

STRENGTHENING CENTRAL AND EASTERN EUROPEAN CLIMATE TARGETS THROUGH ENERGY SUFFICIENCY

Modelling Energy Sufficiency in Appliances

Edouard Toulouse (négaWatt Association, ENOUGH network) July 2021

Supported by:

Federal Ministry for the Environment, Nature Conservation and Nuclear Safety



Modelling Energy Sufficiency in Appliances

 01
 Background: Sufficiency in appliances

 02
 Modelling in the négaWatt Scenario

 03
 Discussion on sufficiency assumptions





energy efficient economy 01

Background on sufficiency in appliances

Energy sufficiency in products Concept paper



Edouard Toulouse and Sophie Attali

© eceee and the authors 2018 eceee'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*. https://www.energysufficiency.org/libraryre sources/library/items/energy-sufficiency-inproducts-concept-paper/

Background on sufficiency in appliances





Energy sufficiency in products Concept paper



Edouard Toulouse and Sophie Attali

© eccees and the authors 2018 eccees'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.

- > **Definitions** of sufficiency applied to energy-using products
- > EU context (trends in appliance ownership, usage, etc.)
- > Existing **quantifications** of sufficiency potentials (micro, macro)
- Barriers & opportunities to sufficiency (values, social norms, routines, manufacturer strategies, new trends, co-benefits, technologies...)
- Refined analysis for 9 product groups at EU level



Sufficiency policies for appliances: recognition, educational tools, incentives, comfort prescriptions, bans, more adequate and transparent product regulations and labels



02 Appliance modelling at négaWatt

- Detailed modelling of appliances in the residential & tertiary sector since 2001
- Improvements in modelling technique over time
- More robust field data available since 2020



Heating & Cooling in buildings

Home appliances

Home IT

Electric equipment in non-residential buildings

Lighting

Scope in négaWatt scenario (France)

- 8 home appliances
- 4 home kitchen appliances
- 2 auxiliaries (ventilation, circulators)
- 6 home IT equipment
- 3 specific sectors (telecom, data centers, professional cold)
- 3 office IT equipment
- Residential light sources
- Tertiary building light sources
- Street lighting



Lucky us!

ENERTECH

Panel Usages Electrodomestiques – Elaboration d'un service de mise à disposition de données de consommations électrodomestiques précises, fiables et actualisées annuellement

Synthèse courte – année 1

Février 2021 Etude réalisée pour le compte de l'ADEME et de RTE par : Enertech







Direct assumptions

Average ownership rate





Direct assumptions

Hours of use per year Average ownership rate 3000 1,80 2500 1,60 1,40 2000 1,20 1,00 1500 0,80 1000 0,60 0,40 500 0,20 0 0,00 2015 2025 2030 2035 2045 2050 2055 2060 2060 2040 2015 2020 2025 2030 2035 2040 2045 2050 20 **Sufficiency** Average screen size (inch) Average lifetime (years) 60,0 14,0 50,0 12,0 10,0 40,0 8,0 30,0 6,0 4,0 20,0 2,0 10,0 0.0 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060 0,0 2015 2020 2025 2030 2035 2040 2045 2050 2055 2060

Stock modelling: assumptions on annual sales







03 Discussion on sufficiency assumptions: *what are they based on?*

- > No universal theoretical framework
- > Case by case approach and educated estimates, but with common grounds
- > Some driving principles:
 - The négaWatt Vision (a more energy sufficient society)
 - Assuming sufficiency becomes an increasingly important criteria in society
 - No non-sense / completely unrealistic targets or pace

03 **Discussion on sufficiency assumptions:** *what are they based on?* Limits? **Policies & Regulations Co-benefit** efforts & **Technologies** trends **Historic**

trends

03 Discussion on sufficiency assumptions: what are they based on?



03 Discussion on sufficiency assumptions: *street lighting*



Taking advantage of an expanding literature



Ecodesign & Energy Labelling Regulations

Vast collections of data on technologies, markets, standards, etc.



marketing associations

Challenging	conventi	ons tow	ards energy	
sufficiency: r	ruptures	in launc	dry and	
heating routi	nes in Eu	urope		
Martyne Sahakian University of Canee Institute of Scolagotal Research Beularand du Pent of Xene 40 1204 Gannes Sattartand martine sahakiangungeich	Charlotte Jensen Autorg University Coperhagen The Stehnke Faculty of IT and Design A.G. Mayon Yango 15 2450 Kadunaten SV Dennark genangelan Jaau dk		Frances Fahry National University of Callery Instand School of Geography and Archaeology and Part Instance and Part Instance Instance for Angenesidence Instance for Angenesidence Instance for Angenesidence	
Patrick Naef University of Genera Institute of Sociologial Research Rouleverd du Pent of Anes 40 1294 Genera Selectrofand patrick neeligunigs ch	Cary Coggins Namou Inversity of Calego Institut Carlos of Congregative Al-Announce University Res. Calego University Res. Calego Internet Sector Calego Internet			
Keywords household consumption, household elec lective conventions	tricity, sufficiency, col-	sufficiency. In a four ing Lab approach, de	th section, we outline the ENERGISE Law- signed towards setting upper limits to con-	
Abstract This contribution proposes to address a central question in so- cal science approaches to household energy analise. They do conventions around energy arevice enviros, have do they alter over time, and how can they be changed once they are centent. end? Sources/10:14:10; Duraning fram as a cold practice they- netical framework, we posit that energy mage at the household house 1s task or with free of constraintical and household house house 1s task or with free of constraintical and household house house 1s task or with free of constraintical and household house.		samption and engaging boundoals in a participative process based or entiting optimis in everyday constant, which are epiter and the end of the a discussion around the seed of rather development around comprisons and synchrolic community, narrows amplifying would change. We consider the reportunities that this repre- sents, and how such any provide bit conversions, constraining and amplifying challmaps to collective conversions can be relevant to precisions en ad biogis-maken allae.		
and across consumption domains, methods in such schurdlard and across consumption domains, methods in study in propos- ing a definition of energy sufficiency which accounts not only a definition of energy sufficiency which accounts in the definition of the study of the study of the study of a study of the study of the study of the study of a study of the study of the study of the study of a study of the domains, study, the lack of a spatial study of the st		Introduction Households, as a consumer and eithers, have a role to play in calcular glo broad on the second second second second second have obtained and the second second second second second priory of automatanting baseded second second second second priory of automatanting baseded second second second second priory of automatanting baseded second second second priory of automatanting based second second second base' second second second second second second second second second second second second second second second second second s		

Research experiments

Analysis of the reasons for appliance behaviours and the drivers for change



Studies on preferences

Insights on the acceptability of sufficiency changes among the population

Thanks for your attention!



