

# Energy Sufficiency: a discussion

## Geneva workshop report



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ecee's energy sufficiency project is funded by the KR Foundation.

It aims at exploring how we can live well, within the limits.

Learn more at [energysufficiency.org](http://energysufficiency.org).

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## Introduction

This workshop was convened at Ferme Sarasin, Geneva, on 1<sup>st</sup> February 2018, to discuss the first four concept papers written within eceee's 'Energy Sufficiency' project, and to consider two key questions:

- How should we talk about energy sufficiency to policy makers?
- What are the key policy messages on energy sufficiency in buildings and products?

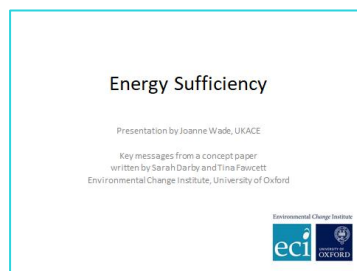
The workshop brought together the papers' authors, members of the eceee board, and invited guests representing policy, commercial and academic stakeholders. We would like to thank the participants for their time and for sharing their ideas. We would also like to thank Services Industriels de Geneve for hosting the meeting.

This report summarises the material shared at the meeting and the discussions that took place. It is a record of the comments made, and does not necessarily indicate a consensus view from the group. The conclusions in the report are the author's reflections on the key points emerging from the discussion and do not necessarily represent the views of others who were present.

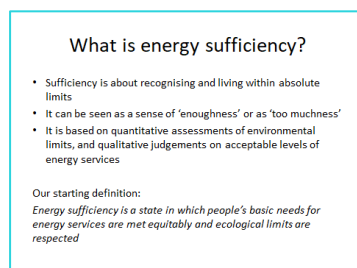
Slides from the four presentations given at the meeting are also available.

## Energy sufficiency: an introduction

**Presentation from Joanne Wade, on behalf of Sarah Darby and Tina Fawcett, University of Oxford**



Joanne opened the meeting and presented the initial findings of work by Sarah Darby and Tina Fawcett, University of Oxford, that provide an overarching view of the concepts and definitions involved in energy sufficiency.



Energy sufficiency is about living within absolute limits, using less energy so that we do not exceed our planet's ability to supply us with resources and to deal with the pollution that we create

Energy sufficiency can be viewed positively – as having enough energy – or negatively – as 'doing without'. We need to understand how we can present it to other people as something that will be good for us all.

The absolute limits we are referring to can be quantified. On the other hand, 'enoughness' tends to be more qualitative; we have different ideas about what is enough.

Our starting point for a definition of sufficiency is ‘a state in which people’s basic needs are met equitably, and where we are living within ecological limits’. We also talk about energy sufficiency as a process; the changes we need to make to reach this state.

This definition leads to a series of questions that this work has considered:

**Questions...**

- How are basic needs defined? What do energy services have to be sufficient *for*?
- How much do we need to think about regional and local limits as well as global ones?
- How do needs and wants differ in different parts of the world?
- At what scale can we most effectively address sufficiency?
- What timescales does sufficiency operate on?
- How can policy address the changing nature and uncertainties of development, consumption and production?

- How are basic needs defined? What do energy services need to be sufficient *for*?
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**Needs or wants?**

- Needs: universal, material and non-material (e.g. indoor environment that promotes health)
- Wants: goals that derive from an individual's personal preferences

*Can we distinguish between these in practice? And who decides which is which?*

Can we distinguish between what we need and what we want? Some people define things that we need as things that are universal (for example, an indoor environment that is healthy) whilst wants are things that derive from our personal preferences.

There is a big debate on whether we can distinguish between them in practice: this is important, since sufficiency implied prioritising needs over wants.

**A practical approach**

- UK Minimum Income Standard
  - Income needed in order to reach a minimum, socially acceptable standard of living in the UK today
  - Based on consultation with the public; what do people think is needed to be part of society
  - Updated annually

There is a practical example in the UK that suggests we perhaps can distinguish between needs and wants to a degree that is useful for policy-making. The Joseph Rowntree Foundation (JRF)<sup>1</sup> has funded work to determine a minimum income standard for the UK. This has involved consulting members of the public to understand what people think is needed to be part of society. This ‘basket’ of goods and services is then

translated into the income needed to pay for them. The level of income is updated annually to account for changes in the cost of these goods and services. Every two years, the consultation is re-run to see whether the basket of goods and services needs to change. Interestingly, there has been very little change over the last 10 years.

**Alternatives**

- Welfare economics and preference satisfaction; no valid distinction between wants and needs
- Capabilities:
  - Greater internal ‘capacity’ → more capability
  - More capability → ability to fulfil more needs

*Capabilities approach takes public goods more fully into account than other alternatives*

There are other approaches to thinking about needs and wants. In the field of welfare economics and preference satisfaction, there is no valid distinction between wants and needs.

Another approach is to focus on capabilities – trying to ensure that people have their own internal capacity to meet their own needs and wants (by being healthy, having sufficient knowledge, and so on). The capabilities approach considers common resources. The problem with

the use of welfare economics is that it doesn’t deal well enough with the resources we share and the suggestion is that a capabilities approach can perhaps take them into account more fully.

<sup>1</sup> a UK charitable trust focused on issues of equity and social justice

Implications for energy sufficiency

- Low carbon transition could happen without resolving the argument about needs and wants
- But
- If distinguishing between them by social consensus is possible, this could be a useful input into policy development

These are some of the options; we would suggest that we do try and distinguish between needs and wants, and that the approach taken in the JRF project is one way we can try.

The energy efficiency community tends to focus on over-consumption and on bringing ourselves back within planetary limits, and there is an argument that we can perfectly well do that without worrying about the different between needs and wants.

But the argument that we are putting forward here is that, actually, if we can sit down and come to a consensus, socially, on what we should all have, this might make it more likely that people accept the idea of sufficiency.

The Oxfam sustainable development doughnut

- Incorporates sufficiency characteristics:
- absolute limits
  - minimum requirements



The Oxfam sustainable development doughnut<sup>2</sup> can be used as a way to help us visualise the sufficiency space. The outer ring of the doughnut represents planetary limits; the inner ring is about meeting needs. The green space in the middle is where we need to be.

Context: international agreements

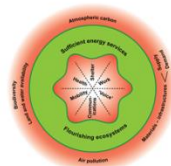
- Outer ring: Paris Climate Agreement
- Inner ring: UN Sustainable Development Goals

The concepts in the doughnut can be related to international agreements. The Paris Climate Agreement is part of the definition of the outer ring; the UN sustainable development goals (SDGs) are one possible definition of the inner ring.

There is a debate about whether the Paris Agreement and the SDGs are consistent with one another: in particular, SDG 8, which includes the idea of economic growth. But

perhaps the debate about whether or not we need / can have economic growth is one for another meeting...

Adapting the doughnut for energy sufficiency



The team at Oxford have adapted the doughnut and produced an energy sufficiency version. The outer edge of this doughnut is defined by levels of atmospheric carbon, use of materials for supply and demand infrastructures, air pollution, biodiversity and land and water availability. The inner ring is defined by provision of health, shelter, work, 'voice', communications and mobility. And the green 'energy sufficiency' space is where we have sufficient energy services and flourishing ecosystems.

Scale and timing

- Scale
  - Global vs regional and local environmental limits
  - Energy system governance
- Timing
  - When is energy used (seasonally, weekly, diurnally, etc)
  - The pace of human activity (importance of non-energy policy)

We need to think about scale: the energy system has global impacts, but it also has regional and local impacts. And we need to think about the scale at which the energy system is governed.

We also need to think about time. We need to think *about time of use*: when we use energy affects the efficiency of the system and hence its impact on the environment. And we need to think about *use of time*: the pace of life affects the amount of energy we use, and the impacts of non-

energy policy on our lifestyles and hence energy use is increasingly recognised as an important area for us to focus on.

<sup>2</sup> This was developed by Kate Raworth for the UK development charity Oxfam. More information on the doughnut can be found here: <https://www.oxfam.org/en/video/2012/introducing-doughnut-safe-and-just-space-humanity>



### Macro trends and sufficiency

- Demography
  - Population growth, unevenly spread in Europe
  - Decline in household size
- Equity
  - Income and wealth inequalities
  - Fuel / energy poverty
- Smart technology
  - 'smart' covers a wide range of things
  - Connected appliances will increase standby
  - Optimistic assumptions about performance and little consideration of ecological impacts
  - Used by and for humans; outcomes may be far from what was intended

There are many trends at the macro level that will have effects (both positive and negative) on the potential for energy sufficiency. These include:

- Demographics: population growth (which is uneven across Europe) and a decline in average household size
- Equity: trends in income and wealth inequalities and concerns about this, and the issue of fuel/energy poverty
- Smart technology: the term 'smart' covers a wide range of things, with very differing potential impacts. Connected appliances will increase standby; we are perhaps too optimistic about the performance of some smart technologies and do not think about their environmental impacts; and the human response to these technologies may mean that the outcome of their introduction could be far from what we intended

### Opportunities for developing sufficiency-based policy

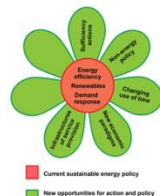
- Continued analysis of the implications of the Paris Agreement and the SDGs
- Developing methods for agreement on minimum standards for energy services
- Revision and rethinking building standards
- Addressing questions of excessive / aspirational consumption
- Developing supportive non-energy policy
- Building sufficiency considerations into smart grid development
- Continuing to promote regional and local sufficiency policies

What do we need to think about as we move from efficiency to sufficiency?

We are looking to reduce energy consumption rather than increasing energy efficiency, moving away from ratios towards absolutes. Do we focus on high personal energy use, or on the products and services that satisfy wants rather than those that meet needs? What are the practices that we want to focus on?

If we think in terms of the energy services, in buildings for example, we will be thinking about integration between supply and demand, and we can think also about ambient energy (PassivHaus) and non-expert ways of achieving home comfort. And we need to consider how we define and ensure equitable access to energy services.

### Suggestions for a flowering of energy policy



Thinking about these different aspects can lead to a 'flowering of energy policy' – expanding the remit of sustainable energy policy to take in new dimensions such as sufficiency actions, non-energy policy, new economic paradigms, and so on.

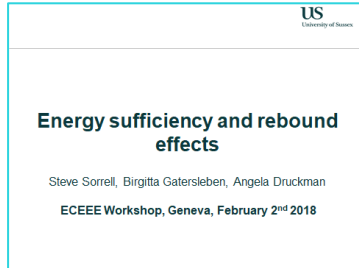
### From concept to policy

- Aim to reduce energy consumption rather than increase energy efficiency: a move from ratios to absolutes
- Develop different policies for energy service needs and wants, based in part on public consensus on basic needs
- Develop policy around energy services
- Set up and maintain inclusive processes for equitable access to energy services

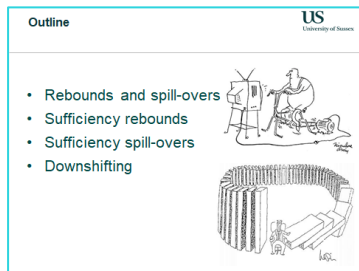
And this leads to many opportunities for developing sufficiency-based policy. For example, can we re-think building standards; how do we develop methods to agree minimum standards for energy services; and what would supportive non-energy policies look like?

# Energy sufficiency and rebound effects

Presentation from Steve Sorrell, University of Sussex



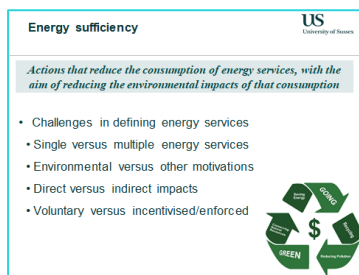
This presentation is based on work out by Steve Sorrell, with Birgitta Gatersleben and Angela Druckman from the University of Surrey. The topic was energy sufficiency and the rebound effect.



Rebound is a term used to describe a number of things that mean you might not save as much energy as you think you might.

Sufficiency can offset some efficiency rebounds; but it can also have similar rebounds itself.

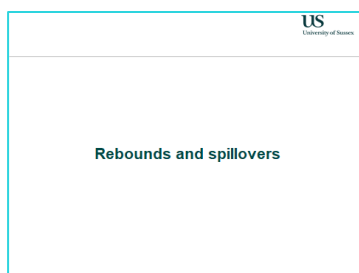
In this work, we focused on sufficiency as a process, but we did also look at the idea of downshifting.



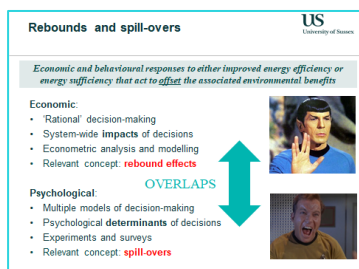
Energy sufficiency as a process is analogous to what we used to call energy conservation. It is taking actions to reduce energy use, often with an environmental motivation.

This is a simpler definition than Joanne used in the previous presentation but it still raises lots of issues: what do we mean by energy services? Are we talking about specific services or all services? Is it right to assume an

environmental motivation? (I might take the bike rather than the car to get some fresh air and exercise, rather than for environmental reasons). One of the biggest ways to reduce carbon emissions is to shift to a vegetarian diet, which is avoiding emissions upstream (embodied energy and embodied carbon). Are we talking about an energy service here, so is this shift in diet something we can call a sufficiency action? And how do we consider voluntary versus mandated things?



Economists talk about rebound. There is also a psychology literature on very similar effects that are known as spillover. There are overlaps between the two but also important differences. *[there was some disagreement within the group as to whether or not a distinction should be made between the two terms]*

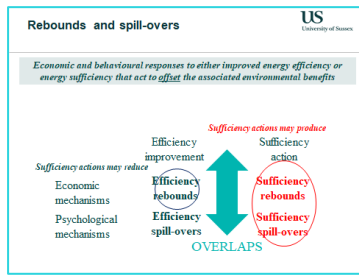


In economics, with rebound, we use econometric analysis to estimate sizes of the effects and we assume rational behaviour.

In psychology, with spillover, there is a much more realistic model of how people make decisions about things – and they use experiments and surveys.

So, rebound and spillover are economic or behavioural

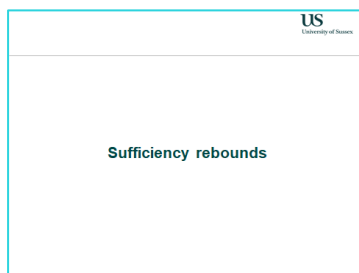
responses to efficiency or sufficiency that offset any environmental benefits of an efficiency or sufficiency action.



This 4x4 picture illustrates the different effects that we are talking about.

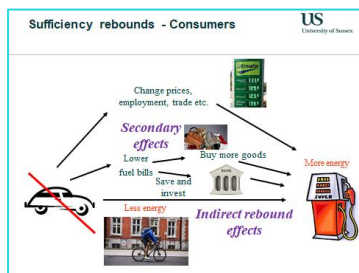
- An efficiency rebound: a fuel efficient car is cheaper to run, so I can drive further for the same money
- A sufficiency rebound: if I give up the car and walk I will save money, and I can spend this on an international flight
- A sufficiency spillover: I do something green and I think it gives me the moral licence to do something un-green'

- An efficiency spillover: I've got a plug-in hybrid electric vehicle and this justifies my overseas holiday

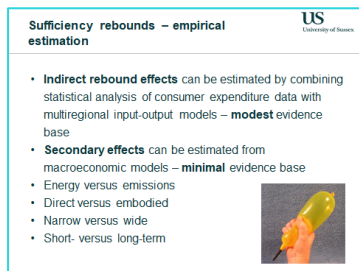


Looking now at sufficiency rebounds in more detail...

Spending anywhere involves emissions from the supply chain, so spending saved money leads to indirect rebound effects. Saving money and spending it in the future also does this. And investing money leads to emissions elsewhere, which is also an indirect rebound.



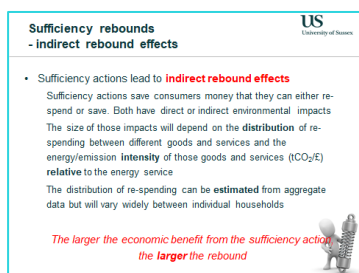
There are also secondary effects: if lots of people give up their cars, this will lead to a reduction in fuel demand, which might in turn reduce the price. This might then encourage some people to use their cars more. This is a macro-economic, or secondary, effect.



Sufficiency rebounds are hard to measure, and vary between households. For indirect effects, we can use consumer spending data and Input-Output models. Macro-economic effects have not been estimated yet for sufficiency actions.

There are a number of things we need to consider: should we be looking at energy effects or emissions effects – it matters which metric we use; we need to think about

embodied emissions, not only direct ones; and things may be different in the short run and the long run.

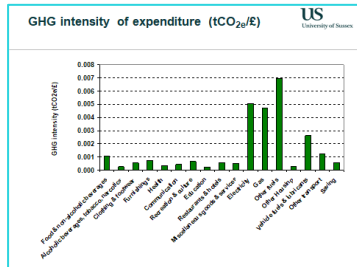


For indirect effects, what matters is what you spend the saved money on, how you distribute the additional money between different goods and services. But in any case, the more money you save from your sufficiency action, the bigger the rebound will be (so a higher tax on fuel will lead to bigger rebounds)

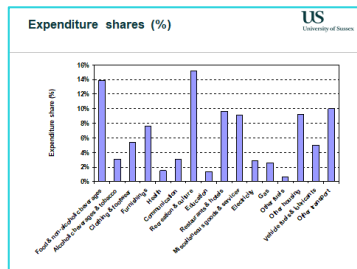




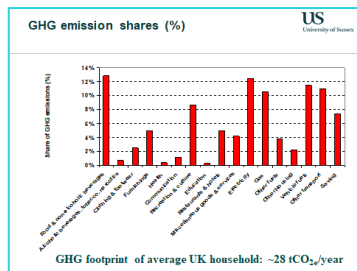
For our estimations of rebounds for UK households, we use a model based on 17 categories of expenditure, which is a pretty crude model.



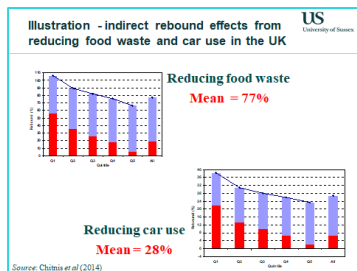
We have data on the carbon intensity of each of these different categories of goods and services.



And we know the split of household expenditure between the different categories.

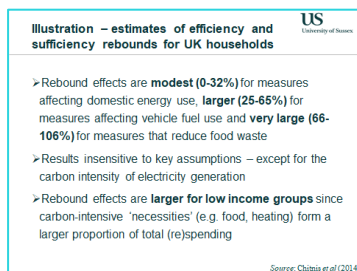


If you combine these, you can work out the carbon footprint of household spending between the categories, and can use this to estimate indirect rebound effects



We analysed spending data to answer the question, 'if you gave up car travel, what would be the impact on emissions, including the re-spending of savings'. In this case, 28% of the direct emissions reduction was offset by indirect rebounds.

We also looked at reducing food waste. When food waste was reduced by 30%, re-spending offset 77% of the emissions reductions.



The size of the rebound for electricity and gas is lower, because these are two of the most carbon intensive categories of expenditure.

Looking at different income groups; rebound effects are higher for low income households because every pound spent by lower income households results in higher emissions than for higher income households (because they spend a larger portion of their budget on food, gas and electricity).

**Illustration – estimates of sufficiency rebounds**

Authors	Region	No. of categories	Measures	Metric	Estimated rebound effect (%)
Alfredsson (2004)	Sweden	300	Food, transport, utilities	CO <sub>2</sub>	Food: 200% Travel: 35% Utilities: 20%
Lenzen and Day (2002)	Australia	150	Food	Energy and GHGs	Energy: 112-113% GHGs: 45-56%
Grabs (2015)	Sweden	117	Food	Energy and GHGs	Energy: 95-104% GHGs: 49-56%
Murray (2013)	Australia	36	Transport, electricity	GHGs	Transport: 15-17% Electricity: 4.5-8.5%
Druckman et al (2011)	UK	17	Heating, transport, food	GHGs	Heating: 7% Transport: 25% Food: 51%
China et al (2014)	UK	20	Eating, transport, food	GHGs	Heating: 12-17% Transport: 25-40% Food: 66-106%


There have been various studies in different countries, which have produced a big range of results and a lack of consensus.

However, in general, we can see that rebound effects for actions on car use are higher than those for actions on home energy use; and effects from action on food seem also to be higher than those for travel.

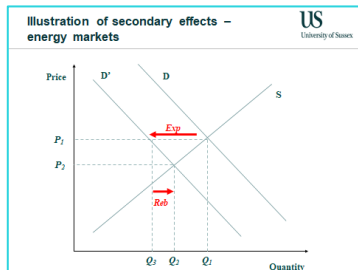
These effects are not trivial: they matter and they should not be ignored.

**Sufficiency rebounds - secondary effects**

- Sufficiency actions can lead to additional **secondary effects** – changes in prices and quantities in domestic and international markets (not captured by simple I-O models)
- One of the biggest impacts may be through the market for **energy** commodities
- Choice of some people use **less** energy (services) leads to price reductions that encourage other (or the same) people to use **more** energy (services)



If lots of people engage in sufficiency actions, there may be effects on fuel markets – the choice of some people to useless energy leads to price reductions that encourage other people to use more energy.



This graph illustrates the effect.

**Sufficiency spill-overs**


That was the economic view. Now I want to move on to the psychological view.

**Pro-environmental behaviour**

*Behaviour that consciously seeks to minimise the negative impact of one's actions on the natural environment*

- Extensive research in environmental psychology on **pro-environmental behaviour** (PEB)
- Focus upon **intentions** and **actions** rather than impacts
- Focus on the effect of **interventions** on actions

*Energy sufficiency is a type of pro-environmental behaviour*




Psychologists don't talk about sufficiency, they talk about pro-environmental behaviour. There is lots of research into what drives this behaviour, what sort of psychological factors, what contextual factors; to what extent can we encourage these actions through nudges. We can think of energy sufficiency actions as one type of this pro-environmental behaviour.

**Spill-over**

*Extent to which engaging in one behaviour changes the probability of engaging in another*

- Across behaviours ( $A \rightarrow B$ ), across time ( $A_{t1} \rightarrow A_{t2}$ ) and across contexts ( $A_{c1} \rightarrow A_{c2}$ )
- Positive spill-overs**: partly explained by consistency and identity effects
- Negative spill-overs**: partly explained by **moral licensing**
- Depends upon **drivers** of decisions, **difficulties** of behaviours, and **similarities** of behaviours and contexts



Spillover – both positive and negative – can be found when people engage in pro-environmental behaviours. Spillover is defined as the extent to which engaging in one behaviour changes the probability of engaging in another behaviour.


Spillover can be across behaviours (recycling encouraging more cycling – positive spillover, or giving me the licence to worry less about flying on holiday – negative spillover); across time (recycling now encourages you to recycle in the

future) or across contexts (recycling at home leading to recycling at work).


Under what conditions are these spillovers likely to be positive and under what conditions are they likely to be negative?

One explanation of positive spillover is the need for consistency; people don't like the inconsistency of behaving well in one context and not in another – this can work well when people have strong environmental identity. One thing that can explain negative spillover is the idea of moral licencing; you think you have earned credit by doing something good and because of this you can justify doing something bad (think of it like allowing yourself to eat a chocolate bar after you have been to the gym).


There is not a lot of evidence yet but there are a few examples where negative spillover has been studied:

**Examples of negative spill-overs** 

- Tiefenback *et al* (2013): interventions to encourage households to use less water led to them to use more energy
- Klockner *et al* (2013): electric car owners drive more than conventional car owners
- Jacobsen *et al* (2007): households who joined a green power program increased their electricity consumption
- Wefel (2017): households who were randomly assigned to report energy saving actions were less likely to support a carbon tax



- A field experiment on encouraging households in an apartment building in the US to use less water – this found that they used less water, but more energy, than a control group
  - A study on electric cars: users tend to drive more – not for economic reasons, but a feeling that they had a green car so they could drive more
  - Households in the US on a green electricity tariff were found to use more electricity than those in a control group.

**Positive or negative spill-over** 


**Positive spill-over more likely when:**

- Behaviour driven by environmental identity
- Initial behaviour is costly (reinforces identity)
- Subsequent behaviour is similar

**Negative spill-over more likely when:**

- Behaviour driven by affect (e.g. guilt)
- Subsequent behaviour is costly
- Subsequent behaviour is different

*Larger cost savings lead to larger rebounds AND emphasising cost savings encourages negative spill-over*




There are also quite a few studies showing positive spillover.

Positive spillover is more likely when it is driven by a strong environmental identity; when the initial behaviour is quite difficult to do (costly in money terms or difficult in psychological terms) and where subsequent behaviour is similar to the original.

Spillover is likely to be negative when the initial action is driven not by identity but by guilt; when subsequent behaviour is difficult. One implication is that if you are emphasising the monetary benefits of green actions, you are more likely to get negative spillover.

There is a lot in the psychological literature that could help us design interventions that would minimise negative spillover.


**Impacts of negative spill-over** 

- Most people have only **limited understanding** of the relative environmental impact of different activities
- They may see sufficiency actions with only marginal emission savings as providing a **moral licence** for more emission-intensive actions
- Few psychological studies analyse **total** direct emissions, and even fewer include **indirect** emissions
- The few that do find **little correlation** between total emissions and either environmental values or pro environmental behaviours (e.g. Bleys *et al.*, 2018; Kennedy *et al.*, 2013)

*Values-action gap reinforced by action-impact gap*

People have a very poor understanding of the relative environmental impact of different activities. People do not understand that, for example, recycling has a very marginal environmental benefit. So, there is a risk that people will do something that they think is having a large positive impact (but isn't) and then think that this gives them the licence to do something else, which perhaps has a bigger negative impact.

Most of the studies on spillovers focus on individual behaviours – they rarely look at the overall environmental impact of a household's activities – it is very difficult. But those that have find very little correlation between environmental values, self-reported pro-environmental behaviours and overall environmental impact. You have high income, well educated households, concerned about the environment and reporting pro-environmental things that they do, but they tend to have a higher environmental impact (of course this is based on only a few studies... but it is interesting).

**Summary** 

- Important to consider the **rebounds and spill-overs** from energy sufficiency
- **Growing understanding** of both the size and determinants of those effects
- Rebounds and spill-overs can be both **positive and negative** and vary widely in size between different behaviours and contexts
- Rebounds **unlikely to outweigh** the climate benefits of sufficiency actions, but negative spill-overs may do in some instances
- Psychological research provide insights into how negative spill-overs may be mitigated, but rebounds are hard to avoid
- Highlighting the cost-saving benefits of energy sufficiency may be **counter-productive**

When we talk about sufficiency, whether in terms of a level or a process, it is important that we consider these economic and psychological evidence that lead to spillovers and rebound.

In most cases, the rebound effect is unlikely to completely offset the benefits of the original actions. Spillovers may

completely offset the original benefit, if you have the situation just described where the person does not well understand the impacts of different actions.

Rebounds are hard to avoid, because people generally choose to maintain their level of income... downshifting is an interesting alternative.

## **Round table discussion 1**

### ***Terms and definitions***

We need to agree what we mean by sufficiency. The two presentations used very different definitions – an absolute or a process.

#### ***Defining needs***

Rather than basic needs, we should try to figure out what are fundamental needs. There is a whole literature on this coming out of philosophy and development studies. There is research in Switzerland on fundamental needs and linking these to satisfiers, systems of provision and of course energy. These needs are about being provided for the necessities of life, living a life that is worth living in an environment that is worth living in. These are overarching goals: how you then describe them can vary with context.

How far away from a definition of basic needs are we? There seem to be some needs that it is easy to agree on (a refrigerator, a certain level of lighting, and so on) and then others where there are very differing opinions (smart phones, computers, air conditioning...). Perhaps if we have the debate, we will find that we are close to a practical agreement. The development of certain tariffs for electricity supply, in developing countries for example, is another example of where we have had to decide on some basic needs for energy services.

Practically, the definition of the basics that we all need may have to be an average. Some people will not need some of the things that are defined within the group of needs, others will need things that are not in the group. Thinking about floor space per person in homes, for example, some will need more than others, but there may be a workable average within a country that is useful for the policymaker.

### ***Data quality***

There were some concerns expressed about the quality of data behind estimates of rebound / spillover, particularly given the very large spread of results in these types of study. This is acknowledged by the report's authors, but does not negate the need to consider what may be important effects.

One suggestion made was that we need to start taking simple actions on sufficiency, then when these things are working and people are starting to understand the concept, more data will become available that will help to improve these analyses.

### ***Minimising rebound through sufficiency***

At the macro level, you could argue that sufficiency will deal with all rebounds: if you set an absolute limit that cannot be exceeded, then rebounds will be constrained to an acceptable level. Of course this would require a global limit; a system of caps that has no leaks. You cannot have something that only covers part of the economy.

There may well be rebounds from sufficiency actions that are taken individually, but one could argue that if someone is, for example, biking more and thinks that this gives him a licence to do something environmentally damaging elsewhere, this person has not really understood sufficiency. Sufficiency is a mindset about limits; it is not just about doing one thing.

It could be interesting to look at households with consistent and more comprehensive sets of sufficiency actions: what conditions would ensure minimal rebounds for these households? Perhaps a very pro-environmental household would save money on some actions but then decide to spend this money on something more expensive that was more pro-environment. Is there an optimal that could be achieved? To be this consistent would imply being well informed and, as yet, there are no studies showing what such an optimal set of actions would be.

### *Motivators of sufficiency and spillover*

It will be important for us to consider how sufficiency actions are motivated. The psychology literature on spillover would suggest that you can either increase or constrain negative spillover, or indeed encourage positive spillover, depending on how you motivate the initial sufficiency actions.

### **Sufficiency as ‘efficiency plus’**

We should recognise that efficiency has achieved a lot. Energy consumption in Europe has decreased quite a lot since 2005. Of course, when we consider embodied energy and the global situation, the result is not so positive. However, we need to go further and this is where sufficiency comes in. If demand for energy services continues to increase, eventually energy efficiency alone will not be able to deliver.

We need all the efficiency work that has happened, but now is time to take stock: there are policies that see efficiency as a way to promote economic growth and this is not where we need to be, in terms of greenhouse gases and other environmental impacts. If we see efficiency policies that are in the end producing more energy use and carbon emissions then we need to look at how we can adopt sufficiency on top of them. We need to think about efficiency and sufficiency together.

Perhaps we should still be starting with efficiency programmes and savings programmes and then see if these are enough or whether we have to build them up. If we wait for the design of the perfect policy then we will not be able to do anything because, rebound or not, and sufficiency or not, we can start to reduce consumption, and this is important whatever is used to motivate it.

### **Barriers to sufficiency**

A lack of knowledge is a barrier: who is aware of the environmental impact of their savings, for example. How do we make people aware that whatever they do with their money, there will be an impact?

The economic arguments for sufficiency are not very strong, since whatever you do – spending, saving, investing – there will be energy use. But we live in a society based on consumption, so is it possible right now to talk about defining limits at a societal level? People can start to do this themselves, and so it might be better to talk about quality of life as this may be the only way to motivate people who are not as keen as we are.

### **Where do we start?**

The implication of the two presentations taken together is that we cannot have policies that only tackle part of the problem: if you set limits on one part of the economy, you will push consumption to other parts of the economy. So, in the end, you have to tackle everything. But if we start by thinking about how to tackle everything, we will never actually do anything. So, the question is, where do we start, knowing that eventually we will have to cover everything?

Perhaps we should start by thinking about direct rebounds. Indirect rebound is also important, but the answer to it is not only a matter for energy efficiency policy. The best way to reduce the indirect rebound is to work less and to earn less money, and perhaps this is where we need to be in the future. Energy policy action is the first step, and then we need



broader policy. Encouraging people who have money to invest it in greener, cleaner things is perhaps a way to reduce the rebound effect.

We cannot let indirect rebounds stand in the way of first steps: yes, reducing our use of resources may lead to increased use elsewhere, but we have to start to make changes somewhere. Of course we have to think about indirect rebounds in the end but we should not think about every potential rebound effect first and let this stop us taking any action.

### *Absolute limits and what needs to happen*

We may need to start by talking to others about how we can live better, but we ourselves must start from the fact that we have only one earth to live on and so there are environmental resource limits that we have to take seriously.

### *Context is important*

Different arguments will work in different countries. In Switzerland for example, the idea of maximum incomes is already accepted more than that of minimum incomes. In this context, maximum income may have more resonance than carbon allowances. But in other countries (for example, the UK) the idea of a limit to income is not something that would have any traction, politically.

## **‘Selling’ energy sufficiency**

When communicating something new to a policy-maker, it is good to present it as an add-on or next step to something that already exists. So, it would be good to say we have done a lot of work on energy efficiency and sufficiency complements this in the following ways... So far the work does not seem to make these links; we need to add in something about ‘today we have efficiency, tomorrow we will have sufficiency, these are the steps we need to take and this is how we can do it’.

Policy makers often hear the term ‘sufficiency’ and think it means taking something away from people, so we need to avoid using this word. Should we continue to use the word ‘efficiency’ instead? Linked to this, we need to think about it more in psychological terms than in economic ones, because selling the idea in economic terms would be difficult.

However, if we start from a capabilities and needs approach, we perhaps can change the conversation. We don’t talk about limits *per se*, although we recognise that they are there. Rather, we talk about freedom, justice, responsibility. If we start with these concepts, it sets a very different tone than if we continue moving forward with environmental limits first. Discussions about sustainability now tend to move towards discussions of wellbeing, and there are more people agreeing with the idea that economic growth at some point does not lead to increased happiness. It may be that we should start by talking to civil society; people can then push policy makers to move towards sufficiency.

### *‘Co-benefits’ of sufficiency*

Focusing on the non-energy benefits of sufficiency actions may be a very good way to persuade people that this is a good thing to do. We can talk about the health and local air pollution benefits of a move from cars to cycling. We can talk about the health benefits of a shift to a more vegetarian diet. And so on. Putting forward the message that sufficiency actions can enrich life rather than impose limits.

It may be necessary for us to look at these co-benefits and think about them, in psychological terms, to understand which may be ‘good’ motivators for sufficiency actions – those that will minimise negative spillover or encourage positive spillover.

### *Simplicity*

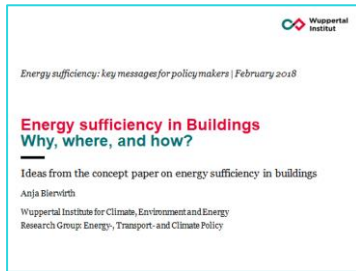
From the perspective of someone who is new to sufficiency, coming from an efficiency and sustainability background, it seems that the average policy-maker is unlikely to understand what it is and why we should focus on sufficiency rather than efficiency. Policy makers already have a new term to deal with, energy productivity, which is an add-on to efficiency. Bringing sufficiency into the discussion will add complexity to the discussion and to the

types of policy: are they energy saving policies, energy efficiency policies, renewable energy policies...where do they fit?

There is a huge confusion in general between all the different terms that are used, and people are tired of this. If we are to persuade people to take action, they need simple motivation; either they have to do it because it is the law, or they want to do it because they will get something good out of it. We need to make it as simple as possible to get things started.

## Energy sufficiency in Buildings

### Presentation from Anja Bierwirth, Wuppertal Institut

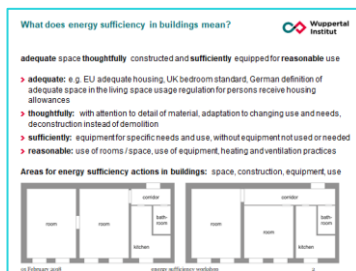


This presentation is on the work carried out by Anja Bierwirth and Stefan Thomas, looking at energy sufficiency in buildings.

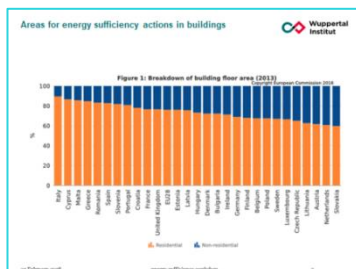
We start with a definition of energy sufficiency in buildings: adequate space, thoughtfully constructed, sufficiently equipped for reasonable use.

Thinking in more detail about each element of the definition:

- **Adequate:** this refers to how we live, how we want to live... there are some policies already that consider this – housing standards, space standards, links to housing allowances / benefits
- **Thoughtfully:** high standards in construction; thinking about the materials used; can the buildings be adapted to changing needs; can buildings be deconstructed?
- **Sufficiently equipped:** how much equipment do I need, how much do I want? What is enough? Also, how, and how often do I use it? Do I only use it when I really need it? Or just because it is there?
- **Reasonable use:** living a house with 5 rooms but only really using 3, having spare rooms? Is it reasonable to have spare rooms? Some would say yes, some no.



We can think about designs of homes that adapt to changing needs for space. This diagram shows a layout that adapts to different types of family (needing one bedroom or two). This is a simple example of how design can lead to sufficiency or can avoid sufficiency.

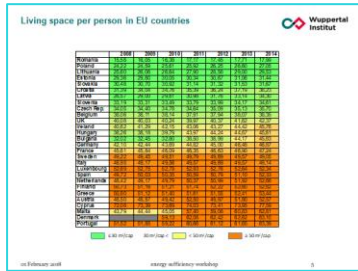


So, how do we define sufficiency potential in buildings? This slide shows the breakdown of floor area in buildings in EU countries. This illustrates the high proportion of residential floor space, which gives us the focus for this paper.

Living space per person in EU countries (may include holiday residences)

Country	m <sup>2</sup> /cap	Country	m <sup>2</sup> /cap
Romania	18.1	Germany	46.6
Ireland	27.1	France	46.9
Lithuania	29.8	Sweden	45.5
Estonia	31.5	Italy	49.1
Slovakia	31.6	Luxembourg	51.1
Croatia	33.0	Spain	52.4
Latvia	34.6	Netherlands	52.4
Slovenia	34.6	Finland	52.6
Czech Rep.	35.6	Greece	53.8
Belgium	36.3	Austria	55.0
UK	42.0	Cyprus	59.0
Ireland	45.5	Malta	62.2
Hungary	45.7	Denmark	62.7
Bulgaria	46.1	Portugal	63.7

This table shows floor space per person, spread over Europe. It is very diverse, ranging from 18m<sup>2</sup> per person in Romania to more than 60m<sup>2</sup> per person in some areas (on average). So, it is not so easy to come up with what is adequate. Is 18 adequate or is it too little; is 60 adequate or too much?



We have some trends to show that floor area all over Europe is increasing over time, as the numbers in this table demonstrate.

Approach to analyse a sufficiency potential  
Space reduction target: 35 m<sup>2</sup>/cap

Country	Reduction	Country	Reduction	Rating	
Belgium	8.3%	1	Romania	-11.2%	0
Bulgaria	24.1%	3	Luxembourg	31.5%	3
Czech Rep.	1.7%	1	Hungary	23.4%	3
Denmark	44.2%	4	Malta	43.8%	4
Germany	24.9%	3	Netherlands	33.3%	3
Estonia	-11.2%	0	Austria	36.4%	3
Ireland	23.1%	3	Poland	-29.3%	0
Slovenia	34.9%	3	Portugal	45.1%	4
Spain	33.2%	3	Romania	-83.8%	0
France	25.3%	3	Slovenia	-1.2%	0
Croatia	-8.1%	0	Slovakia	-10.8%	0
Italy	28.8%	3	Finland	33.5%	3
Cyprus	40.7%	4	Sweden	29.9%	3
Latvia	-1.3%	0	United Kingdom	18.7%	2

To come up with an idea of the potential, we used a very simple method. Let's say our target is 35m<sup>2</sup>, which is somewhere in the middle. Can you reduce to this, and what would it mean in terms of area saved? We calculated the percentage reduction needed to achieve this average space per capita (negative potential means space needs to increase), and then translated these into ratings from 0 to 4, with 0 indicating a very low potential for sufficiency action in this aspect, and 4 indicating a very high potential for sufficiency action.

Approach to analyse a sufficiency potential

**Under-occupation and overcrowding rate**

- High overcrowding rate and low under-occupation rate => less potential for sufficiency

**Population without bath, shower, indoor flushing toilet in household**

- High share of population => less potential for sufficiency
- Hints at more space needed

**Dwelling not comfortably warm during winter time**

- High share of population => less potential for sufficiency
- Hints at need for efficiency and / or heating system

We also considered three other factors that could indicate where there is potential for sufficiency or alternatively a need for more space: under-occupation and overcrowding; lack of adequate bathroom facilities; and the proportion of properties that are not comfortably warm during winter time.

Rating example Belgium

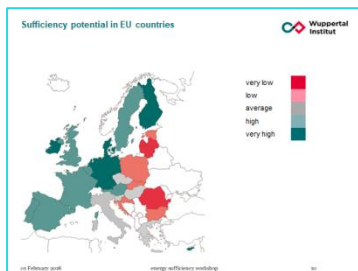
Indicator	Rating
Space reduction	8.3% 1
Under-occupation / Overcrowding	70% 4
Sanitary equipment	0.2% 3
Warm in winter	12.6% 3
<b>3*4+3*3 = 11 11.4 = 2.75</b>	<b>Overall rating: 2.8</b>

We gave each of these elements a 0 to 4 rating also, and then added up and averaged the ratings across all four elements to give a first indication of the potential for sufficiency in different countries. This slide details the process for Belgium, as an example and the table on the next slide shows the ratings for all countries.

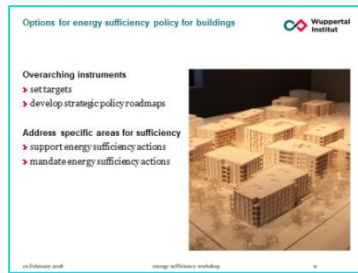
Sufficiency potential in EU countries

Country	Overall rating	Country	Overall rating
Luxembourg	3.9	Portugal	2.5
Germany	3.5	Italy	2.3
Ireland	3.5	Czech Republic	2.0
Netherlands	3.5	Slovenia	2.0
Denmark	3.3	Greece	1.8
Cyprus	3.3	Hungary	1.8
Malta	3.3	Estonia	1.5
Finland	3.3	Slovakia	1.5
Spain	3.0	Croatia	1.3
Austria	3.0	Bulgaria	1.0
Sweden	3.0	Poland	1.0
United Kingdom	3.0	Latvia	0.4
Belgium	2.8	Lithuania	0.4
France	2.8	Romania	0.3

It is a really rough first approximation, and this topic is sensitive: what is considered an adequate amount of space. But we wanted to see how the situation compared in different countries and whether we need to focus policies on particular countries.



If we illustrate these ratings on a map we can see that the East and South has rather low potential whilst the North has more.



At Wuppertal, we completed a project about 18 months ago, which defined a need for some overarching instruments for sufficiency: a target; strategic policy to implement sufficiency – what are all the areas where we need to take action; and then specific instruments for all these different areas.



We don't want to discuss whether we need efficiency policies or sufficiency policies; we need both. We need to think in an integrated manner; adapting to sufficiency to efficiency policies as far as possible. For example, we look at targets and dwelling floor area size. How do you get to climate neutral – does this mean a cap per person for floor area? Should it be legally binding or just a policy target? We need to think somehow about not just the most efficient buildings but perhaps the plus energy / climate neutral building stock. Are single family dwellings occupied by just two people the way we reach climate neutral? Perhaps not.

The image on the previous slide is an example from Zurich. It is one of the examples of the most efficient, sufficient and resource efficient integrated kind of building project that I ever heard about so far.



Turning to some more concrete examples of policies, and thinking first about the idea of a cap on average dwelling space: are there things that municipalities can do? We have focused on this in another project: could municipalities for example influence their inhabitants by helping them move in and out of flats that become too big? We can find many people looking for small flats but they cannot find them, or they are too expensive. And larger properties can be difficult to divide and sublet whilst

retaining privacy. These things have to be considered when designing construction policy.

You can also have financial incentives and, for older people, practical help to move is also important. Other possibilities include progressive energy tariffs and other ideas for new methods of pricing; or adapting funding programmes so that there is more money on offer as a result of having more people in an area.

There is a link to products: if you say for example that we do not need tumble dryers, then we will need some space to dry our clothes.

We need to think about sufficiency advice. Architects (and engineers) earn more money by designing bigger and more expensive buildings. Instead we need to think about advice as a potential income stream for the professionals, and to start by asking what the client needs, and what they will need in 20 years. We also need to share information about interesting projects, at the national and European level. We need to spread the word about projects that are delivering high quality of life.

# Energy sufficiency in Products

A presentation from Edouard Toulouse



This presents the results of work by Edouard Toulouse and Sophie Attali, on energy sufficiency in products.



One particular point about products is that there are hundreds, if not thousands of them around and there might be sufficiency aspects for all of them. But it is not possible to cover them all, so we had to narrow down the scope. So we decided to focus on the main energy using products.

**Context**

**More efficient products, but...**

- More users
- More products
- More functionalities
- More usage

Context: there are already many policies at the EU level that have been successful in making products more energy efficient... things are much more efficient than they used to be, but at the same time there are more of us using them, more products, more functions, and longer usage. And all of these have offset energy efficiency and so energy use from products is not going down as much as we could hope. It is going down, but we have these trends that offset this.

**Sufficiency strategies**

Category	Description	Example
<b>Usage</b>	Changing / reducing the way we use a product	Unplugging a product instead of leaving it on standby
<b>Dimensional</b>	Better sizing of products to match people's true needs	Avoiding oversized refrigerators
<b>Substitution</b>	Choosing a different way (e.g. different type of product or less sophisticated one) to fulfil one's needs	Using a tablet instead of a computer to surf on the internet
<b>Collaborative</b>	Increased sharing of products	Sharing a wi-fi access
<b>Radical divestment</b>	Substantial changes in the ownership of products	Dropping the home TV set or the freezer

Sufficiency strategies and actions for products are usually split in the following way: usage (how much you use the product); dimensional (how the product is sized – does it match your true needs); substitution (use a different product to meet needs); collaborative (increasing the sharing of products – reducing redundancy, eg in wifi access); and more radical decisions, dropping the use of products (e.g. the TV or the freezer) altogether. All of these strategies may entail some changes in lifestyles – more at

the bottom than at the top of the list in the table.

**Sufficiency potentials in a household**

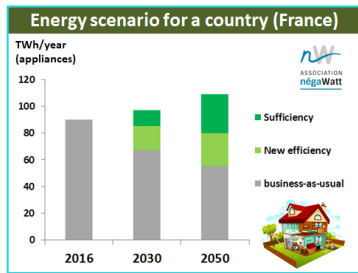
In terms of the potential, if we start at the micro level – at the level of one household / one entity – with average / typical features, there are some studies which have shown that sufficiency can deliver a substantial energy reduction; up to 50%. Of course it is quite theoretical: this maximum may not be generalisable to all types of households, and there may be constraints or barriers. It is a theoretical potential; sufficiency could be between zero and 50%, even on the most efficient appliances.

**Sufficiency potentials in an office**

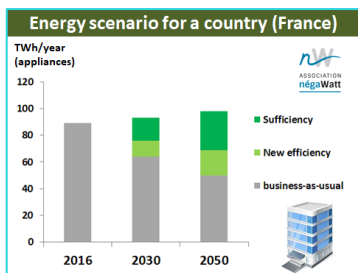
Unfortunately, there is a bias in the literature towards the residential sector. Sufficiency is often considered as something related to private behaviour, but it could be applied everywhere, for example in an office. For offices we could not find a quantified assessment, so we have done our own calculation. We assumed an office with 10 computers, lighting, server, printers, a coffee machine. Estimating the sufficiency potential for all these products



leads to a similar outcome; that you could save about 50% in an office. So it is quite significant.



We looked at the micro level of one entity. Another option is to look at the potential at the level of one country or region. That is what the NegaWatt association has done in France, developing a scenario including sufficiency, efficiency and renewable energy. For products, they have made a series of assumptions about the use of products in homes, and have tried to make reasonable assumptions about the evolution of sufficiency in society. In the residential sector, starting from today, we see that by 2030 sufficiency starts to be important and that by 2050, sufficiency gives more savings than new appliance efficiency. If we are serious about our new energy transition, we should halve our energy consumption, in France. We see that it will be very difficult to do it without sufficiency. We can have more efficiency, that will still provide something, but sufficiency is then quite critical.



And for offices, you see things are the same, and even more for sufficiency. Sufficiency can be commensurate to efficiency.

Clarification: the grey bar is actual energy consumption and the green bars indicate what has been avoided via efficiency and sufficiency.

**Trends** (Sad face icon)

- Capitalistic / consumer society values
- Dominant social norms of comfort
- Energy practices, habits & routines
- Energy prices

There are a number of negative trends that are barriers to sufficiency at present. Some of the values of consumer society are not consistent with sufficiency – materialism, power, greed and so on. There are a lot of social norms of comfort that have a strong influence on the way people use their products, and they are difficult to change; norms of hygiene etc. Also, social scientists have shown that the way we use products and energy is very routinized, so we have a lot of habits, which are difficult to change. Energy prices are also a factor; if they are low then it doesn't motivate people to save energy; in this case the most radical sufficiency actions will not have a strong financial impact.

**Trends** (Happy face icon)

- Attitudes challenging consumer society
- Co-benefits of sufficiency
- The sharing economy
- Product convergence & intelligence
- User feedback & empowerment

There are also some more positive trends. There are groups that are challenging consumer society for ecological or social reasons. There are experiments of people trying to live differently and to take into account the issues at stake.

A lot of sufficiency actions have co-benefits, on health, local pollution or biodiversity, for example, which is an interesting aspect.

The sharing economy: we speak a lot about it but we don't necessarily know exactly what it is. This has differing impacts: if we share products we reduce the energy to produce them, but also people may start using the products they were not using before because it is easy to go to their neighbour and start using it.

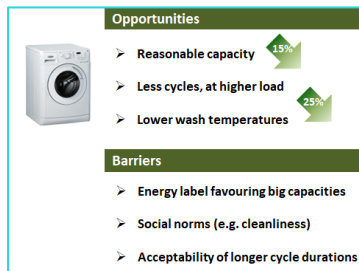
Product intelligence: as products become more and more intelligent and can understand and adjust to the user needs, it can be hidden sufficiency. If the product is smart enough to cue better usage and help you in a way that is fit to your needs, then you may save energy and you don't have to make the decision yourself.

Product convergence is also interesting. The fact that a phone is now also a camera, a recorder and so on, so a lot of functions are in one small product... they are consuming fewer watts because they are mobile and there is the battery.

People are not aware of what products consume. They do not understand how much they can save and there is an underestimation of how much we can do, in terms of sufficiency. User feedback (products that can inform about energy consumption and about how much can be saved if they are used differently), will increase and could be quite interesting in informing people of what they can do.



These are the quite general trends. Obviously we needed to be more specific, on an appliance by appliance basis. So, in the report we have gone into some detail on a set of product groups. We have chosen them on the basis of energy consumption and on sufficiency potential. I won't present all of them – I am just taking one example: the washing machine.



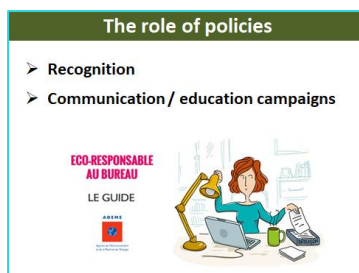
For each of these products we have looked at the sufficiency opportunities and the barriers we have to deal with. For the washing machine, we have seen increasing capacity and we need to think what is reasonable; try to wash at higher load and do fewer washes (currently users tend to wash the same load but in the larger machine). Lower wash temperatures is a trend that is already happening, we have better detergents etc.

We tried to quantify these potentials as best as we could. For example the issue of capacity means that 15% of the savings are wasted; the load and wash temperatures means that if you can reduce them, 10% fewer cycles and 5 degree lower temperature, you can save 25%.

What are the barriers? The problem of these growing capacities has a lot to do with the energy labels, as these are very linear with size, so it is easy to get a good energy class when you are big; manufacturers agree. There are obviously some social norms about cleanliness, how far you are willing to wait before washing your clothes, how many times you will wear before washing – that's a long term issue. Now machines are able to wash at very low temperature, but to achieve the same wash efficiency they need longer cycles, and it is not regulated at the moment so we are seeing machines that last longer and longer, with more than 3 hours for the standard cycle and we start seeing some issues of acceptability – there is a problem that people might not agree that their wash cycle is so long, so we have to find some balance.



This slide shows the rough estimates for all the other products that are in the report. It is sometimes difficult to quantify so we had to make our own guesstimates, so these must be treated cautiously but you see all of these products have some potential...



I will finish with the role of policies. Probably the most important is the official recognition of sufficiency. There is still some official resistance to the concept and the idea of impact on people's lifestyles etc. So, just to have recognition from the Commission that this is an important strategy would be a good start, with specific policies on top.

To change social norms, we need information campaigns. One example from Ademe in France: being eco-responsible in the office. It is quite interesting because not many people know about the impact of electronic communications on energy use: the way they send emails, whether they put attachments or not, how often they surf

the web and what they download has quite an impact on energy consumption.



There are many policy options to support sufficiency actions, including tax rebates, support for pilot projects and so on.

Also, authorities can directly or indirectly change some of the comfort standards or specifications, for heating for example. The Coolbiz programme in Japan is an interesting example. After Fukushima, there has been a lot of communication by the state, by companies and by other opinion leaders to say it fine to go to the office dressed in

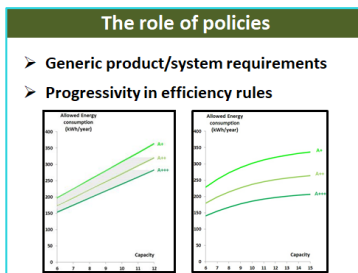
cooler clothes rather than suits, and so we can increase a bit the temperature in offices in the summer. This has been quite successful.



If we want to be really serious about sufficiency, we might want to say 'enough is enough' for some of the worst trends. For example, why are there still some supermarket refrigerators without doors: there are studies that show there is little impact on sales, and even that consumers feel more comfortable in shops when there are doors because they are less cold. And the investment cost is relatively low. So, there is no reason we could not require this.

Similarly, France has a decree that requires lights in shops

and offices, away from tourist areas, to be off between 1am and 6am.

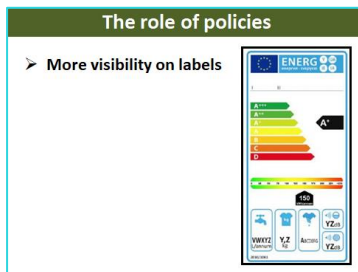


Then we come to the really specific product policies like ecodesign and energy labelling. They are focused on efficiency, but there are also a lot of general requirements that could be helpful. For example, making sure that products are delivered to the user with all the energy saving features on, like auto power down and so on. Making sure that if the user changes something there is an alert that informs the user of the impact on energy consumption.

And if an online update to a product will increase its energy use, the user should be informed before choosing the update.

Something that has been discussed for some years is progressivity in energy efficiency rules, to make sure that labels do not encourage bigger size or additional functionality. This was discussed in an eceee report from 7 years ago, 'Is efficient sufficient', but such changes have yet to be made.

The slide shows the referent lines for energy classes for washing machines today (chart on the left). As you can see they are quite steeply inclined and an A+++ can use more than an A++ etc. If they are shaped more like those in the chart on the right, curved, it becomes more difficult to achieve a high energy class for bigger machines.



We could also think about making sufficiency more visible to the consumer. This slide shows a proposal from one stakeholder from a number of years ago. You still have the efficiency scale; but you could also have a sufficiency scale based on the absolute energy consumption, also from green to red, to show you that a very efficient product could still have high energy consumption.



By the way, this monstrosity of a screen does exist. If you are interested in where, ask Edouard...

## **Round table discussion 2**

### ***Terms and definitions***

One participant questioned whether  $m^2$  was the best metric to use. Should we instead be looking at kWh or carbon? Is there a problem with having a large house if it is zero carbon? Another suggested that  $m^2$  is a good unit, as it can represent a much wider range of impacts such as embodied energy and land scarcity. We need to be clear whether we are concerned only with energy use and carbon emissions, or whether we are interested in other environmental impacts.

We also discussed the use of  $m^3$  as a more accurate reflection of impacts, but agreed that the lack of data on this measure makes it an impractical choice.

We had a discussion about the impact – on energy use but also on things such as land use and materials used in the construction – of the type of buildings that are constructed (for example, single family vs. multi-family; low-rise vs. high rise), but this is not something looked at in detail in this project.

We are looking at water saving sufficiency actions, as these have an impact on energy use for water heating. There was a discussion about the distinction between efficiency and sufficiency here, highlighting the importance of careful definition of the service being delivered: if the service is hot water, then using less of it by showering for less time can be seen as a sufficiency action; but if the service is getting clean, then doing it with less water is an efficiency action.

### ***Lifecycle analysis***

The issue of lifecycle energy use was raised: it is more difficult to find quantitative data on the potential impacts of sufficiency actions on lifecycle energy use, but where possible this is being referred to in the study.

### ***Barriers to sufficiency***

Looking in more detail at the  $m^2$  per person numbers, two points emerge. First, the national averages may hide very big differences within countries. For example, in the UK some people have very large houses whilst some people cannot afford houses at all as our prices are the highest in Europe. There is a lot of overcrowding in some areas, but also an issue of under-occupancy in some households. It can be very difficult to try and tackle this, as  $m^2$  per capita is a very sensitive issue: for example in the UK there was a policy to encourage people receiving benefits who were under-occupying to move to smaller properties by reducing the housing-related benefits they received, but this was very badly received in the media.

As mentioned, there is a trend to increasing  $m^2$  per capita. Over time, homes have got more attributes. As our income has grown over time, so have our wants: things that are now just normal were once real luxuries. What we think is 'sufficient' has to be seen in the context of a growth-focused, capitalist economy.

### ***Where do we start?***

Efficiency improvements have largely been delivered by engineers. When we move to sufficiency actions, we will need social scientists involved so that we can understand how best to do this.

We should think about the importance of social cohesion, of doing things together. It may be that the success of Super Cool Biz in Japan was linked to its timing (post-Fukushima) which meant the necessary social cohesion, and a sense of readiness to act, was there.

Are there policy makers outside of energy who would be interested in the actions we are trying to take? To give one example: in Sweden there are basically no property taxes at the moment; most taxation is on the sale of the building, not when you are living in it. This

means that people stay in larger houses than they might otherwise because it is very expensive to move. There are some quite conservative economists who are not happy with this situation because they see it as economically inefficient, particularly because there is a housing shortage in Sweden at present. Perhaps in this case, we could team up with them to promote reform of the tax system, because they would see it simply as a better way of managing the building stock. In any case, proposing changes to taxation will be an important part of what we need to do.

We need to develop more the details of the policy options we are proposing; for example how stringent do they need to be to deliver a suggested level of sufficiency action?

Three different types of policy that we can be looking at:

- Progressive taxation on energy, so that when you use more it is more expensive – but the difficulty with this is that the differential would have to be large to encourage the change we want to see’
- Labelling that is based on absolute energy use rather than relative – this is already the case for cars in many countries, for example in Denmark the only cars that achieve the highest label ratings are the small ones.
- Personal CO<sub>2</sub> quotas (as worked on in the UK around 10 years ago).

We perhaps need more funded work on sufficiency to better define the policies to promote sufficiency and to look at the policies that act against sufficiency.

### *Level of ambition*

We discussed how much energy saving we should be expecting sufficiency to deliver. Some at the table considered that the levels of saving put forward in the presentations were not ambitious enough; others suggested that these were realistic in the short to medium term.

There is a balance to find and at the moment the end point we want to reach and the timeframe over which we do this are not clear. We also need to be aware that not all sufficiency actions can deliver in the short term: when we are talking about changing social norms, it can take decades.

Taking the example of building size: we could have looked at a target average of 30m<sup>2</sup> per person, rather than 35m<sup>2</sup>, but this was quite ambitious so we decide to start with the higher number. We would rather be seen as reasonable to start with, and 35m<sup>2</sup> per person seems to be a size that will not impact on quality of life.

### *Absolute limits and what needs to happen*

We discussed how sufficiency interacts with renewables. For example, having solar panels on the roof decreases the environmental impact of energy use in the building. Whilst this interaction is important and will contribute to setting the level of the limit to energy use, we should remember two things: first, we should not only think about energy use and climate change, but also about other environmental impacts (for example, land use) that may not be addressed by the use of renewables; second, reducing demand reduces the cost of supplying from renewables and may make buildings more affordable. So, we cannot go so far as to say, ‘if we have renewables, we do not need sufficiency’.

Should we be including occupancy as well as the energy use of buildings in building codes? For example, in the project in Zurich mentioned in the presentation, you are only allowed to live in the development if there enough people in your household for the property you are living in. This was seen as necessary if the project was to deliver on its target of 2000W living. The idea about occupancy levels came from the co-operative that designed the neighbourhood: it may be that we can find other examples of interesting policy ideas in projects like this.

### *Context is important*

We need to think about cultural context when developing our policy proposals. For example, the CoolBiz campaign worked well in Japan where a top-down approach is usual whereas something similar did not work well at all in Italy. Communal washing rooms,



which are quite popular in Switzerland, may not be acceptable in Germany ('I don't want my neighbour to know what underwear I have' was one reaction).

Context can provide opportunities as well as barriers. For example, in Switzerland, there is a very strong norm about things being clean and in order. Recently a project tried bringing people together to experiment with not washing clothes so often and the result was that people did not in fact feel dirty and were happy with the time saved by not doing as much washing.

Context is not only social: the form of existing infrastructure can have an impact. For example, in Rome there are many apartments of 140-160m<sup>2</sup> that have two entrances. These can easily be divided into two, to make smaller homes that meet the needs of younger couples. But of course in other places the existing properties may not be so easy to divide.

### *Trigger points*

The first thing we may need to do is look for instances where we need to change policy so that it *allows* sufficiency. For example, why is the European Commission against the introduction of regulations for building renovations that require spaces for bicycles and wheelchairs: this is not forcing everyone to use a bike, but it will help those who want to. Buildings renovation can be a trigger point for sufficiency in the same way that it is a trigger point for efficiency. Creating space for line-drying is another example.

### *Trends we can build on*

There are some trends that are positive for sufficiency, and perhaps we should start by building on these. For example, for the first time in many decades, younger people in German cities have fewer cars than previously. More people in the 40-50 age group are thinking ahead about downsizing their property so that they do not grow old in a home that is too large for them and difficult to manage. Whilst it is difficult to think how to deal with the existing building stock, we do perhaps have this increasing desire for smaller homes at different life stages that helps us to push forward the argument.

We are seeing increased building of smaller new apartments in a number of cities (in Copenhagen and Cologne for example), but it is difficult to know how much this trend is driven by a desire for smaller homes *per se*, and how much is because in these cities, homes are becoming more and more expensive, indeed too expensive for many people, so the space per person has to decrease.

The scope of this present project is not large enough to allow us to test policy and trend hypotheses on consumers. But we are basing our assumptions on what seems to be possible from existing trends.

## **'Selling' energy sufficiency**

One interesting point is that for many sufficiency actions, the financial cost to the consumer is low or zero; the investment required is more a psychological one. This is a very important point for the argument for these actions.

### *'Co-benefits' of sufficiency*

Land is a key resource and in many countries it is in short supply. For example, in Denmark, if you add up the land needed for all uses (nature, cities, roads, agriculture, energy crops and so on), it is 50% more than the land area of the country. When we think about sufficiency in buildings, we must link this to the impact it will have on land-use.

## **Conclusions**

This round table, and the work presented at it, is very much a starting point for the discussion about how we take forward action on energy sufficiency. However, there are a number of tentative conclusions that we can draw from the points made.

## **Talking to policy makers about sufficiency**

It is clear that we need to present energy sufficiency as ‘a good thing’. To do this we need to think more in psychological terms than in economic ones, and talk about the well-being benefits that sufficiency actions can bring.

We should keep the message as simple as possible and it may be best to present sufficiency as the next step on from efficiency (and therefore as something that is relatively easy to begin to do).

Contextual differences between countries, and between regions within countries, are important; these will need to be taken into account when developing any policy proposals at the national and sub-national levels.

It may be more effective to start the discussion with civil society groups rather than policy-makers; they may be more receptive to the idea and also are able to help us persuade policy-makers.

## **Policy messages**

The key message is that sufficiency is needed, in addition to efficiency and renewables, if we are to achieve our environmental goals. There are many co-benefits to sufficiency actions that will help to persuade people that this is a good thing to do.

Sufficiency actions can have rebounds and spillovers. Only a holistic and comprehensive policy approach (e.g. a global cap on emissions with no leaks) can avoid these, but this is not a practical starting point. Therefore, it will be important to think about the best way to motivate these actions, so that negative spillover is minimised and positive spillover encouraged.

### ***Buildings***

There has been a trend to larger per person floor area in buildings, but there are some signs that this may be reversing, in certain cities and amongst some groups of the population. Building on these emerging desires for smaller living space could be a good place to start.

We need to think about how to enable sufficiency actions:

- New buildings need to be more flexible to allow layouts and use to change over time;
- Financial incentives could encourage people to move to smaller properties, overcoming any additional costs of doing so;
- Building regulations could require aspects that promote sufficiency, in new build or refurbishment, for example space to store bicycles or to line dry clothes;
- Municipalities could help people looking to downsize to find suitable properties; and
- The incentives for professionals need to be considered (for example, at the moment an architect will be paid more for a bigger, higher specification building).

### ***Products***

There is significant scope for sufficiency action on products used in homes and workplaces, but there are many trends acting against this. Key areas for early policy action here also should look to enable sufficiency actions:

- Labelling should be designed around absolute rather than relative energy use;
- Information campaigns are needed to help people understand ‘invisible’ energy use (for example, resulting from their use of the internet);
- We can learn from campaigns that have effectively altered social norms (such as the CoolBiz campaigns in Japan); and
- There may be scope for interesting developments to enable sufficiency as product intelligence grows.

## ***Areas for further work***

The discussions highlighted a number of areas where further work will be useful:

- Agreeing definitions and indicators for sufficiency;
- Defining needs and wants (for example, looking at the idea of fundamental needs);
- Exploring the psychology literature to better understand motivators for sufficiency actions that will encourage positive spillover; and
- Thinking about policy makers outside the energy space, and how they might be allies in some of the changes that we would like to see.