ODYSSEE-MURE

Energy Sufficiency Indicators and Policies

Lea Gynther, Motiva Oy

28 September 2021

Rewieved by: Dr Wolfgang Eichhammer (Fraunhofer Institute for Systems and Innovation Research ISI)

Energy Sufficiency Indicators and Policies

Motiva

Contents

Introduction to energy sufficiency

Energy sufficiency indicators

Policies and measures

What next (policy implications)?
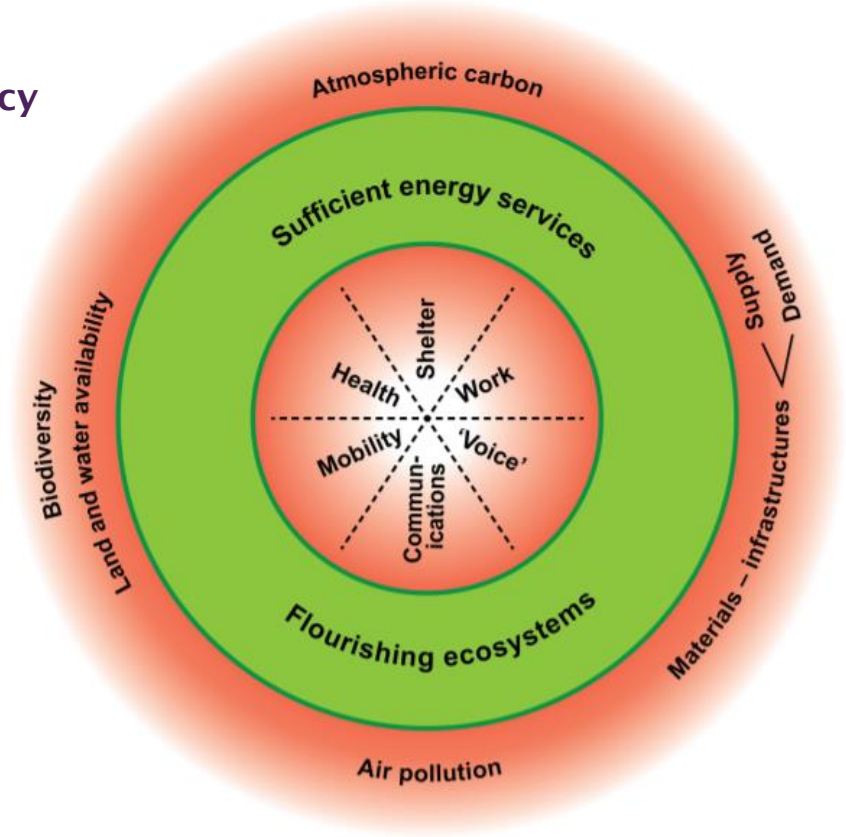
28.9.2021

Motiva

Introduction to Energy Sufficiency

Motiva

What is energy sufficiency?

Energy sufficiency is a state in which people's basic needs are met equitably and ecological limits are respected. (from eceee Sufficiency Project)

Energy Sufficiency Donut

Atmospheric carbon

Sufficient energy services

Biodiversity

Land and water availability

Supply

Demand

Health · Shelter · Work · 'Voice' · Communications · Mobility

Materials – infrastructures

Flourishing ecosystems

Air pollution

28.9.2021

Motiva

Relationship between energy efficiency and energy sufficiency

Why energy sufficiency? Energy efficiency alone is not enough to meet the climate objectives and avoid exceeding the maximum carrying capacity of the environment.

Energy efficiency involves improving ratios, achieving greater output for a given input, while energy sufficiency involves recognising and living within absolute environmental limits. (eceee Sufficiency Project)

Many policies and measures are the same, but sufficiency can also be addressed by measures not primarily set up for energy efficiency purposes.

28.9.2021

Motiva

Some "numerology"*

A meta-analysis of 18 studies to identify a point where increased energy consumption no longer correlates with increased well-being: sufficiency range from 60 to 221 GJ/capita/year (on TPES basis) with a mean of 132 GJ. (Burke 2020)

- Mean very close to the European average level

Policy example: Switzerland aims to "2000 W society", corresponding to 63 GJ/capita/year.

- Ambitious: halving the current average level

UN Secretary General's Advisory Group on Energy and Climate Change: modern needs could be met through an aggregate energy use of around 37 GJ/capita/year (26 GJ of final consumption).

- Extremely ambitious

* Burke, M.J. (2020): Energy-Sufficiency for a Just Transition: A Systematic Review. University of Vermont. Energies Journal 13 May 2020

28.9.2021

Motiva

Sufficiency Indicators in the Odyssee Database

Motiva

Indicators per sector

Households: average floor area/person or dwelling or new dwelling; the share of impermanently occupied dwellings; number of persons in permanently occupied dwellings; number of appliances per household.
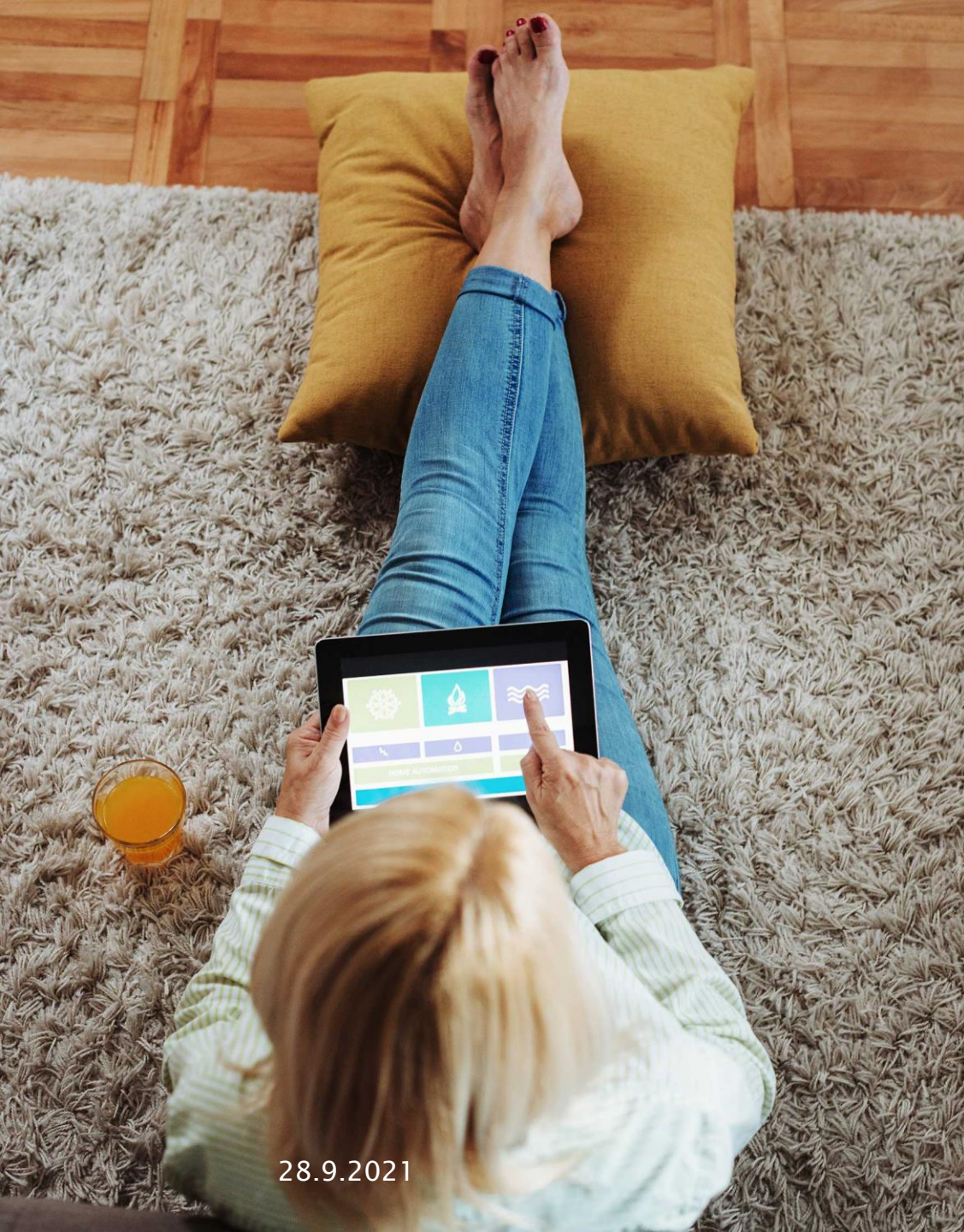
Transport: cars/person or household; road and air travel mileage/person; passenger-km/cars; data on modal split; data on car features.

Services: floor area/employee; final energy consumption/employee or floor area; electricity consumption/employee or floor area.

28.9.2021

Motiva

Household example: Floor area per person in 2018

Source: Odyssee 6/2021

28.9.2021

Motiva
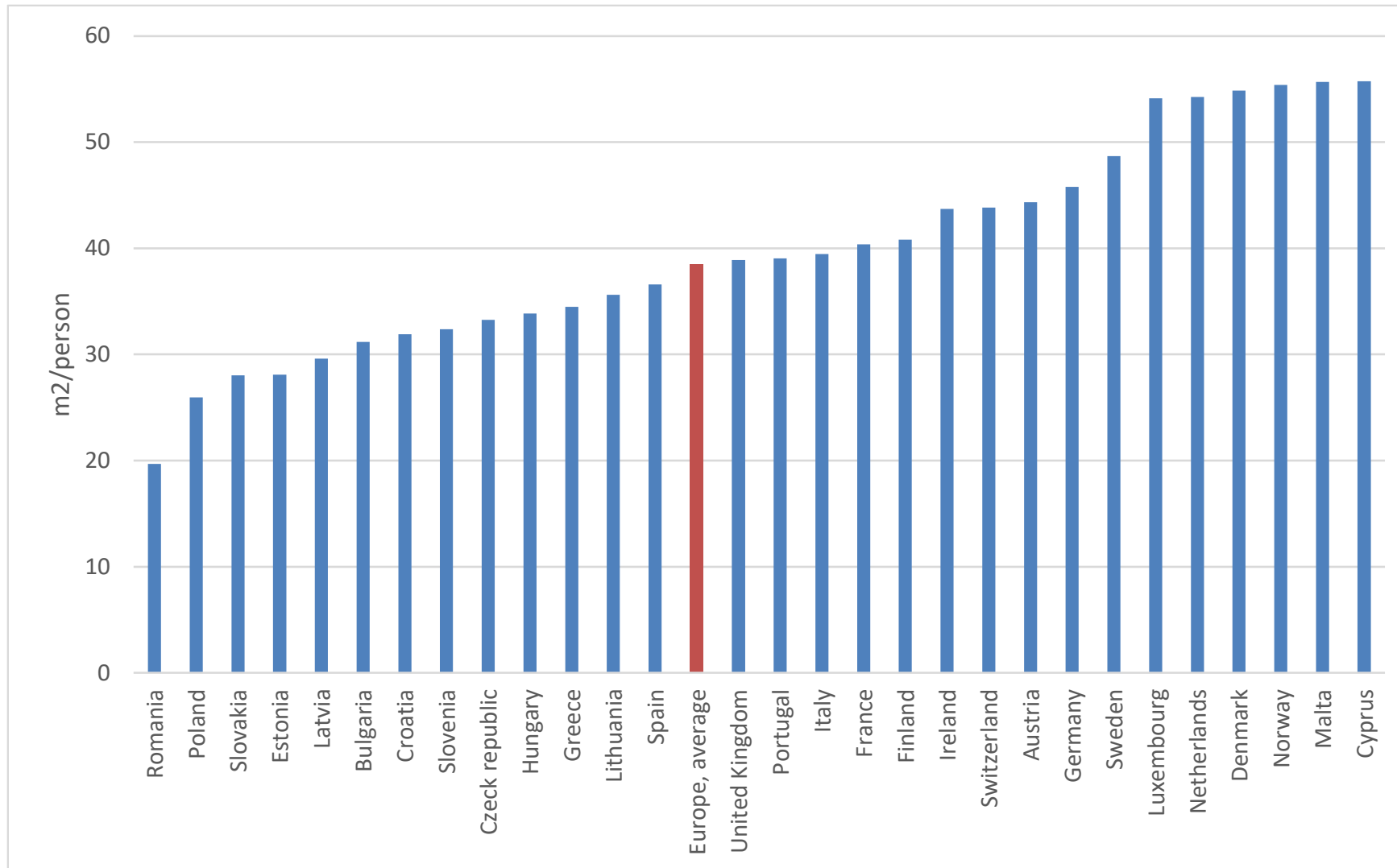
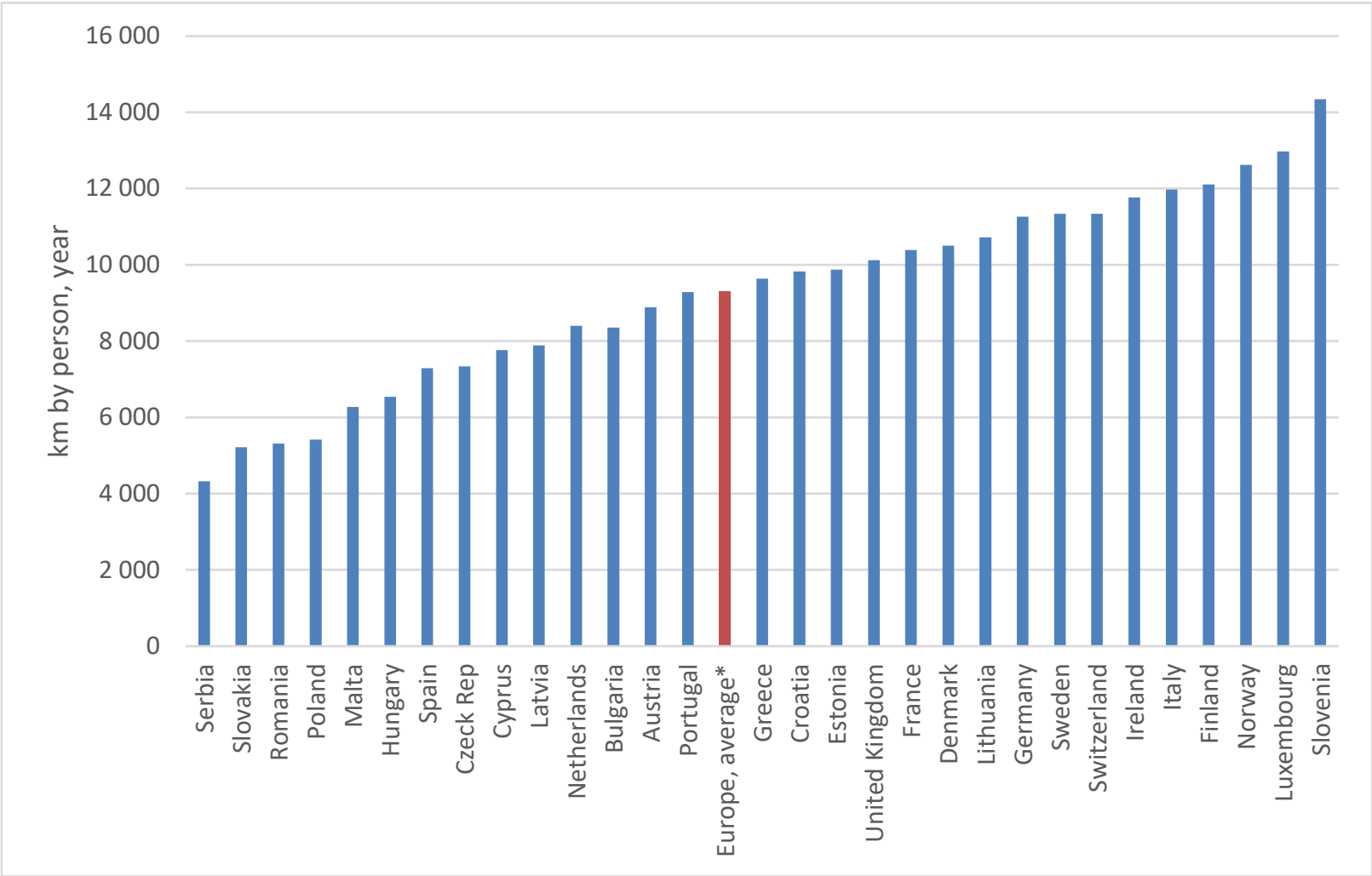# A little back-of-the-envelope example calculation with Odyssee data - living space

Let's cap the floor area per person at 35 m² (concerns 16 countries in the previous figure) and compare this to the actual levels in these countries.

➢ Savings in space would theoretically be 2.9 billion m² at the European level.

Let's apply specific consumption of energy for space heating (kWh/m²) in each of these countries (no data for Norway).

➢ Energy savings in heating could add up to 322 TWh/a (16% of space heat consumption in EU-28).

28.9.2021

Motiva

Transport example: Car travel mileage per person in 2018

High/low mileage and high/low car ownership ratios do not fully align although ownership tends to be higher at the higher end of the mileage.

Source: Odyssee 6/2021

28.9.2021

Motiva

Another little back-of-the-envelope example calculation with Odyssee data - car mileage

Let's cap the car mileage per person at km per year (concerns 16 countries in the previous figure) and compare this to the actual levels in these countries.

➢ Savings in mileage would theoretically be 562 billion km at the European level.

➢ Energy savings in car transport could add up to 374 TWh/a (18% of energy consumption of cars in EU-28).

Motiva

Policies and Measures for Energy Sufficiency
- Policy options
- MURE database outlook
- What next (policy implications)?

Motiva

Policy types in buildings

Building codes: caps on space, flexible use of space and facilities, heating and cooling control automation/control

Taxation: property taxation

Public housing: rent bonus to tenants for changing to a smaller flat

Shared economy: co-living, rental of facilities instead of ownership

Public sector: programmes aiming at efficient use of space (real estate management)

Information measures addressing procurement and habitual behaviour, such as building energy certificates

28.9.2021

Motiva

Policy types in transport

Taxation: fuel taxation, taxation of new cars, annual car taxation, taxation of shared cars

Pricing policies: road tolls, congestion fees, price of public transport, parking pricing, internalization of transport externalities

Subsidies: electric bikes

Infrastructure: bus lanes, cycling lanes, moderation of parking, winter-time maintenance of walking and cycling infrastructures

Urban planning: land use, urban density requirements, car free zones

Building codes: requirements for bicycle storage, e-bike charging and parking, charging for shared car services

Mobility management, shared and/or smart mobility services

Promotion of teleworking

Digitalization of services

Information measures addressing procurement and habitual behaviour, such as vehicle labelling

Motiva

Other policy types

Eco-design of appliances and other equipment: e.g., new automatic and smart control functionalities according to usage patterns

Restrictive legislation: forbidding certain consumption (difficult to implement)

Personal carbon budgets (very difficult to implement but experiments are being done)

Motiva

Policy examples in the Mure Database (June 2021)

- National mobility management programmes (e.g., France and Germany).

- Portugal: A sustainable mobility programme for the public sector.

- Taxation of vehicles and high fuel taxes (e.g., Denmark, Finland)

- Labelling of vehicles (e.g., EU and Switzerland)

- Transport modal shift (e.g., Latvia and Finland)

- Subsidies to e-bikes (e.g., Italy)

➢ Numerous examples in the transport sector

- UK: Boiler Plus standards setting requirements for individual boiler time and temperature controls

- Finland: A programme for reducing office space per employee in public administration (completed in 2020).

- Poland: The New Energy Programme aims to add innovation at the systemic level facilitating, e.g., plus-energy buildings, smart cities and self-sufficient energy clusters, thus providing a platform for a more energy sufficiency and energy efficiency - oriented future.

➢ Only a few examples in the building sector

28.9.2021

What next?

There is a need to fully recognize the potential of sufficiency measures in reaching sustainability goals.

Technical, social and juridical challenges associated with some sufficiency measures require thorough analysis to enable policy making.

There is already some encouraging development in the form of quickly growing platform economy and shared services without much political influence.

→ Attitudes and behaviour are changing but are they changing quickly enough?

A lot of courage is needed to publicly discuss changes in lifestyles.

28.9.2021

Motiva

Policy Brief available at:

https://www.odyssee-mure.eu/publications/policy-brief/energy-sufficiency.html

ODYSSEE-MURE

Motiva

Thank you!

Lea Gynther

lea.gynther@motiva.fi

@MotivaOy

www.motiva.fi