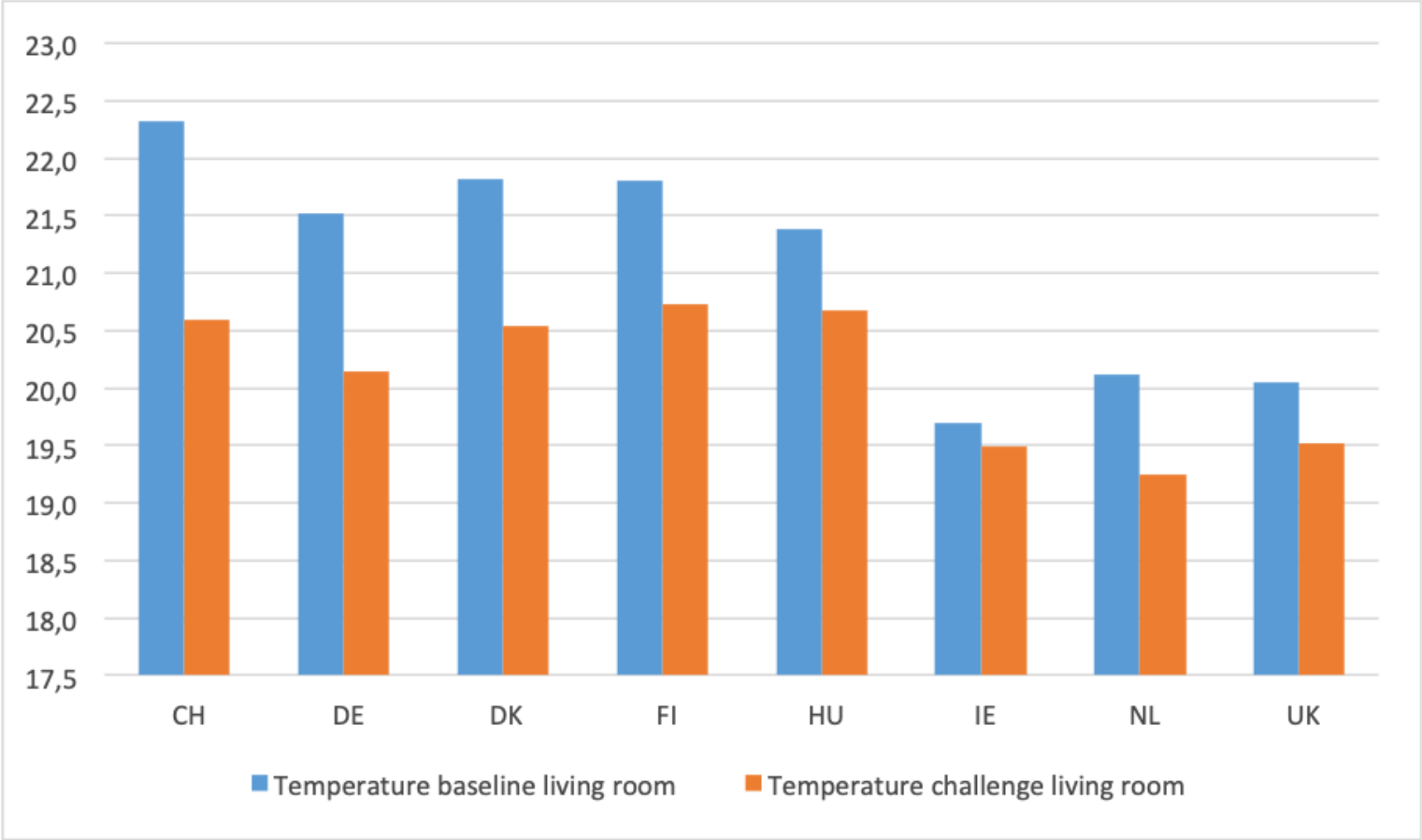
RESULTS FROM ENERGISE LIVING LABS



Reported living room temperature baseline and average values during challenge. Source:
Sahakian et al (2019) Report on the analysis of ENERGISE Living Labs data across all eight participating countries, D5.2.

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LAUNDRY CHALLENGE: RESULTS FROM ENERGISE LIVING LABS

- The challenge allowed people to question their own social norms and standards; participants realized that they can wear clothes several times, without negative judgments.
- This led to modifications in “doing the laundry” as a series of tasks, and the development of new skills and competencies.
- People have both a mechanical (wear once, wash) and sensory approach to what is clean or dirty.
- On a daily basis, the ‘mental load’ was reduced and in families, laundry became less gendered (younger generations became involved).

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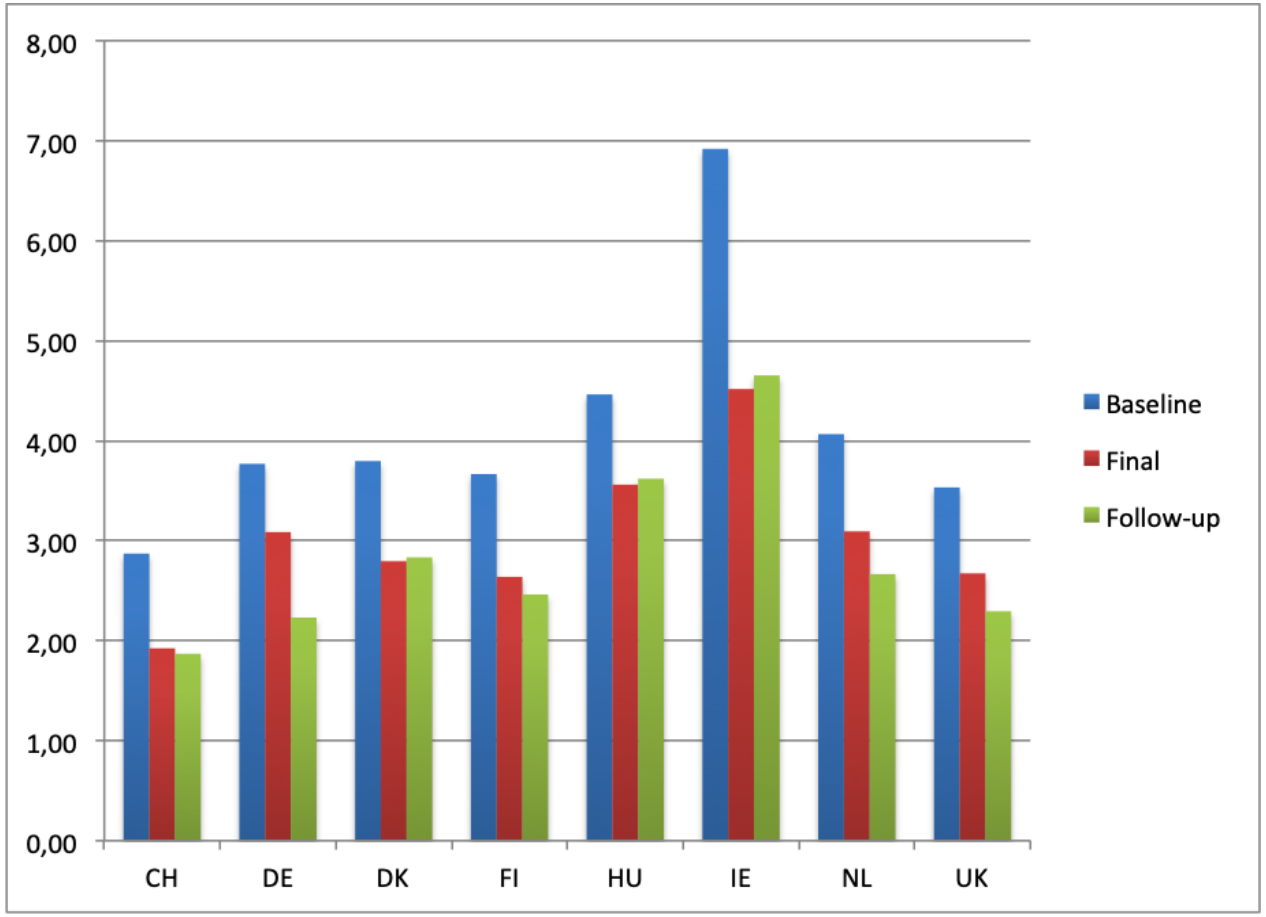
RESULTS FROM ENERGISE LIVING LABS



Stated weekly average laundry cycles by country, before, at the end of and 3 months after the challenge. Source: Sahakian et al (2019) Report on the analysis of ENERGISE Living Labs data across all eight participating countries, D5.2.

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RESULTS FROM ENERGISE LIVING LABS

Average changes in reported temperatures and wash cycles during ELLs:

Change in temperatures		Change in weekly wash cycles		
Living room	**Bedroom**	**For all households**	**Family of 2**	**Family of 4**
From 21.12°C to 20.16°C	From 20.0°C to 18.6°C	From 4.2 to 3.1	From 4.3 to 3.2	From 4.1 to 3.0
1°C less	1.4°C less	1.1 cycle less (26% reduction)	1.1 cycle less (26% reduction)	1.1 cycle less (26% reduction)

Source: Sahakian et al (2019) Report on the analysis of ENERGISE Living Labs data across all eight participating countries, D5.2.

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POLICY RECOMMENDATIONS

- At a minimum and as a **key policy message**, we can state that:
  - **Reducing indoor temperatures by 1°C** in the winter months is possible and not *un-comfortable*.
    - 1°C reduction in temperature equals approx. 5% energy saving for heating
  - **Reducing by 1 laundry cycle per week** is possible and not *in-convenient.*
    - 52 fewer wash cycles per year saves time, water, laundry products, electricity use, carbon emissions, depreciation of appliances

This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 727642.

KEY RESULTS

- **Changing practices, not people, nor technologies:**
  - Engaging and empowering people in new ways of doing is impactful in terms of reducing energy consumption.

- **Giving people the space and means for experimentation:**
  - Creating spaces for reflexivity involving different actors is effective for discussing and debating tacitly accepted norms and assumptions around consumption practices.
  - Validating the Living Lab approach!

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KEY RESULTS

- **Heating bodies, rather than solely heating spaces:**
  - It is possible to engage in public discourse around the need to heat bodies, rather than solely spaces, during colder periods.

- **Placing people and everyday practices at the centre of 'smart technology' approaches:**
  - It must be ensured that people can continue to have an influence on their thermal comfort, rather than counting on smart buildings or invisible heating systems that allow only limited human interventions.

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AMPLIFYING RESULTS

1. **Media partners, both traditional (radio, television and print), and social media**, or the role of the media in relation contesting social norms.
2. **Social or peer groups,** recognising their role in social learning and integrating challenges into educational programs (school, workplace).
3. **Small to medium enterprises,** engaging the building and design industry, and new business development ideas.
4. **Cities and municipalities,** as well as the utility sector, and energy intermediaries.
5. **Non-energy-related policies,** urban planning standards, labelling on clothing items, among others.

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Enabling the Energy Union

Decarbonising household energy consumption:

How close will it come to meeting the EU's energy-climate targets?

Stijn Van Hummelen, Managing Director of Cambridge Econometrics (Belgium)

László Szabó, Director of the Regional Centre for Energy Policy Research

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This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement number 727524.

Overview

- Methodology: modelling framework
- ENABLE.EU combined scenario
- Results:
  - Economic impacts
  - Energy impacts
  - Meeting the targets
    - what the targets are
    - how close does the scenario get us to the target?
- Concluding remarks

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Methodology: a novel modelling framework was applied

- Cambridge econometrics (CE) and REKK generated a modelling framework to assess households' contribution

Modelling household decisions → Macro modelling → Energy market modelling

- CE utilised a suite of FTT models to measure the household energy technology choices in the three key areas.
- CE's macroeconomic model E3ME assessed the wider economic impacts of these choices
- and REKK's electricity and gas market models were used to estimate the impact on the energy market and on consumer prices

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The ENABLE.EU scenario: modelling the role of consumers in the low-carbon transition

- To assess the ability of households to transition to a low-carbon economy, the ENABLE.EU scenario was designed
- It combines ambitious policy measures which considerably alter household decision-taking in three key areas, mobility, energy consumption and energy production:
  1. Reduced use of passenger vehicles and transition to e-Mobility (tailpipe emissions from road transport reduce by 80% in 2050 compared to 1990)
  2. Zero local emissions from heating and cooling by 2050
  3. Democratisation of electric production for household consumption via deployment of rooftop solar PV

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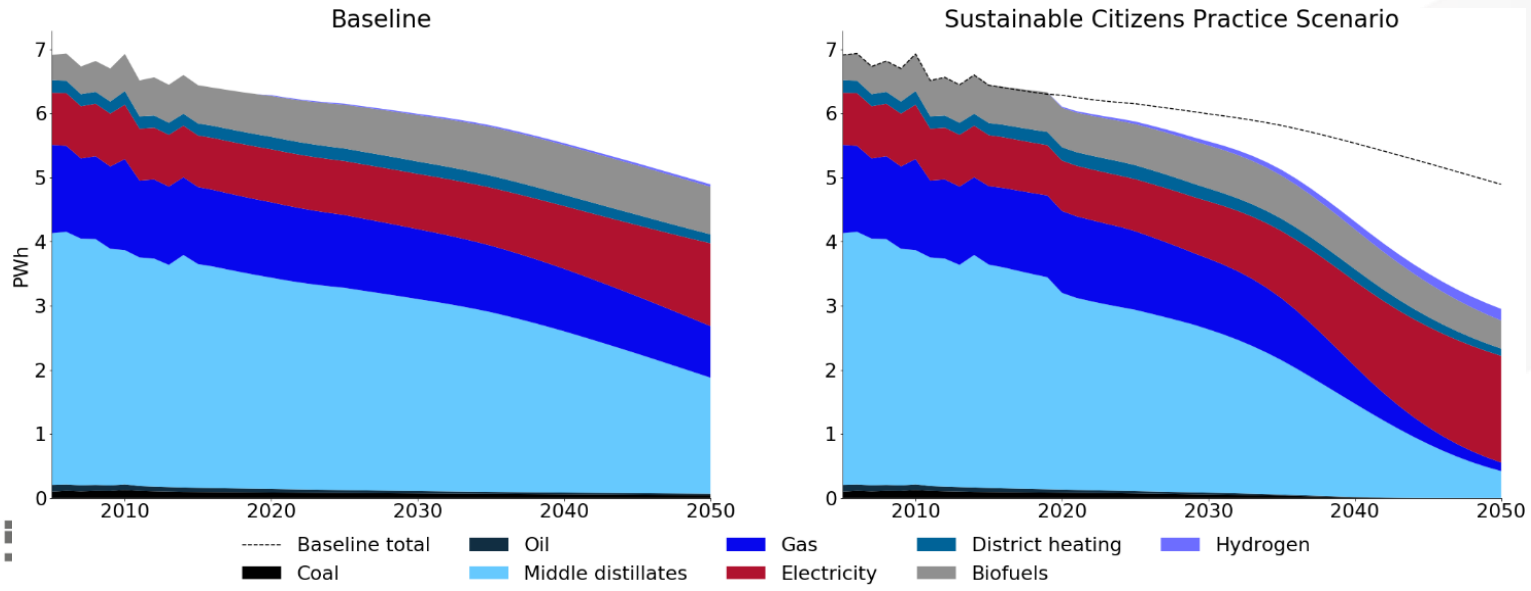
Impact on energy demand: changing consumer decisions leads to large scale electrification

- Total household (incl. mobility) energy demand falls driven by:
  - take up of energy efficient and renewable technologies (e-Mobility, renewable heating technology) and
  - take up of solar PV
- As most new technologies are powered through electricity, the share of electricity grows: to over half of total energy demand in 2050



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The EU energy-climate targets

1. Reduce greenhouse gas emissions by at least 40% (compared to 1990)

2. Increase the share of renewable energy in final energy consumption to at least 32%

3. Achieve energy efficiency improvements of at least 32.5% (compared to the EU Reference Scenario 2007 baseline projections)

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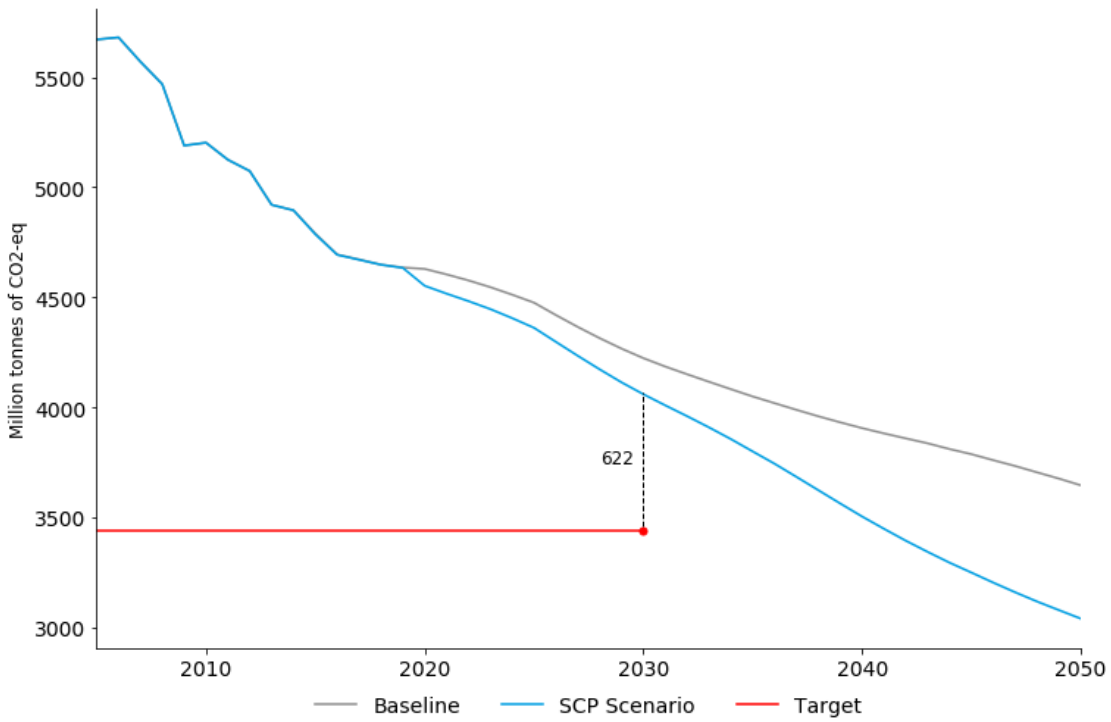
The GHG emissions reduction target cannot be met by households alone

- The modelling suggests that by 2030, households can achieve a reduction in GHG emissions of 29% compared to 1990 levels
- Although considerable reductions are achieved, the efforts by households falls short of the target
- Policy in other areas of the economy will be needed to help reduce emission by a further 622 million tonnes of CO2-eq



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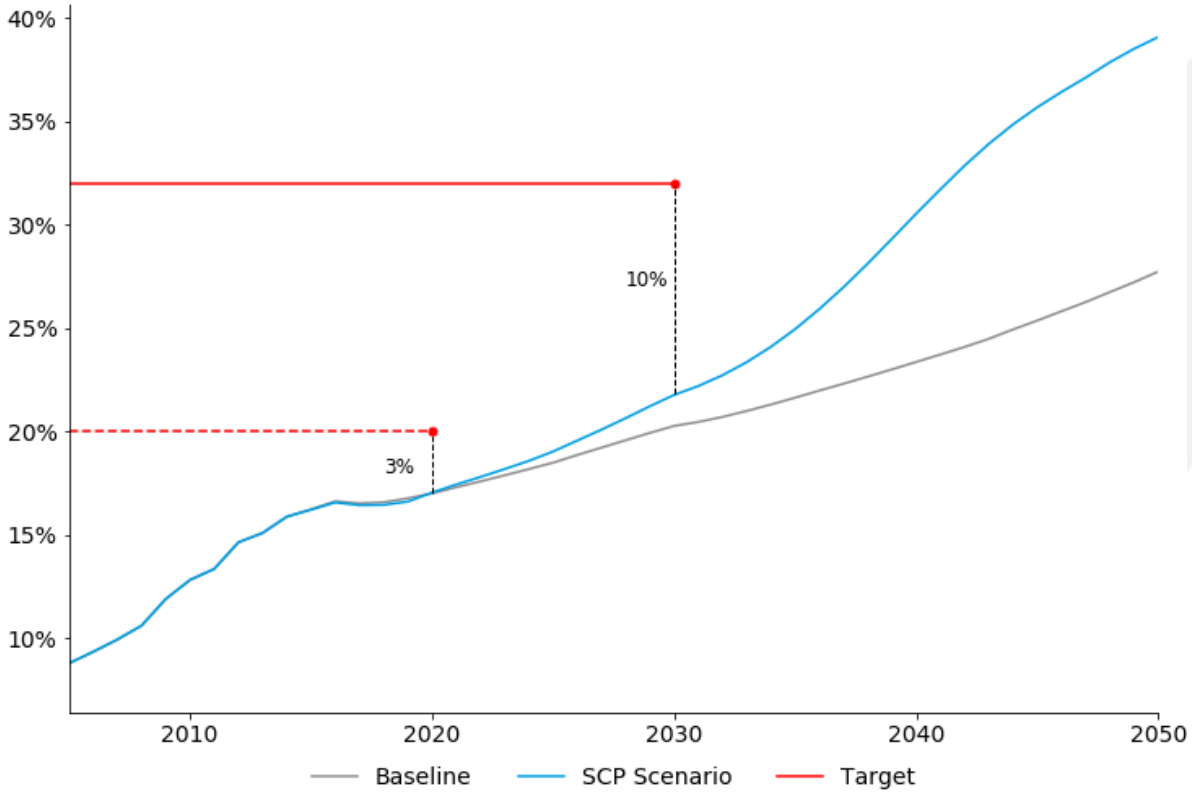
Households can help to increase the penetration of renewable technologies

- By 2030, changes in household sector can lead to 22% share of RES in final energy consumption.
- Again there is a considerable effort made by households, but much more is needed
- The scenario does not take into account any changes to the power sector or industry



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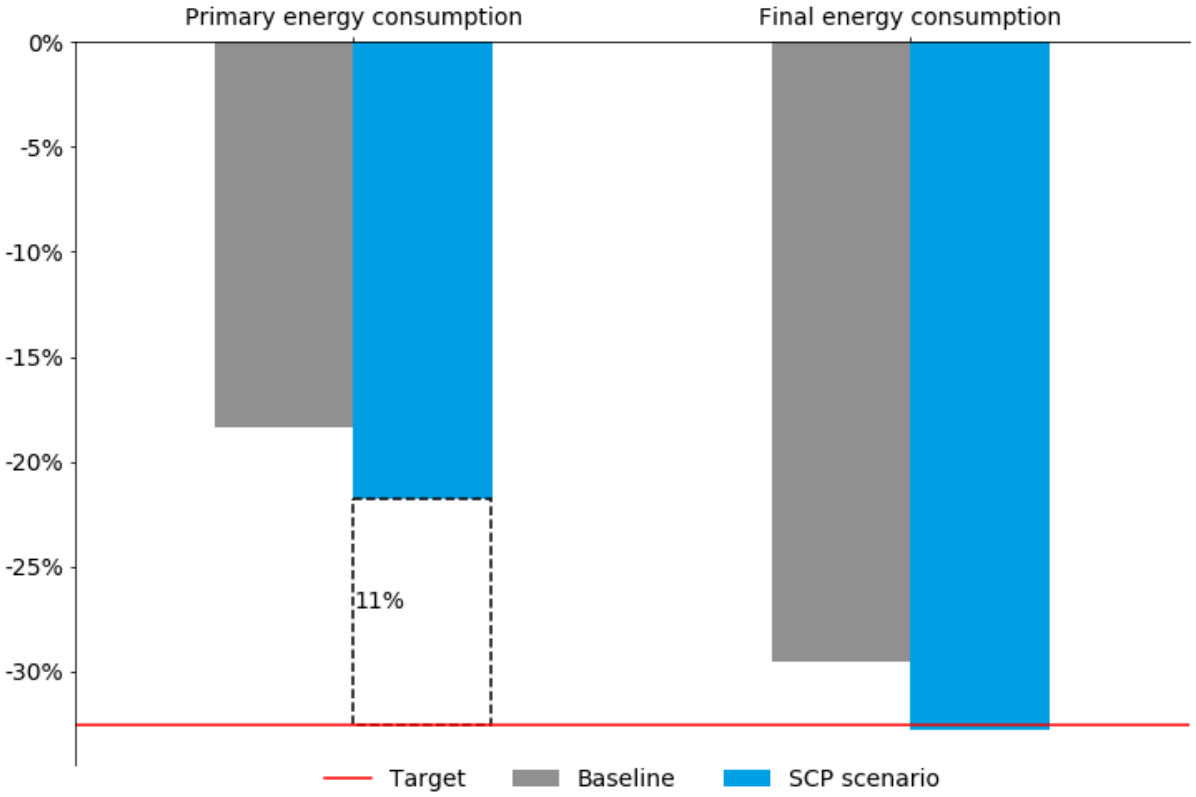
Households can meet an aspect of the energy efficiency target

- Energy efficiency target are for primary and/or final energy consumption
- No policies in primary energy consumption means this part of the target is not met
- But final energy consumption energy efficiency is achieved via:
  - e-Mobility
  - renewable heating technologies, and
  - energy efficient appliances



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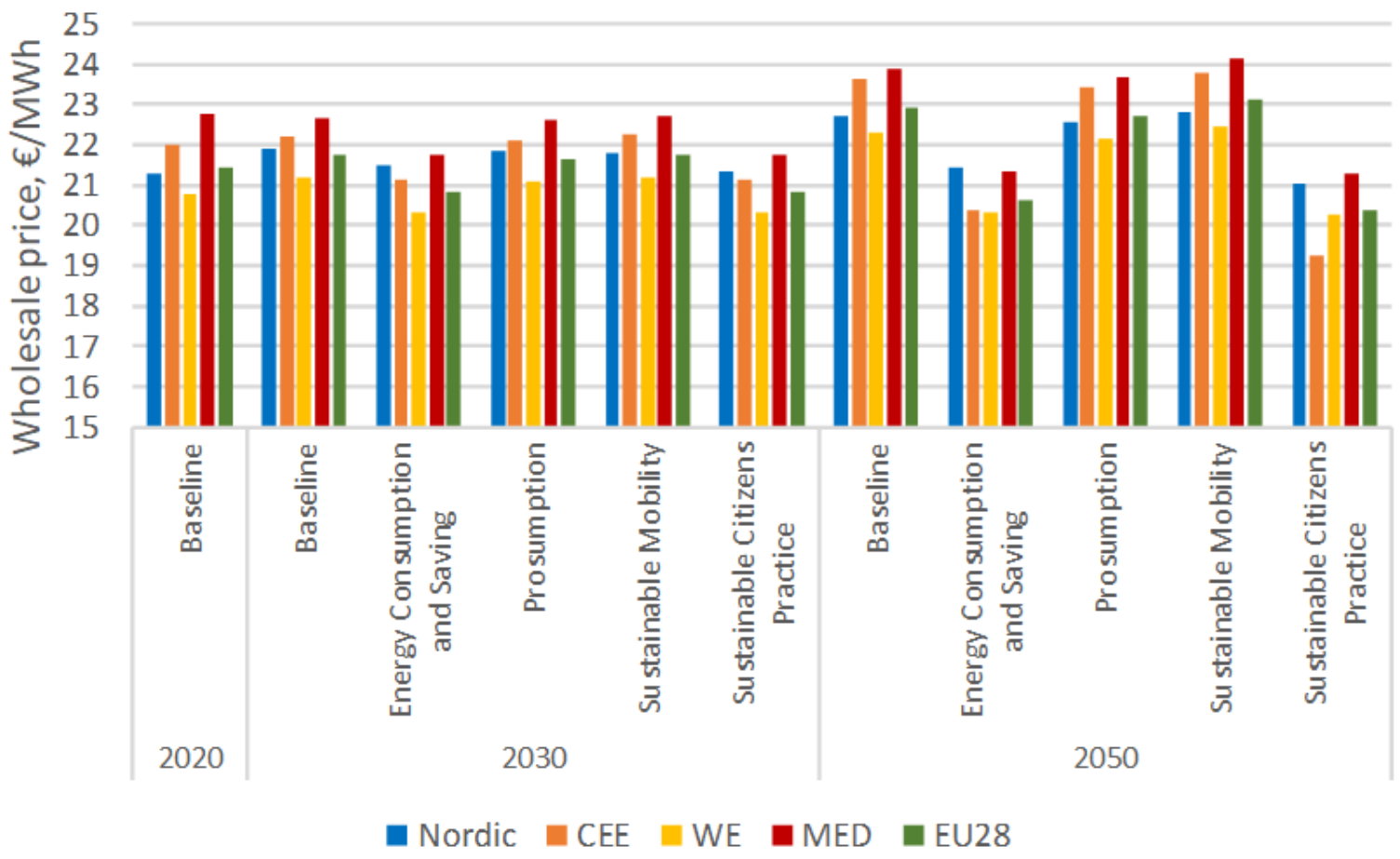
Energy impact: Wholesale gas prices



- Households savings in gas consumption in the Energy consumption and SCP scenarios results in significant gas price reductions
- This translates to significant energy bill savings
- It can also reduce import of natural gas to the EU, improving supply security

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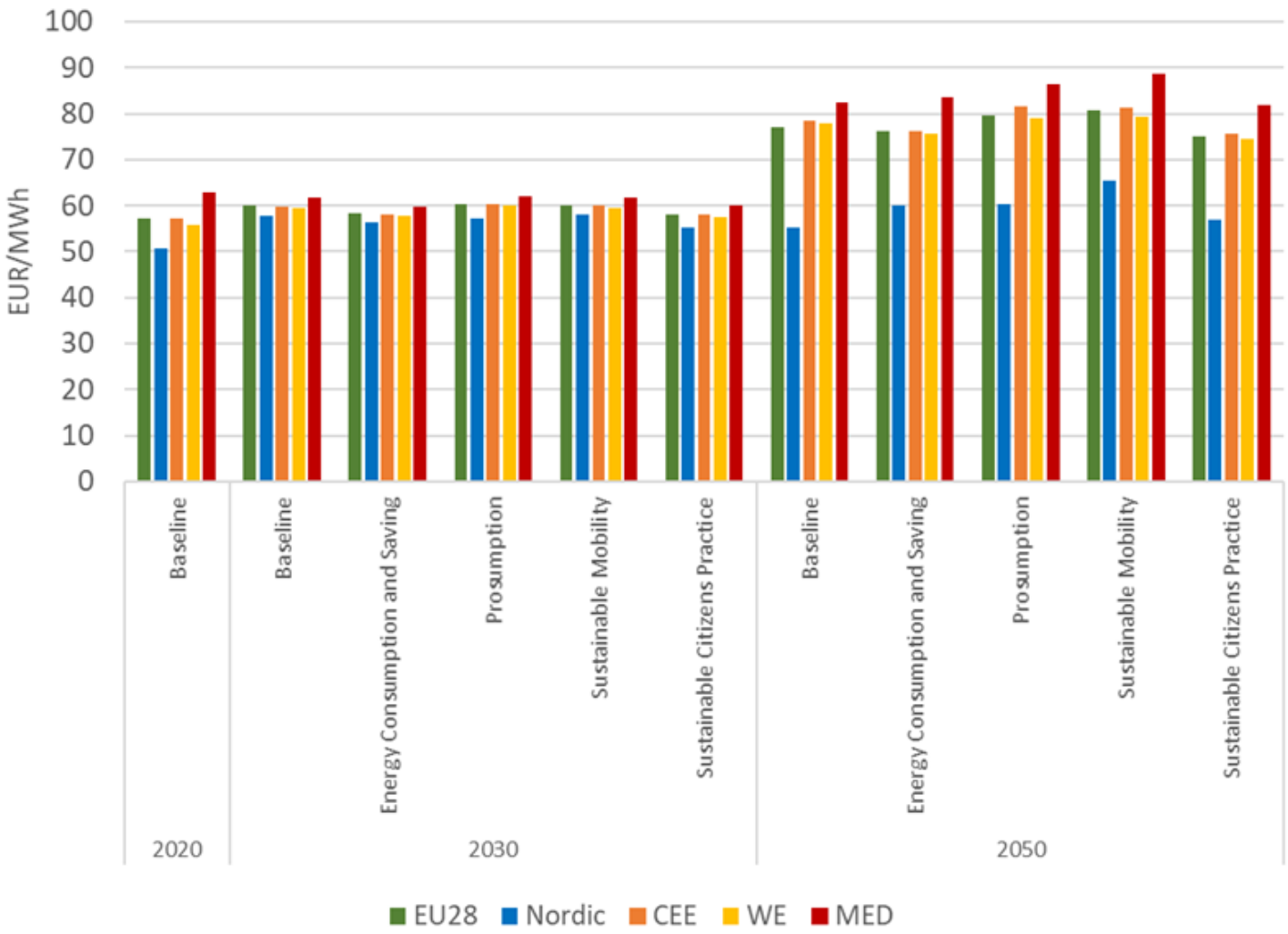
Energy impact: Wholesale electricity prices



- Significant growth in electricity consumption of households can be reached without increase in wholesale electricity prices
- The policies and measures reduce emission intensities in the power sector but the increased electricity consumption compensates this positive effect in the mobility scenario

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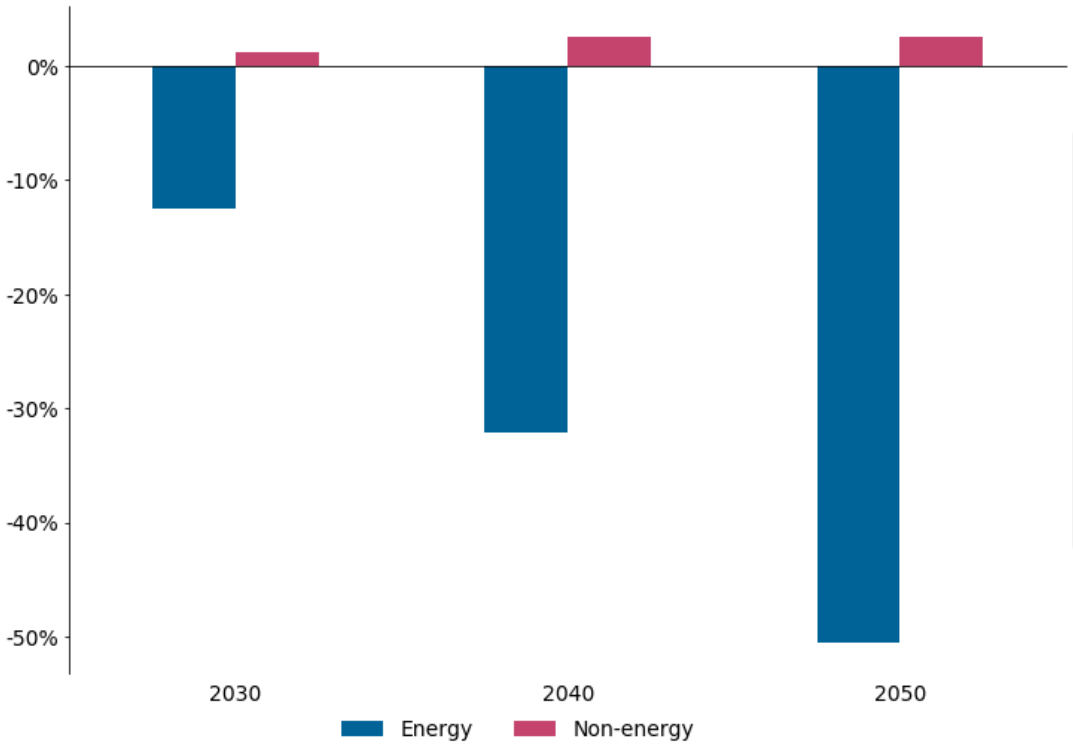
Economic impact: changing consumer choices also changes their expenditure patterns…

- Decarbonisation means households will spend less money on their energy bill (on average 50% less in 2050)
- This results in more consumption elsewhere in the economy
  - spending on other goods and services
  - part of this is higher expenditure on new technologies
- Overall, in 2050 there is a net increase in consumer expenditure of €130 billion



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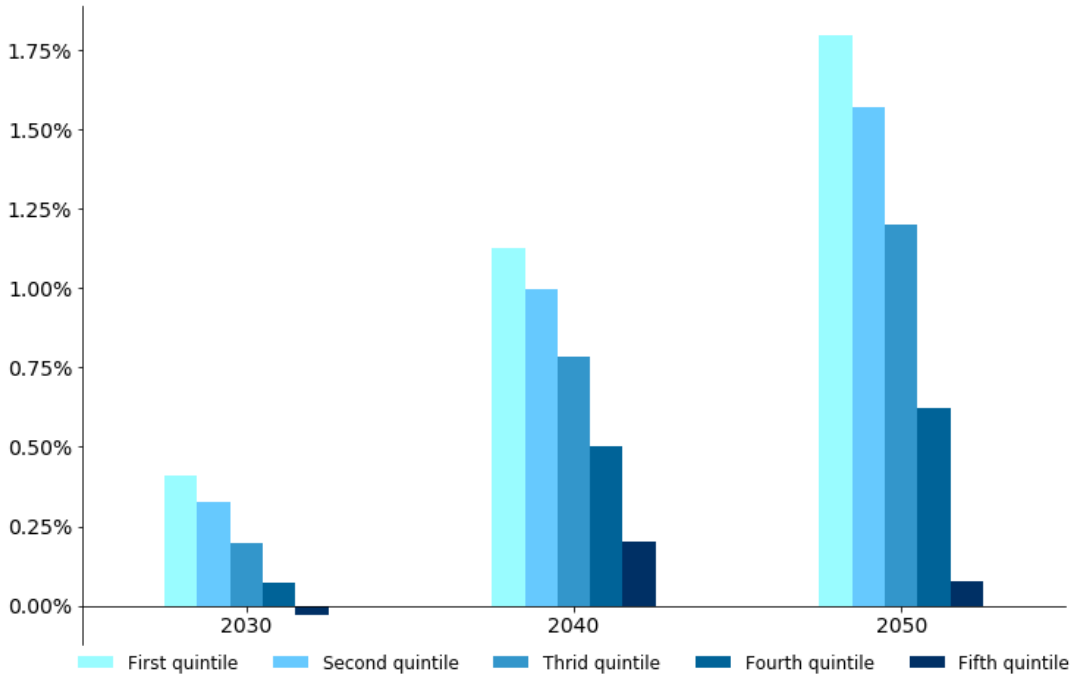
…while incomes are increased

- The greatest increase in incomes is attributed to low income households
- This is because energy bills make up a larger share of their total expenditure…
- …and because the modelling assumes an even split of the funding through VAT, income tax and employer's social contribution
- Different funding mechanism, e.g. wholly through VAT, could reduce the benefit to lower income households



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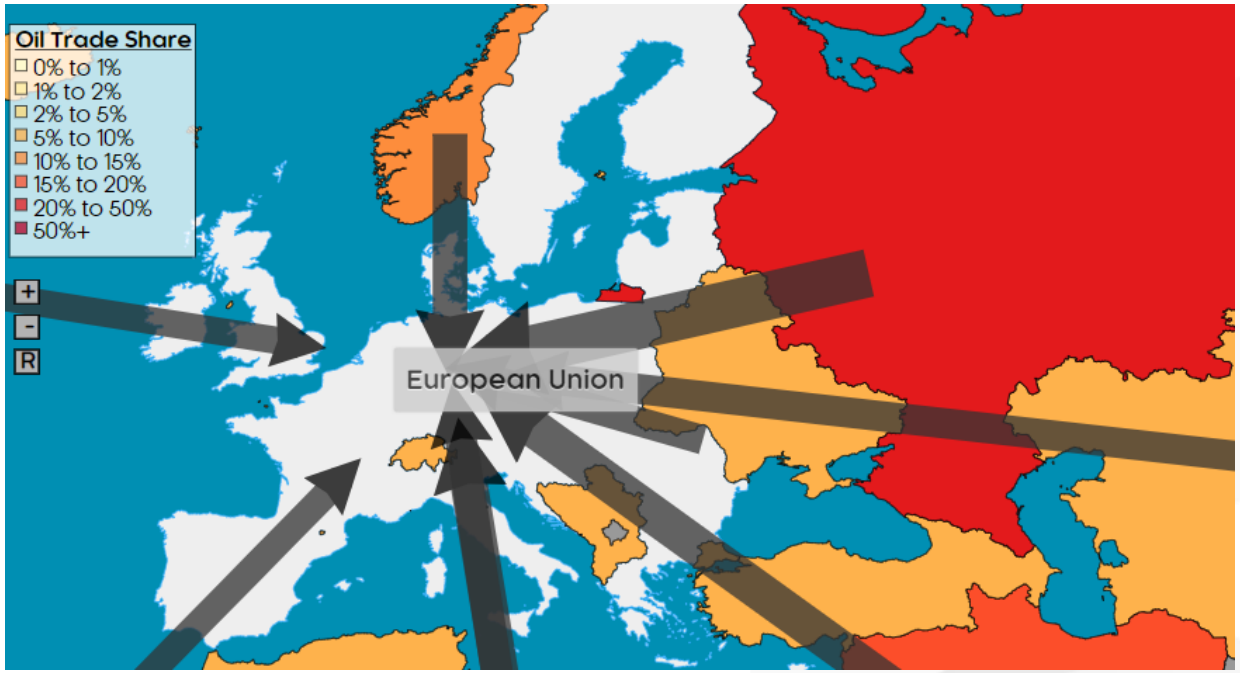
The economic impacts are driven by a shift away from imported fossil fuels

- The majority of EU fossil fuels are imported, therefore decarbonisation reduces the leakage from the EU economy
- Instead the money is spent on goods and services where more value is captured within the EU, which generates more valued added along EU supply chains and boosts GDP and employment in the European economy



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Concluding remarks

- Ambitious policy action engaging households in the energy transition can provide a significant household contribution to reducing greenhouse gas emissions, increasing renewables deployment and increasing energy efficiency in Europe
- Substantial contributions from households are possible, but they are not sufficient to meet the EU energy-climate targets; additional policy measures targeting other areas of the economy (e.g. the power sector) are needed
- The area where household can contribute the most is through energy efficiency
- There is economic benefit from the transition, via increased domestic spending
- Low income households can benefit considerably if careful attention is paid to the distributional impacts of policies and government funding mechanisms

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CONCLUSION
H2020, Energy and Social Sciences & Humanities

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