Clever | A Collaborative Low Energy Vision for the European Region

CLEVER – a Collaborative Low Energy Vision for the European Region

–

Launch event

5 June 2023 - Brussels

Agenda

15:00 — **Registration**

15:30-15:45 - **Welcome and introduction**

Scotland House welcome

Adrian Joyce – Secretary General, *EuroACE*

Opening

- **Hélène Gassin** – President, *négaWatt Association*
- **Andrea Roscetti** – President, *eceee*

15:45-16:55 - **Main scenario results and lessons** | *CLEVER, a low-energy demand scenario for Europe*

- **Yves Marignac**, **Adrien Toledano** – *négaWatt Association, FR*
- **Benjamin Best** – *EnSu/Wuppertal, DE*
- **Elliott Johnson** – *CREDS, UK*
- **Krista Petersone** – *Green Liberty, LV*
- **Gunnar Olesen** – *INFORSE Europe, DK*
- **Sébastien Meyer** – *negaWatt Belgium, BE*

Q&A Session

Moderation: Stephane Bourgeois, négawatt, FR

16:55-17:55 — **Policy panel** | *Bridging the climate neutrality, energy security and sustainability gap through energy sufficiency, efficiency and renewables, between ambition and feasibility?*

Panel, *moderation*: Arianna Vitali Roscini – Secretary General, Coalition for *Energy Savings*

- **Jakop G. Dalunde** – MEP *(*Greens-Efa*)*, TRAN and ITRE Member, *European Parliament*
- **Clément Serre –** *Economist, Energy Economics and Modelling, DG ENER, European Commission*
- **Robert Nuij** – Deputy Head of Unit for Energy Efficiency, *DG ENER, European Commission*
- **Ursula Woodburn –** Director, CISL Europe, *CLG Europe (Corporate Leaders Group)*
- **Dimitri Vergne**, Team Leader Sustainability, *BEUC*

Q&A Session

17:55-18:00 - **Closing**

Welcome speeches

15:30-15:45

Moderation: ***Stephane Bourgeois****, négaWatt, FR*

Adrian Joyce

SCOTLAND EUROPA

Secretary General, **EuroACE**

(European Alliance of Companies for Energy Efficiency in Buildings)

Scotland House Brussels

Charline Dufournet

On behalf of President Hélène Gassin

négaWatt Association

Andrea Roscetti

President, **eceee**

(European Council for an Energy Efficient Economy)

Main scenario results and lessons

15:45-16:55

CLEVER consortium partners

moderation Stephane Bourgeois, négaWatt, FR

Agenda of the session

0. Building the CLEVER Vision

1. Sufficiency, efficiency and renewables deliver a swift and equitable response to the climate and energy crisis

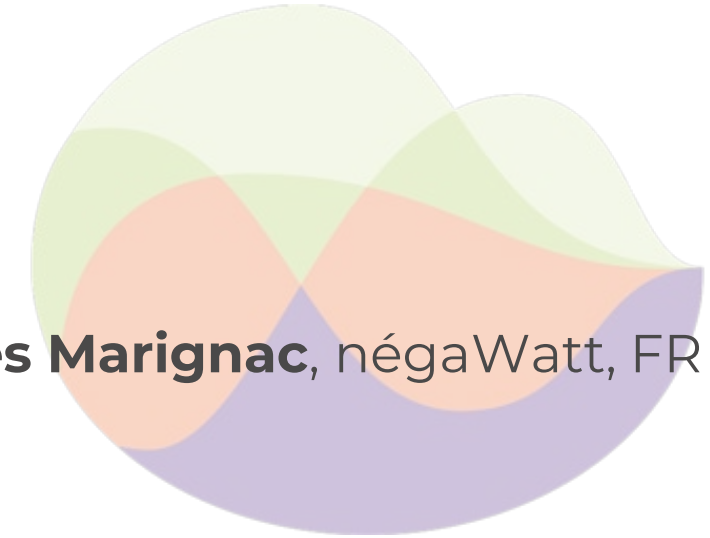
- Global results : GHG, EE, RES
- Sufficiency in CLEVER
- Solidarity and equity in CLEVER

2. Sufficiency and efficiency guarantee an effective and fair decarbonisation of consumption sectors

- Buildings
- Transport
- Industry

3. Renewable energy sources are the backbone of a resilient European energy system

0.
Building the CLEVER Vision



Yves Marignac, négaWatt, FR

A **Collaborative** Low Energy Vision for the European Region

“Bottom-up” partnership and construct

A three-stage approach

2019-2020

Gathering and building of national trajectories

2021-2022

Comparison, harmonisation, reinforcement

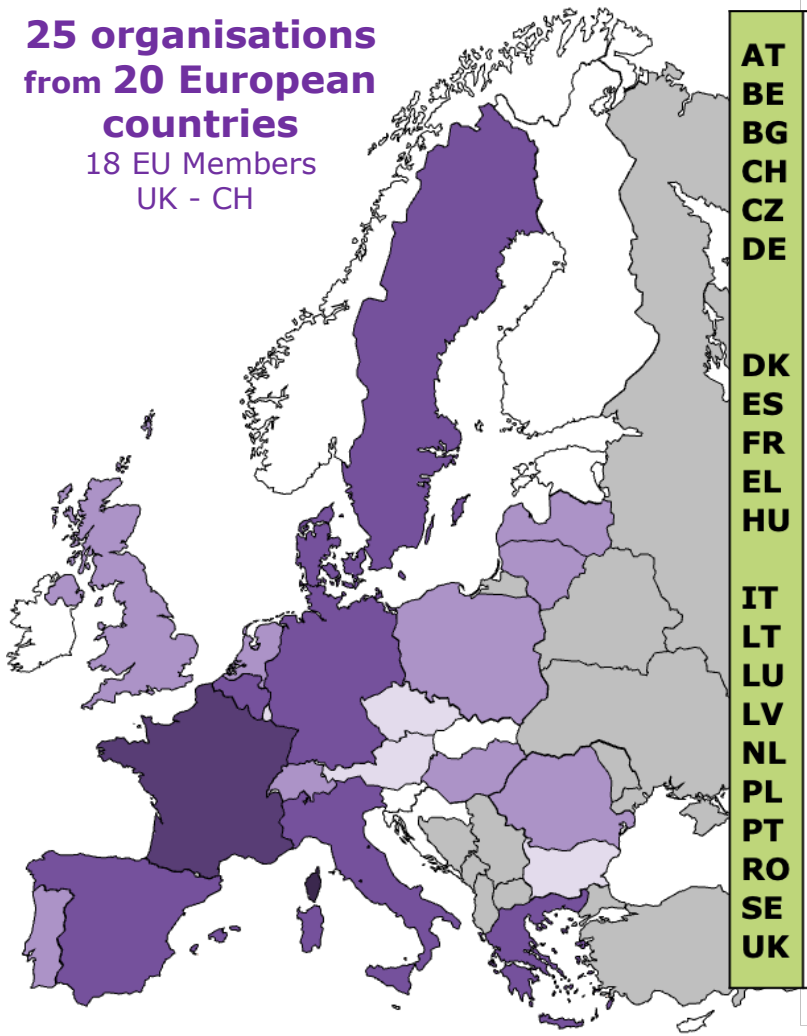
2022-2023

Integration into a European scenario

25 organisations from 20 European countries

18 EU Members

UK - CH



Project lead

Active partner

Commenting partner

Observing partner

AT	EEG TU Wien
BE	negaWatt Belgium, ICEDD
BG	Za Zemiata; Sofena
CH	negaWatt Switzerland
CZ	Charles University Environment Centre
DE	EnSu (Wuppertal Institut für Klima, Umwelt, Energie; Europa-Universität Flensburg; Öko-Institut)
DK	INFORSE Europe
ES	Ecoserveis Association
FR	negaWatt Association
EL	National Observatory of Athens (NOA)
HU	Environmental Planning and Education Network (EPEN)
IT	Politecnico di Milano
LT	Lithuanian Energy Institute (LEI)
LU	Consortium Cell/List
LV	Green Liberty - Zala Briviba
NL	Possible Worlds
PL	WiseEuropa
PT	ZERO
RO	Energy Policy Group (EPG)
SE	Air Clim Coalition
UK	CREDS, Center for Alternative Technologies (CAT)

Systemic approach

Modelling through the SER framework

Evolution of the demand side sets the need on the supply side

Renewables | **Efficiency** | **Sufficiency**

Losses | Losses

Resources → **Carriers** → **Services**

Bottom-up, physical construct

Biomass nexus considered through the inclusion of AFOLUB

Energy carriers balanced adequately to resources / infrastructures / uses

Raw materials issues considered through industry and carriers choices

Evolution of energy services addressed through dedicated indicators

Broad sector coverage (maritime, non energy feedstocks, …)

Sustainability objectives

Climate & sustainability	Fast reduction of emissions	Carbon neutral and reduced environmental footprint
Energy security & independence	Cut of sensitive energy imports	Energy supply based on local and affordable resources

Out of the crisis, towards global sustainability

Pathway's robustness & fairness

Balance of ambition and realism
regarding the pace and depth (affordability, scalability…)

Consistency and soundness
based on the systemic merit of options (deep sustainability)

Fair and meaningful share
between countries and within each country

Global objectives

Net zero emissions asap
and by 2050 at the very latest, and a 1.5°C compatible carbon budget

100% renewable energy
with no reliance on risky or less sustainable supply options (nuclear power, CCS…)

1.
Sufficiency, efficiency and renewables deliver a swift and equitable response to the climate and energy crisis

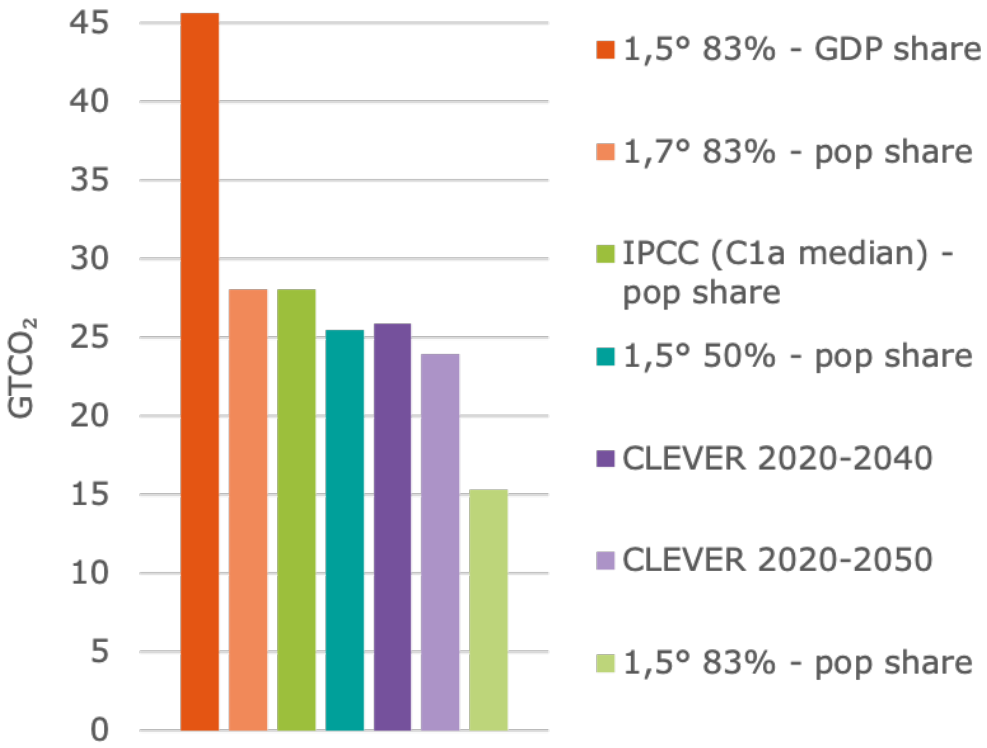
Clever

Global results:
Greenhouse gas emissions

Yves Marignac, négaWatt, FR

Living up to the climate emergency

CO_2 net budgets 2020-2050 for EU27



1.5°C compatible scenario

- **Cumulative CO_2 emissions:**

  26-28 $GtCO_2$ as ***maximum*** **EU CO_2** ***budget*** for 2020-2050

  - World cumulated CO_2 emissions over 2020-2050: **500-550$GtCO_2$**
  - Demographic (per capita) share for EU27 (**5.1%**)

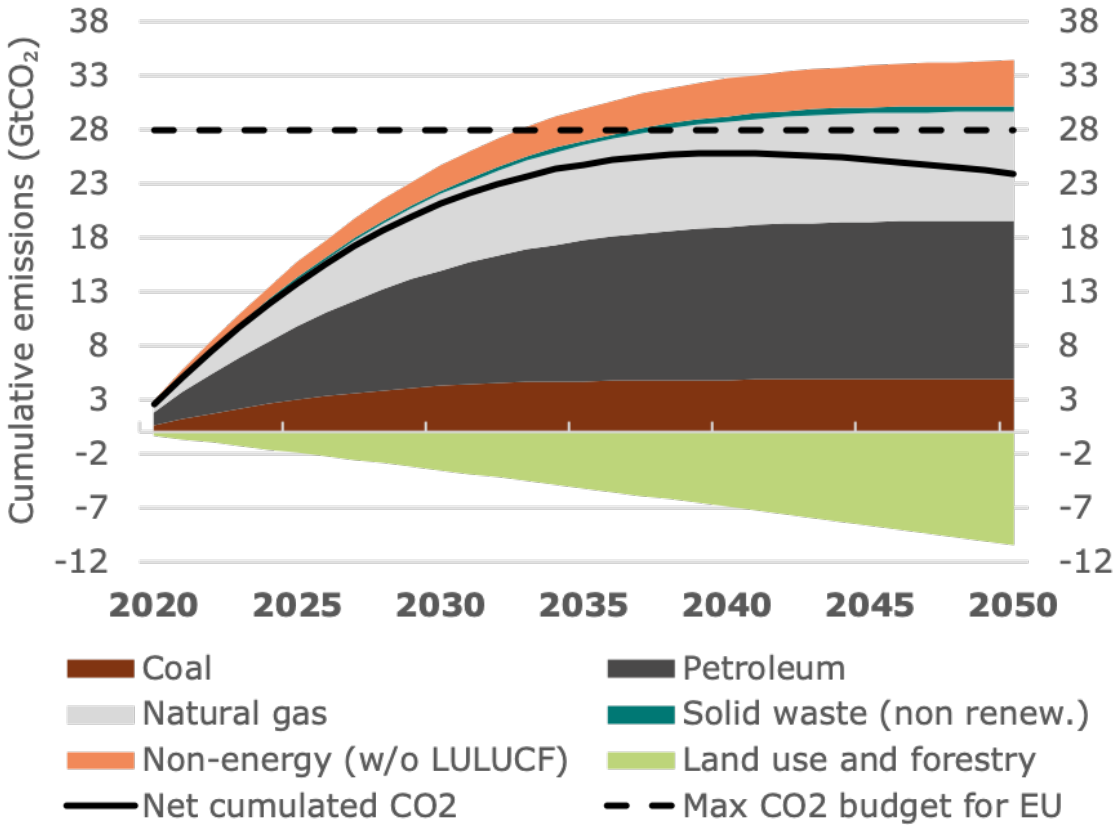
- **Cumulative methane emissions:**

  ~25% below 1.5 trajectories from IPCC (SSP1-1.9 – pop. share)

IPCC carbon budgets:
- p.25 https://report.ipcc.ch/ar6wg3/pdf/IPCC_AR6_WGIII_SummaryForPolicymakers.pdf
- P.29 https://www.ipcc.ch/report/ar6/wg1/downloads/report/IPCC_AR6_WGI_SPM_final.pdf

Action is needed now

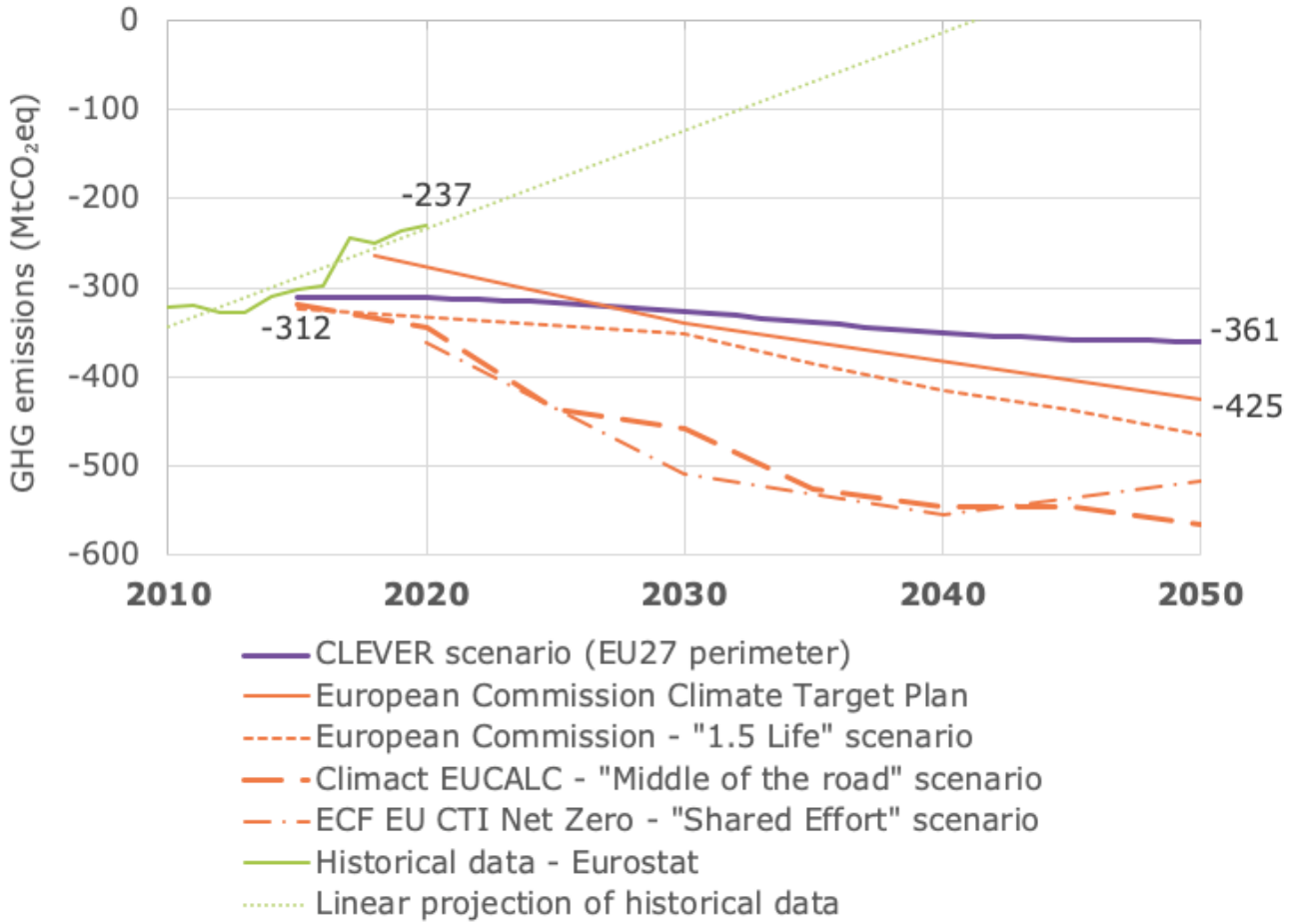
Cumulated CO2 emissions in CLEVER from 2020



- **Most CO2 budget consumed by 2030**
- Any **delay steepens the curve**
- Need to **activate all levers now**
  - ➔ new nuclear and CCS not relevant
  - ➔ sufficiency, efficiency and RES

Minimising the gamble with carbon sinks

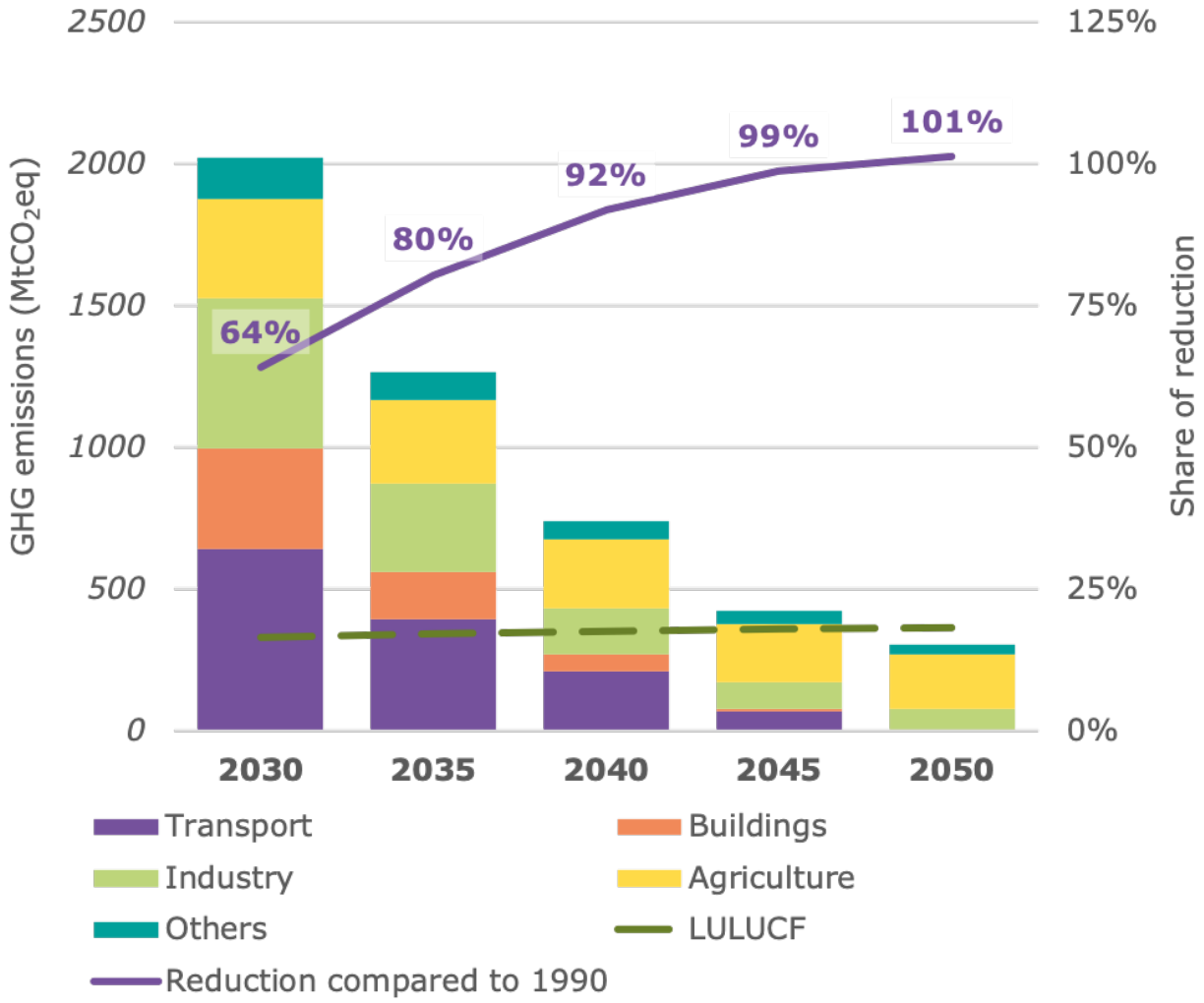
EU27 greenhouse gas emissions from Land Use, Land-Use Change and Forestry (LULUCF negative emissions) in various scenarios



- Increasing droughts, fires, heat waves and diseases
- Forests capacity to ↗ CO2 absorption ?!
  - ➔ **Relying too much on carbon sinks should be avoided**
  - ➔ **Profound action through SER minimises risks**

Europe can be GHG neutral by 2045

GHG emissions for EU27 over 2030-2050



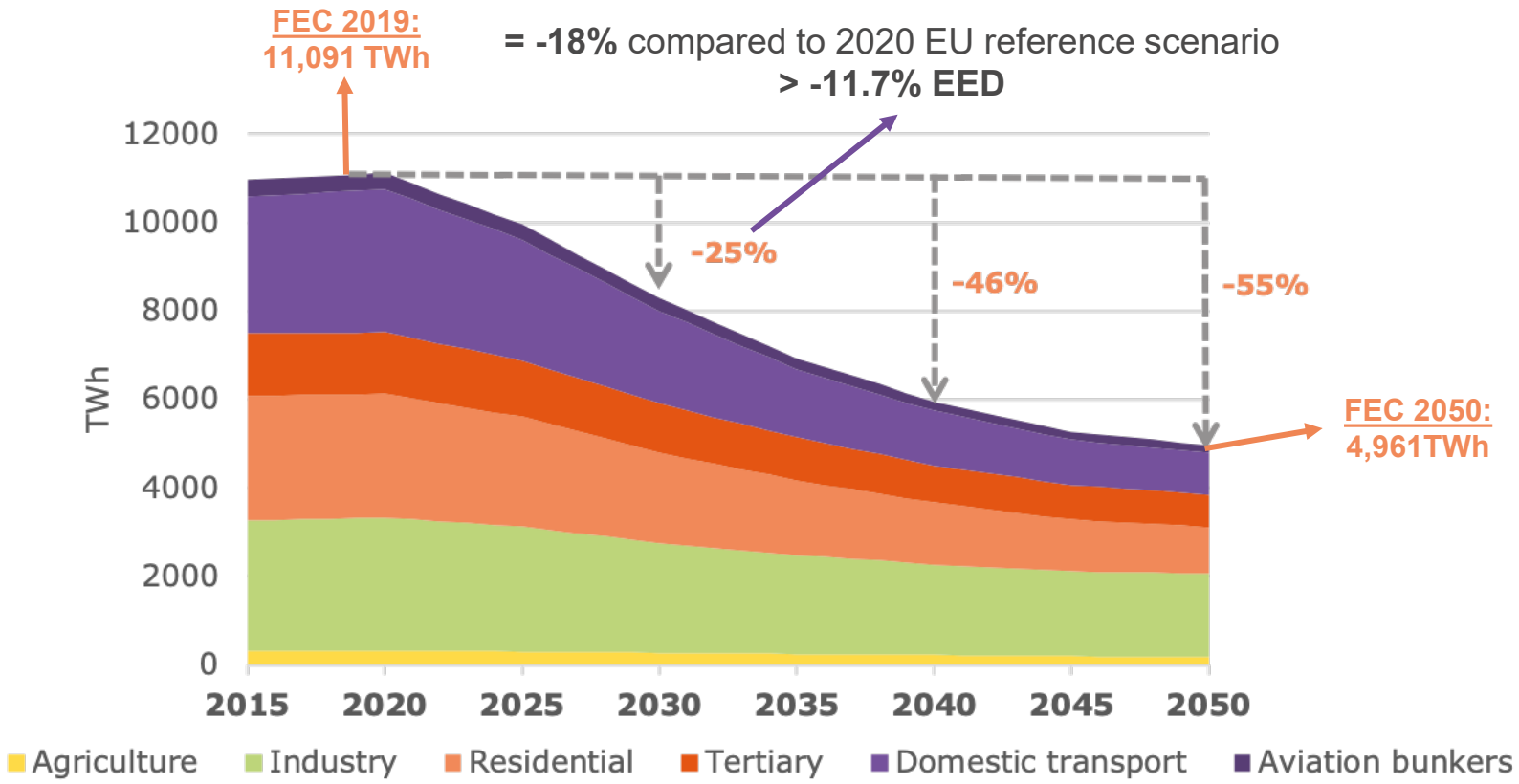
- **-64% net in 2030,** -80% in 2035 and **-92% in 2040**
  ⇔ **85% gross** to remain conservative on carbon sinks

  → **current EU ambition may fall short of 1.5°C**
- ↘ **in all sectors**, remaining emissions in agriculture, some industry and others

Global results:
Energy demand

Elliott Johnson, University of Leeds / CREDS, UK

Europe can reduce its energy demand by -55% by 2050

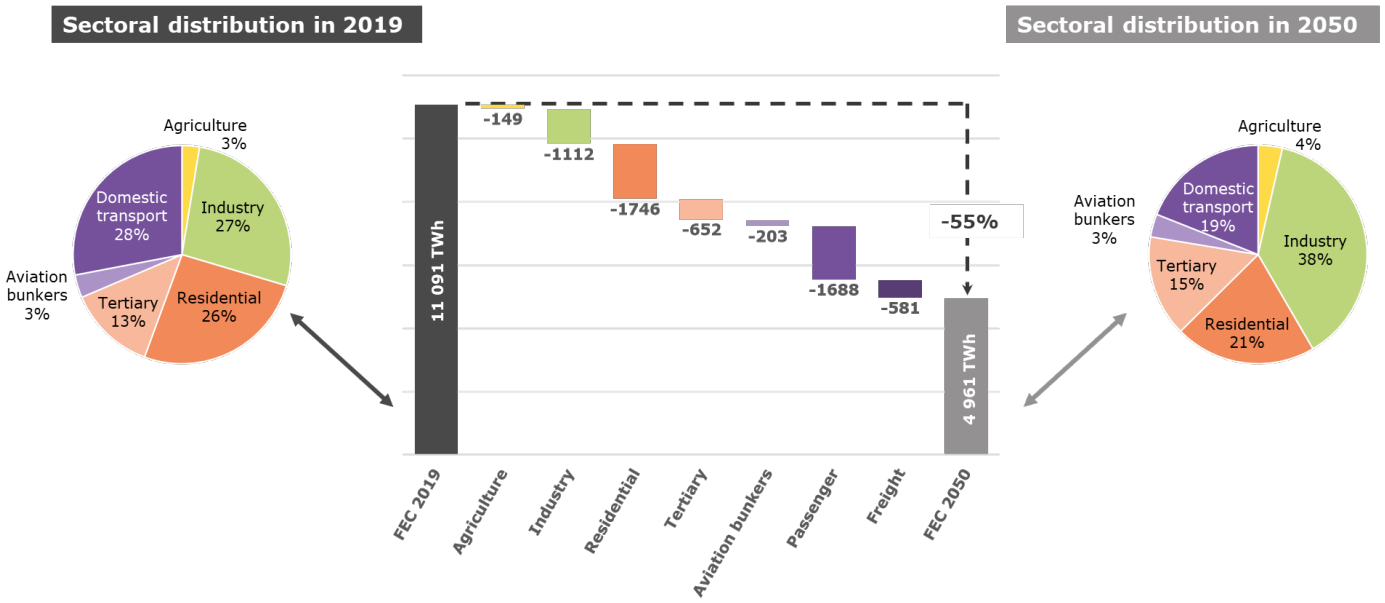


EU27 Final Energy Consumption (FEC) reduction by sector and EU statistics and objectives (TWh)

- **Official EU ambition for 2030 may fall short of setting Europe on a 1.5°C-compatible pathway**
- Need for very **ambitious sectoral** and **national implementation**

Europe can reduce its energy demand by -55% by 2050

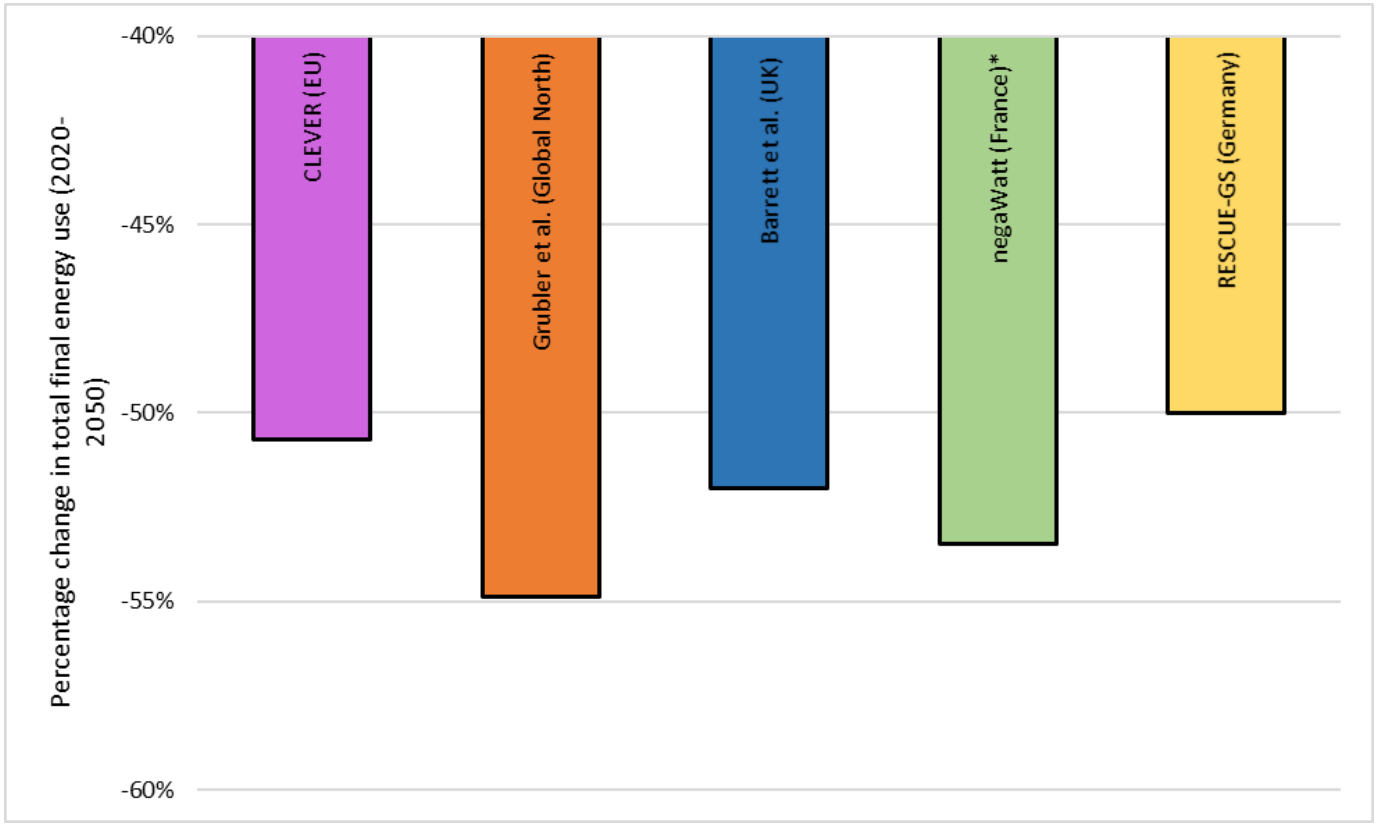
Contribution of sectors to EU27 Final Energy Consumption reduction (TWh)



- **Buildings** (residential + tertiary), **transport** (mobility+ freight) and **industry** major consumption sectors
- **Ambitious reductions** in all sectors
- Sufficiency (and circularity) and efficiency the main drivers
- Agriculture (GHG emissions) covered top-down in technical note on CLEVER website

-55% is in line with other major demand-focused scenarios reductions

Energy demand reduction (2020 to 2050) in scenarios pursuing low energy demand

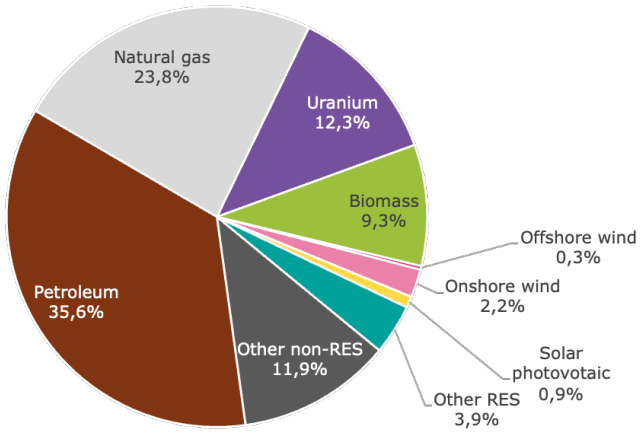


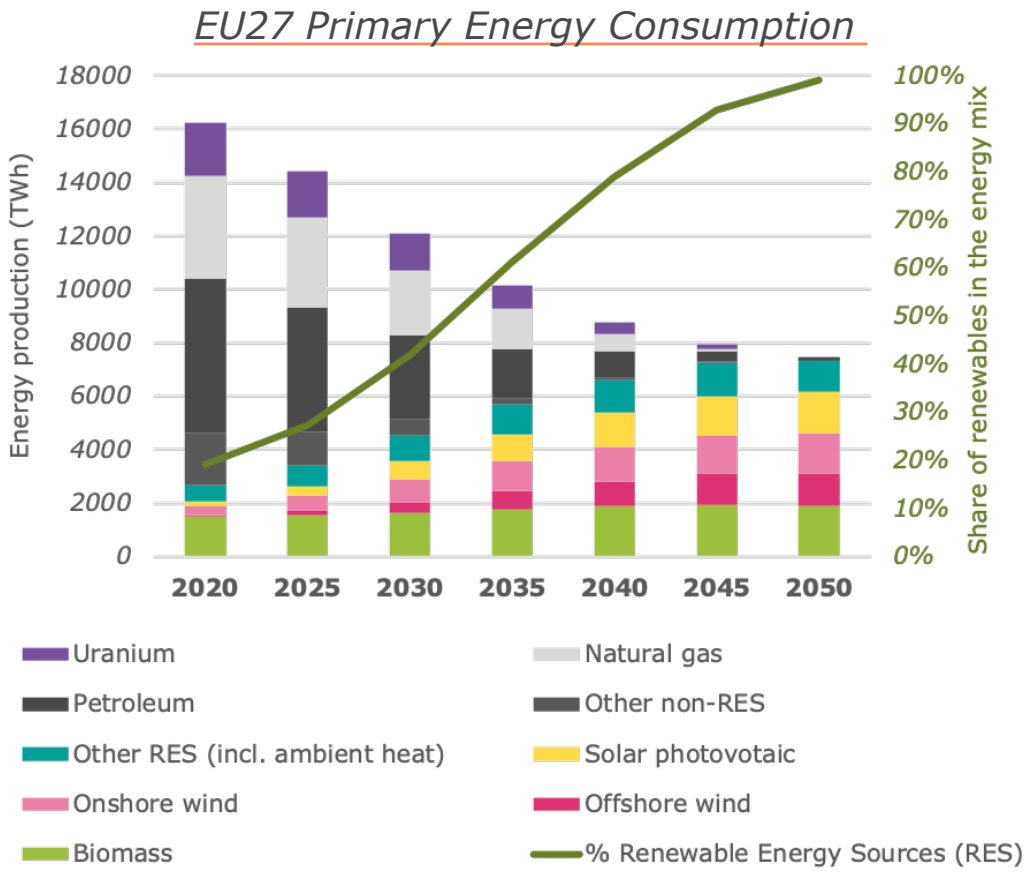
Global results:
Energy supply

Yves Marignac, négaWatt, FR

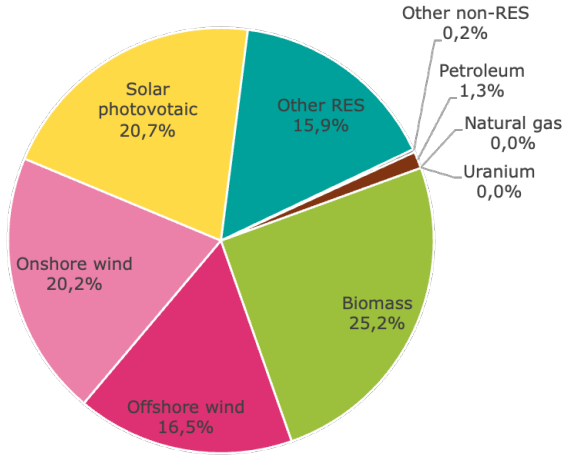
Europe can be fully renewable by 2050

Primary energy supply in 2020 (EU27)





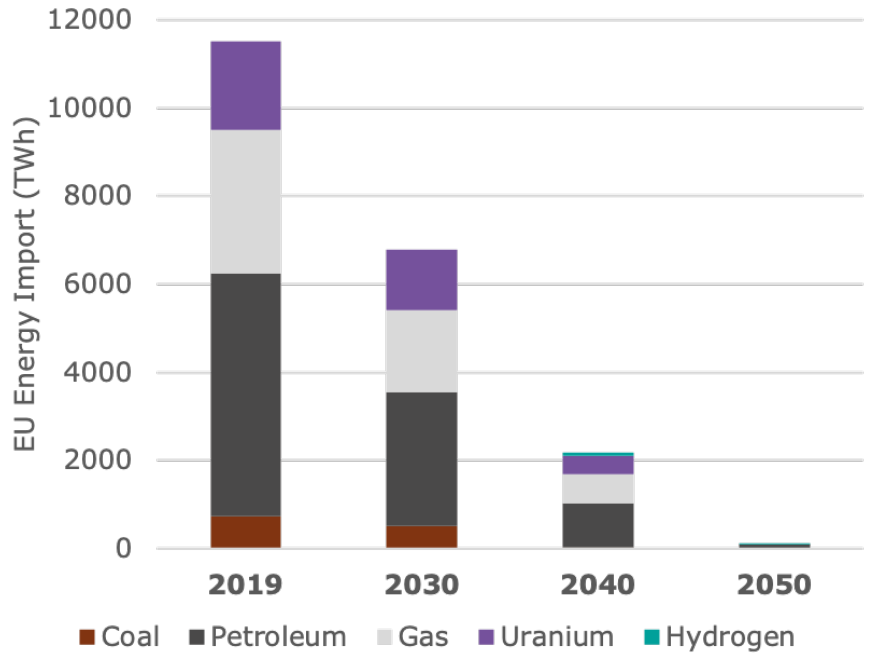
Primary energy supply in 2050 (EU27)



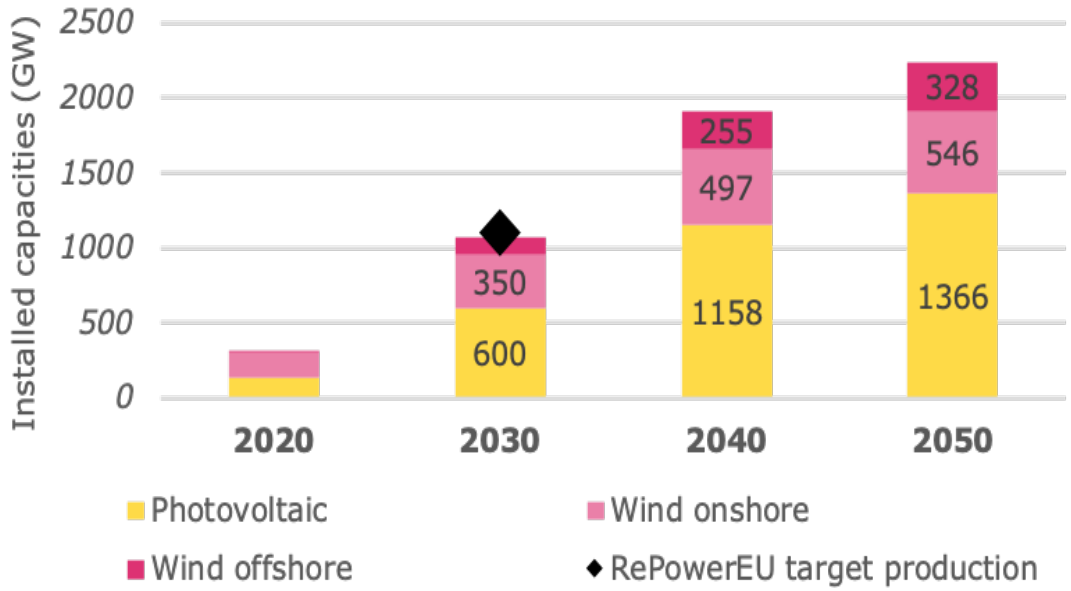
- **42% in 2030** and **80% in 2040**
- **100% RE possible by 2050 on the basis of existing 2030 RE targets**
  if enough action on demand

Europe can be freed from energy imports

Evolution of EU27 energy imports in CLEVER



Cumulated installed capacities in the CLEVER scenario for solar PV, onshore wind and offshore wind for the EU27

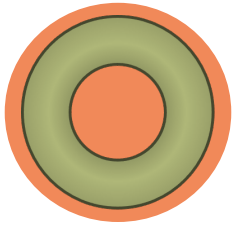


- **Fossil gas :**
  - minimising **new infrastructure**
  - halving **consumption** before 2035
- **No reverting to coal**

- **100% RES-E in 2040**
- **Wind** and **solar** the backbone

- Minimising (environmental) risks of **extra-European H_2/PtX imports**

Sufficiency in CLEVER



Benjamin Best, EnSu /Wuppertal, DE

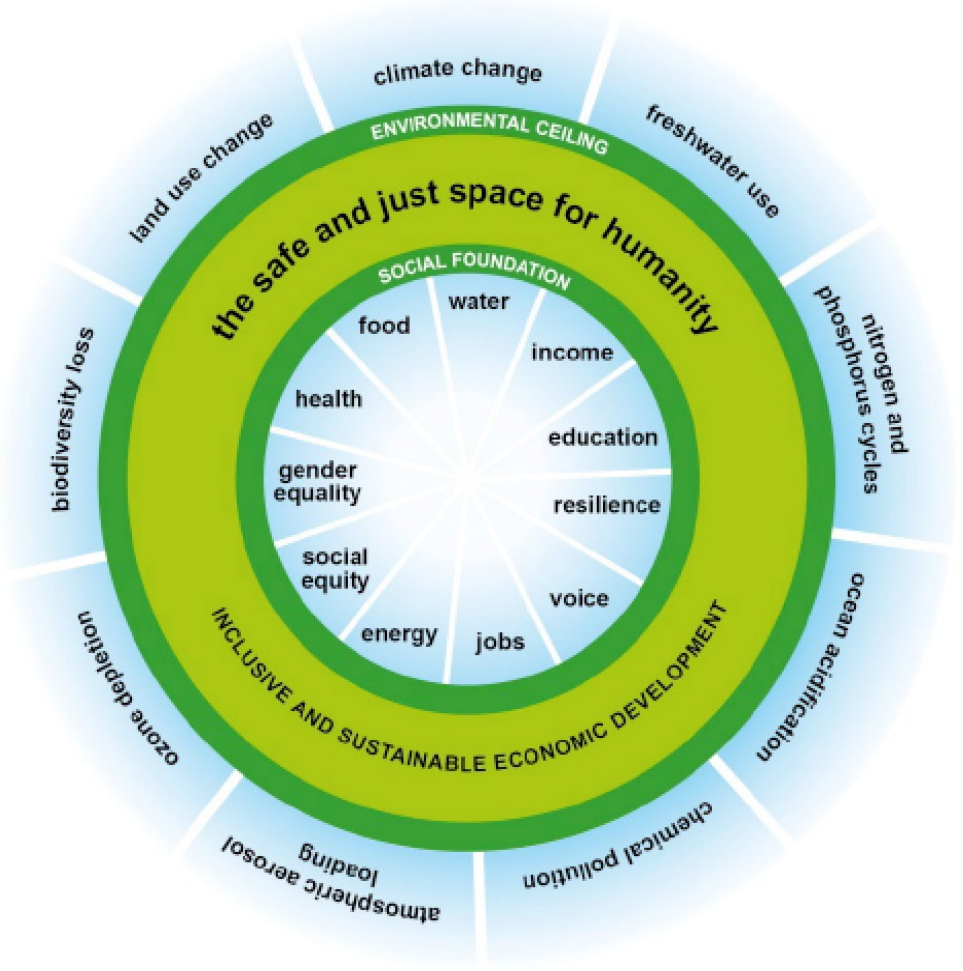
Sufficiency embedded in a global equity framework

Sufficiency means redesigning **collective and individual infrastructures** and **practices** to **minimise demand** *(energy, materials, land, water and other natural resources)* while delivering **human well-being for all** within **planetary boundaries**.

Adjusting nature and **amount** of **services** to keep demand impact below planetary limits

Fulfilling everyone's needs for **services** to live **a decent life**

A fair and sustainable transition



Doughnuts economics (Raworth, 2018)

Sufficiency's impact in CLEVER

CLEVER EU27 trajectory:

-55% of final energy consumption

Partners trajectory:

-20% to -30% due to sufficiency

Energy Consumption reductions: 2019 vs 2050

	Total FEC reduction	FEC reduction due to sufficiency
Total	-50 to -55%	-20 to -30%
Buildings *(residential and tertiary)*	-50%	-13 to -25%
Transports *(passenger mobility and freight)*	-65 to -70%	-20 to -39%
Industry	-25 to -45%	-13 to -36%

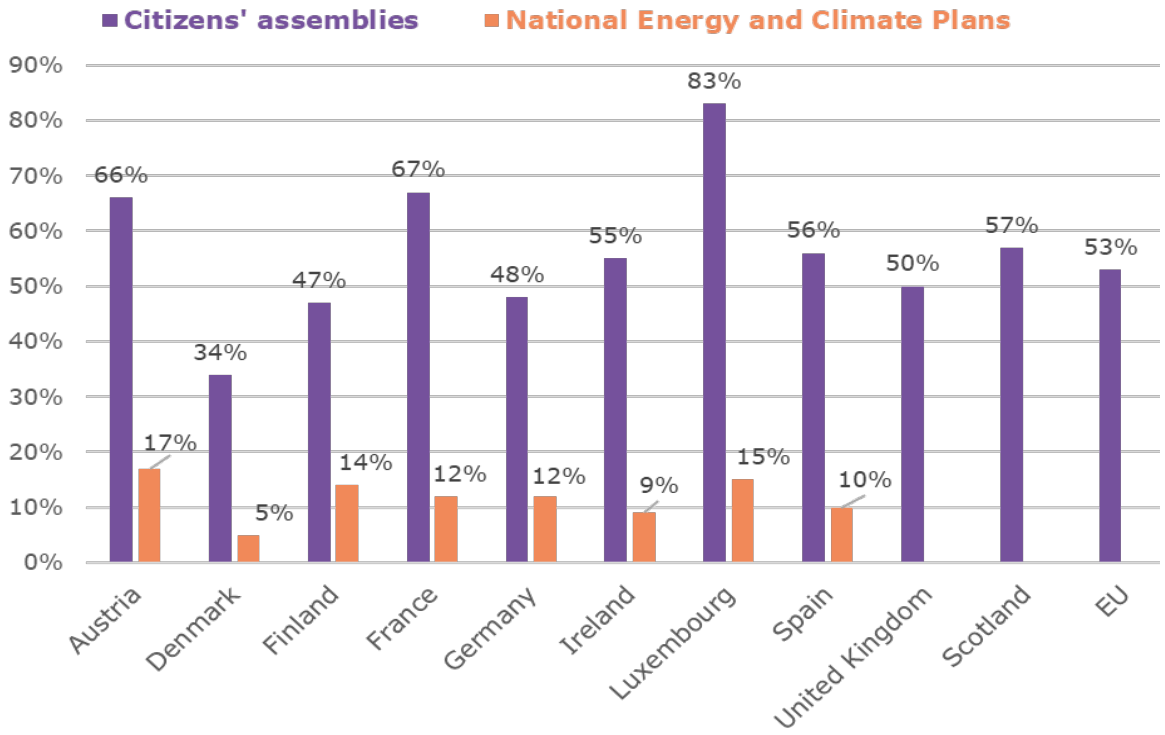
300 sufficiency policy ideas: https://energysufficiency.de/policy-database/

Sufficiency embedded in CLEVER as another lever

Sufficiency ≠ "behaviour"

- **Sufficiency is about setting the infrastructures and policies in place so that the collective organisation of our societies can evolve**
- **Work on assumptions just as another lever**
- **Work on clear sufficiency policies and strategies** just as another lever

Mainstreaming sufficiency



Share of sufficiency policies in national mitigation policies

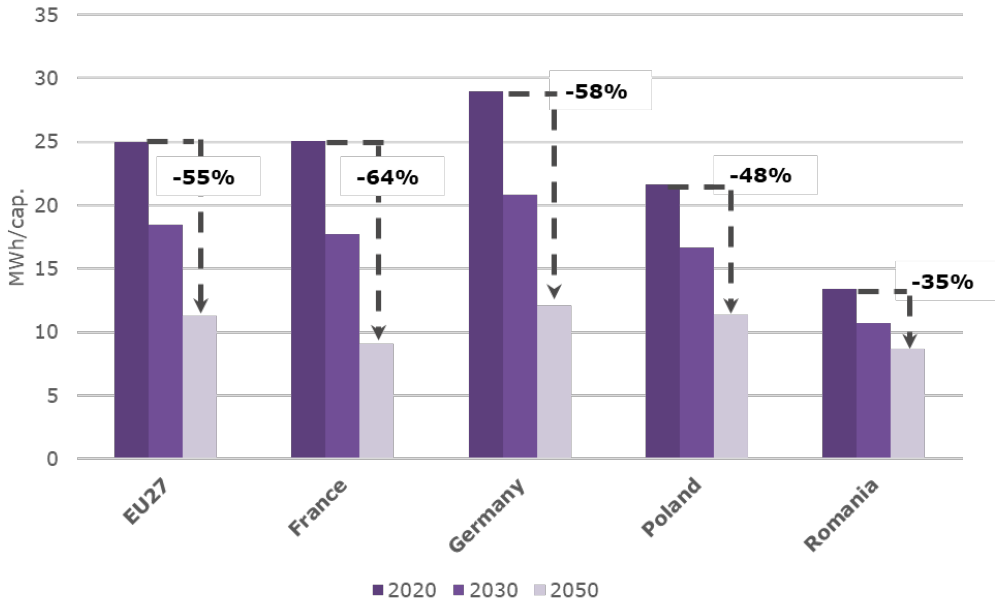
- **European Commission scenario building** and data
- **EU Governance** and **NECPs**
- **Sectoral legislation** at EU and national level

Solidarity and equity in CLEVER

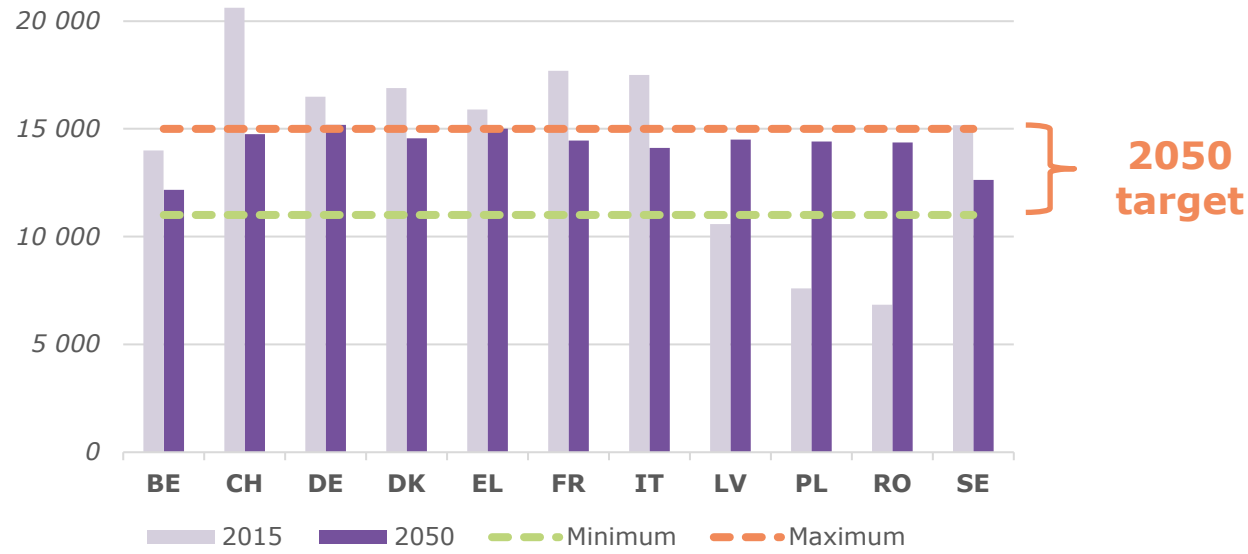
Krista Petersone, Zalabriviba/Green Liberty, LV

Sufficiency can be an equity enabler throughout Europe

Final energy consumption



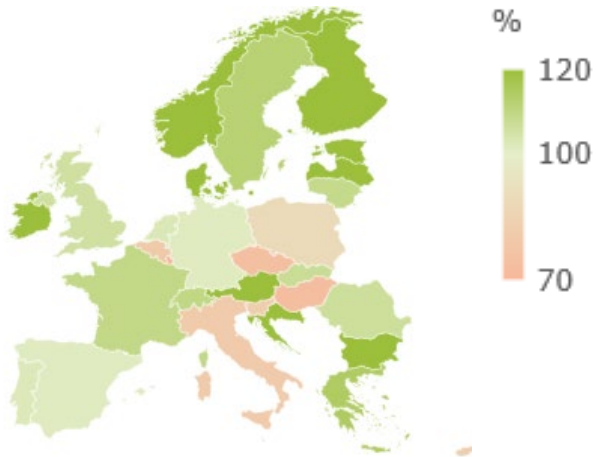
Example: passenger traffic (km/cap)



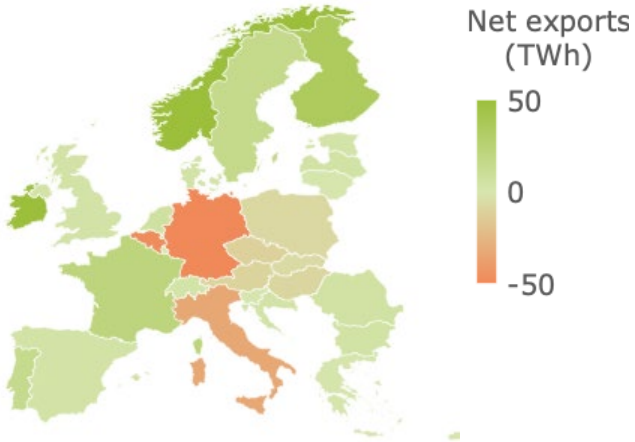
- Convergence of **consumption per capita**
- Enabled by strong **cross-sectoral sufficiency** through **corridors of convergence** towards convergent level of services
- Supported by **ambitious policies**, including at the national level to support equity within countries (e.g. targeting **most unsustainable patterns of consumption**)

Solidarity and Europeanisation smoothen the transition

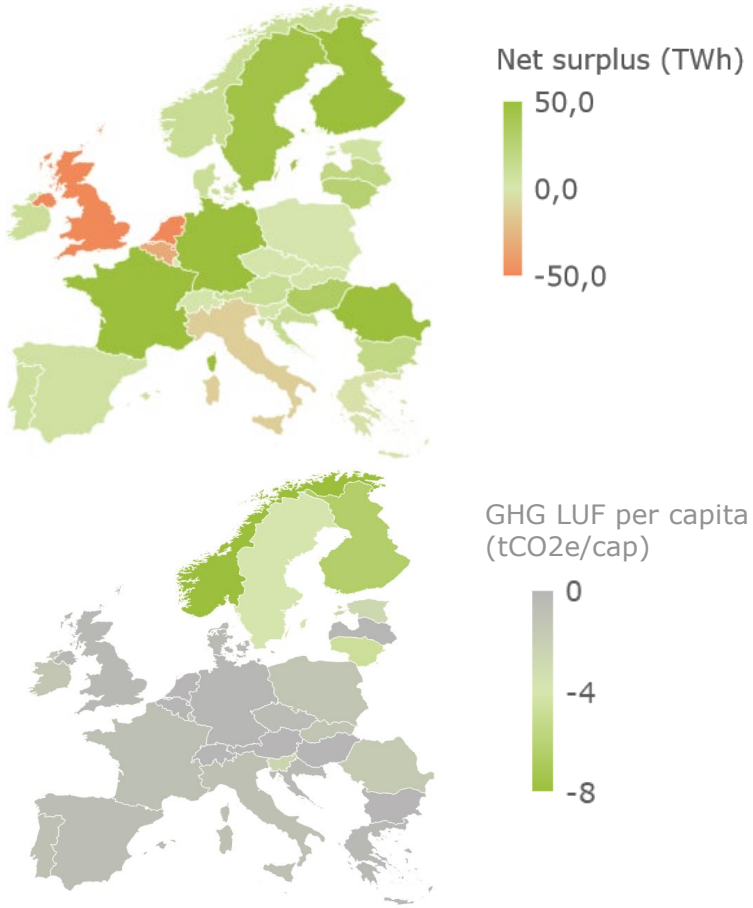
Net exports of electricity in 2040



Net exports of green H_2 in 2050



Net total surplus of bioenergies in 2050



Per capita Land Use and Forestry (LUF) GHG emissions in 2050

- Production (and sinks) **tailored to local physical potentials and politics**
- National production adjusted to European demand
- **Pressure within countries alleviated** : eg the pooling of CO2 sinks facilitates the avoidance of CCS
- **Europeanisation smoothens the transition** and solidarity a key enabler
- Need for countries to recognise these benefits to **avoid costly (national) investments**

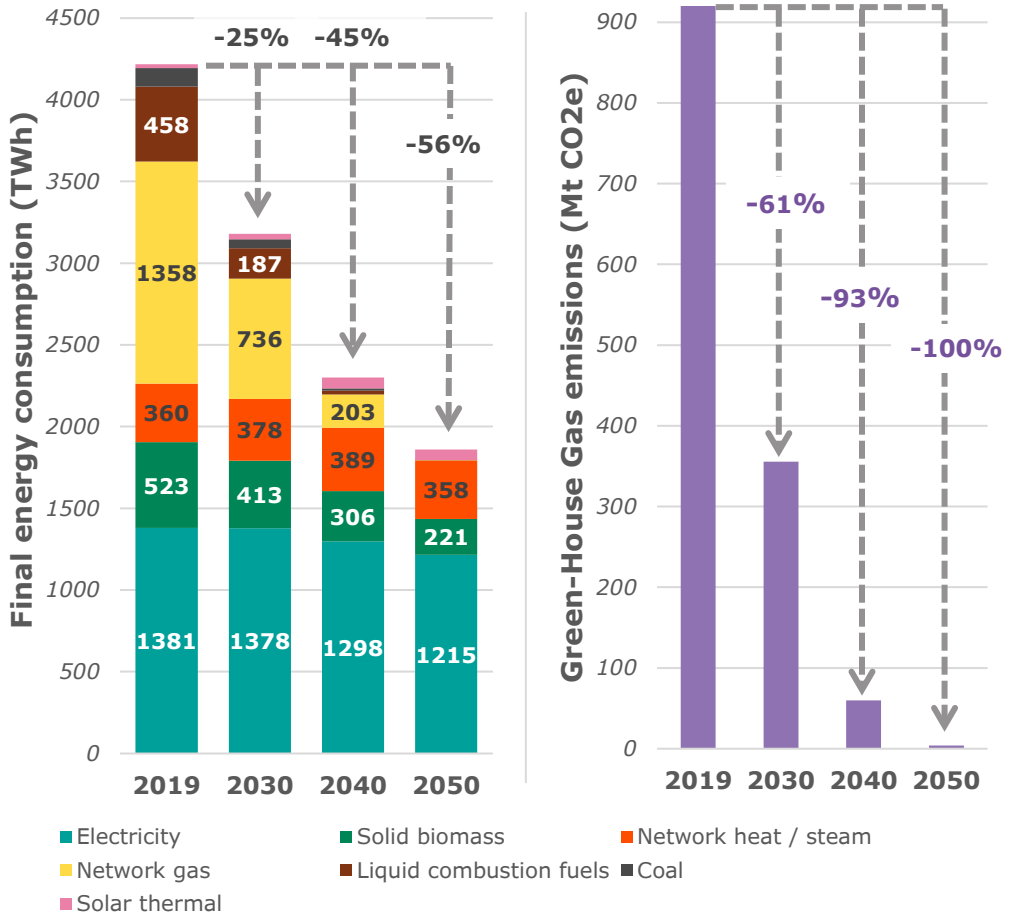
2.
Sufficiency and efficiency guarantee an effective and fair decarbonisation of consumption sectors

Buildings

Sébastien Meyer, negaWatt BE

The deep renovation imperative must be complemented with sufficiency

Evolution of the FEC and the GHG of the buildings sector at the EU27 level



Key lessons

- **Large scale rollout of deep renovation** is key and needs to begin immediately
- **Sufficiency as an indispensable complement to deep renovation**
  - Addresses both short-term issue (energy crisis) and structural changes
  - Encompasses dwelling size and consumption patterns
- **Rollout of heat pumps and heating networks critical to remove fossil fuels**
  - Should be integrated into the deep renovation strategy

Major policy recommendations for buildings

Translating ambitious deep renovation imperative into EU legislation

Clearly define deep renovation with energy and GHG emissions requirements

Target a minimum of 2% of deep renovation per year by 2030

- *Integrate **ambitious MEPS***
- ***Fiscal, financial, administrative and technical support** + specific funding for lower income*
- *Develop **training capacities** to support construction professionals*

Integrate **fossil-fuel phase-out (heat pumps)** into the deep renovation imperative

Limiting living space footprints & Supporting household energy sufficiency

Clearly define sufficiency in EU legislation to limit living space footprint

- *Strong **governance on land-take limitation** & fiscal incentives for small-sized living spaces*
- ***Local agencies/one stop shops** to integrate sufficiency actions into renovation*

Supporting housing energy sufficiency

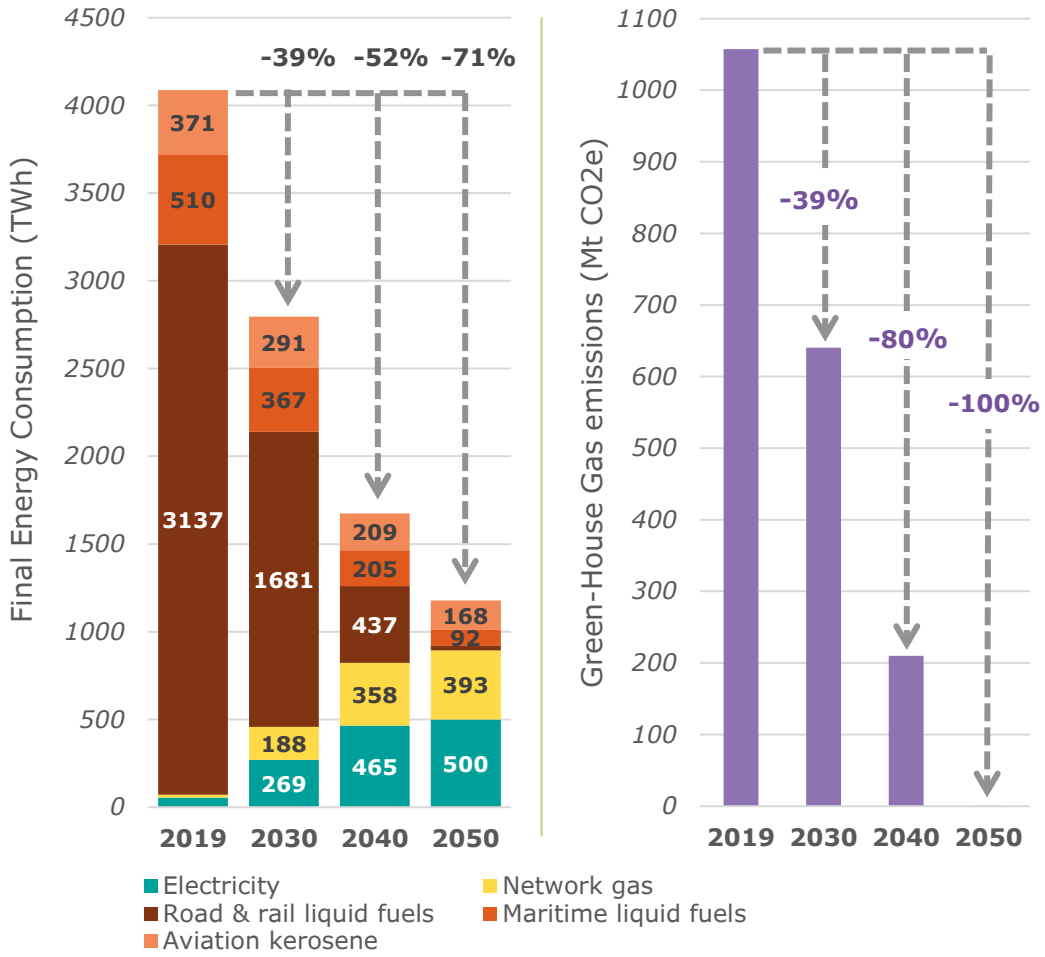
- ***Product regulation and labelling** - correct calibration and reasonable use of appliances*
- *Incentives for energy suppliers to propose offers **favouring low consumption***

Transport

Gunnar Boye Olesen, INFORSE

Shorter trips and lighter modes at the core of the transition

Evolution of the FEC and the GHG of the transport (mobility & freight) at the EU27 level



Key lessons

- **Sufficiency as a no-regret option**
  - Needs to be combined with other levers, especially electrification, which cannot deliver alone
- **Modal shift** and a sharp **drop in air travel** are required, coupled with an ↗ **in rail travel**
- Need for **smaller, lighter and increasingly shared and pooled fleet of vehicles**, together with **biogas trucks**
  - Alleviates **pressure on critical resources** such as lithium, cobalt, nickel or copper for vehicles batteries

Measures and infrastructures enabling European citizens to live less energy- and travel-intensive lifestyles

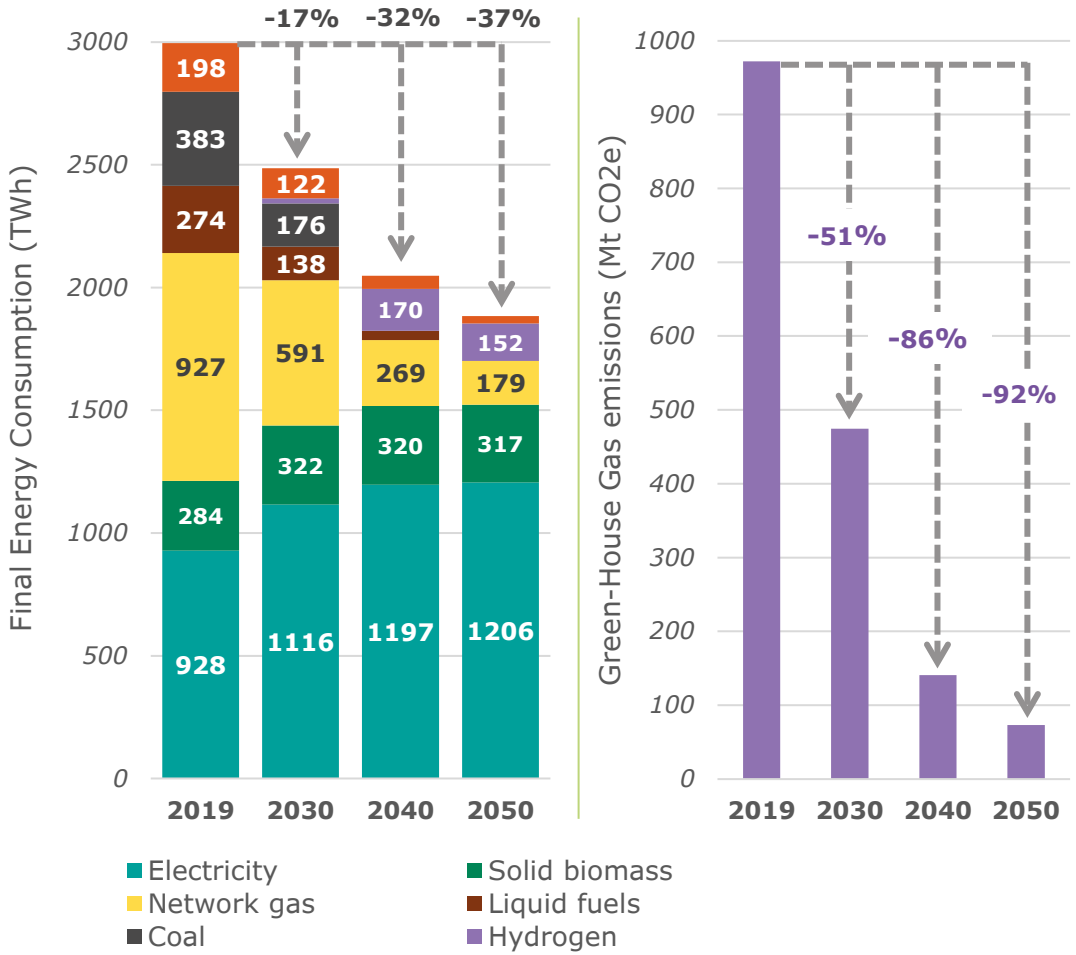
	Infrastructures & services	Legal framework & regulation
Less travel-intensive lifestyles 	**Spatial planning** allowing proximity to services → *15 min city*	Financial support to **remote working** associated to legal insurance **Frequent flyer levy**
Modal shift  	**Collective transports** development → *local to EU-wide train networks (TEN-T)* **Cycling infrastructure** → *strong city networks to EU cycling lines*	↗ **Accessibility of collective modes** → *fair tariffs* Fiscal policies and **regulation on unsustainable modes** → *flight bans if <5h train alternative*
Lighter, shared and high-occupancy electric vehicles 	Dedicated **car-pooling and car-sharing infrastructures** → *HOV lines, tolls, specific parking slots with charging points, adapted services, apps*	**Promoting lighter and electric cars** → *bonus/penalty system offering incentives and purchase taxes, indexed to LCA (energy & materials consumption and CO2 emissions)*

Industry and materials

Adrien Toledano, négaWatt, FR

Sufficiency and circularity should be at the basis of the transition

Evolution of the FEC and the GHG of the industry sector at the EU27 level



Key lessons

Sufficiency and circularity are essential levers of industry's decarbonisation which makes not relying on CCS.

Direct electrification is crucial to ↗ energy efficiency and ensure energy carrier balancing.

Hydrogen is a very judicious choice for specific applications: primary steel production and production of ammonia and olefins (as a feedstock).

Policy recommendations towards a less energy- and raw materials-intensive European industry

Policy regulation & industrial strategy

Sufficiency

Other sectors specific policies
→ *Net Zero Land Take*
→ *Bonus/malus on vehicles weight*

Job training and restructuring as part of a **re-industrialisation strategy** to guarantee employment and industrial sovereignty
Integrate sufficiency in CRMA : reduction targets for CRMs + limitation of SRM growth

Circularity

Strong products regulation supporting reuse, repair and recycle
→ *reinforcement of the ESPR to improve product life cycle assessment monitoring (prohibiting the destruction of unsold products, ensuring affordable repairs, etc.)*

Increase recycling targets
→ *Increase targets in CRMA for EU recycling capacity for SRMs. Extend to CRMs.*
→ *Defining recycled contents targets in products regulations (beyond batteries and permanent magnets)*

Energy efficiency

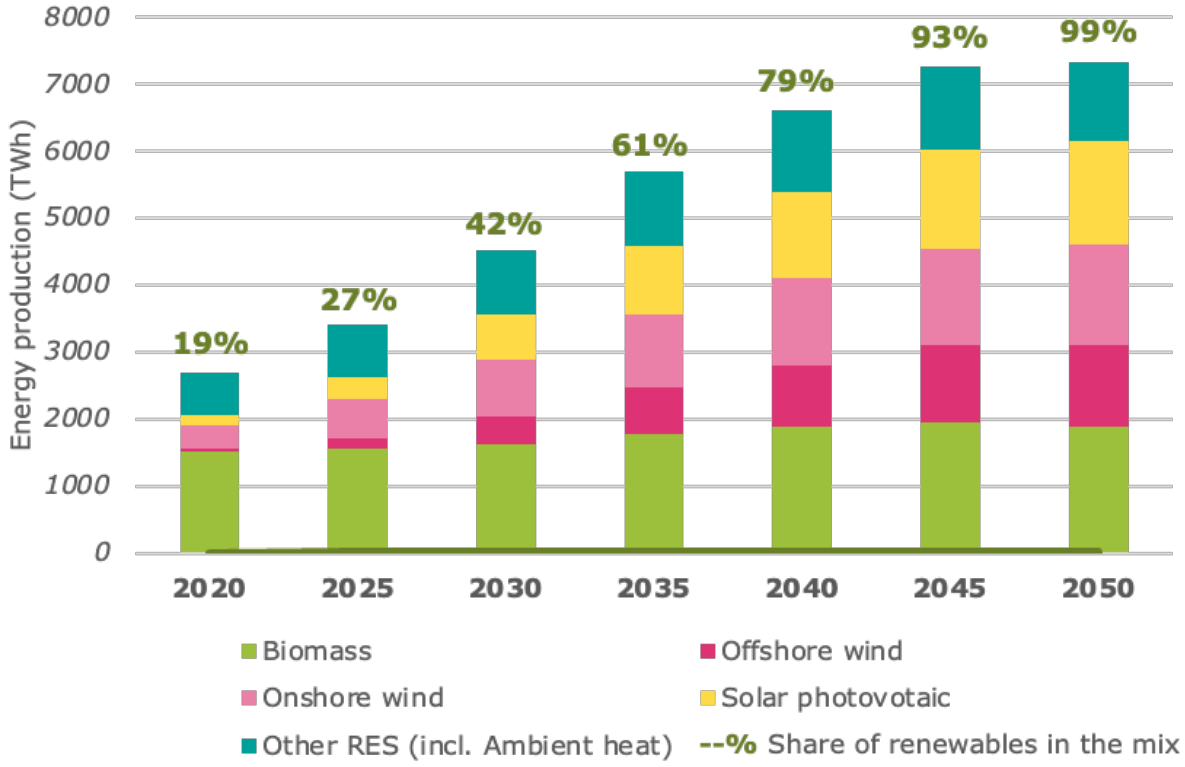
Financing the scaling-up of energy-efficient process and especially **direct electrification +** guiding the use of H2 for specific applications
→ *Integration in the GDIP*/NZIP

3.
Renewable energy sources are the backbone of a resilient European energy system

Yves Marignac, négaWatt, FR

Europe can develop 100% renewable supply by 2050

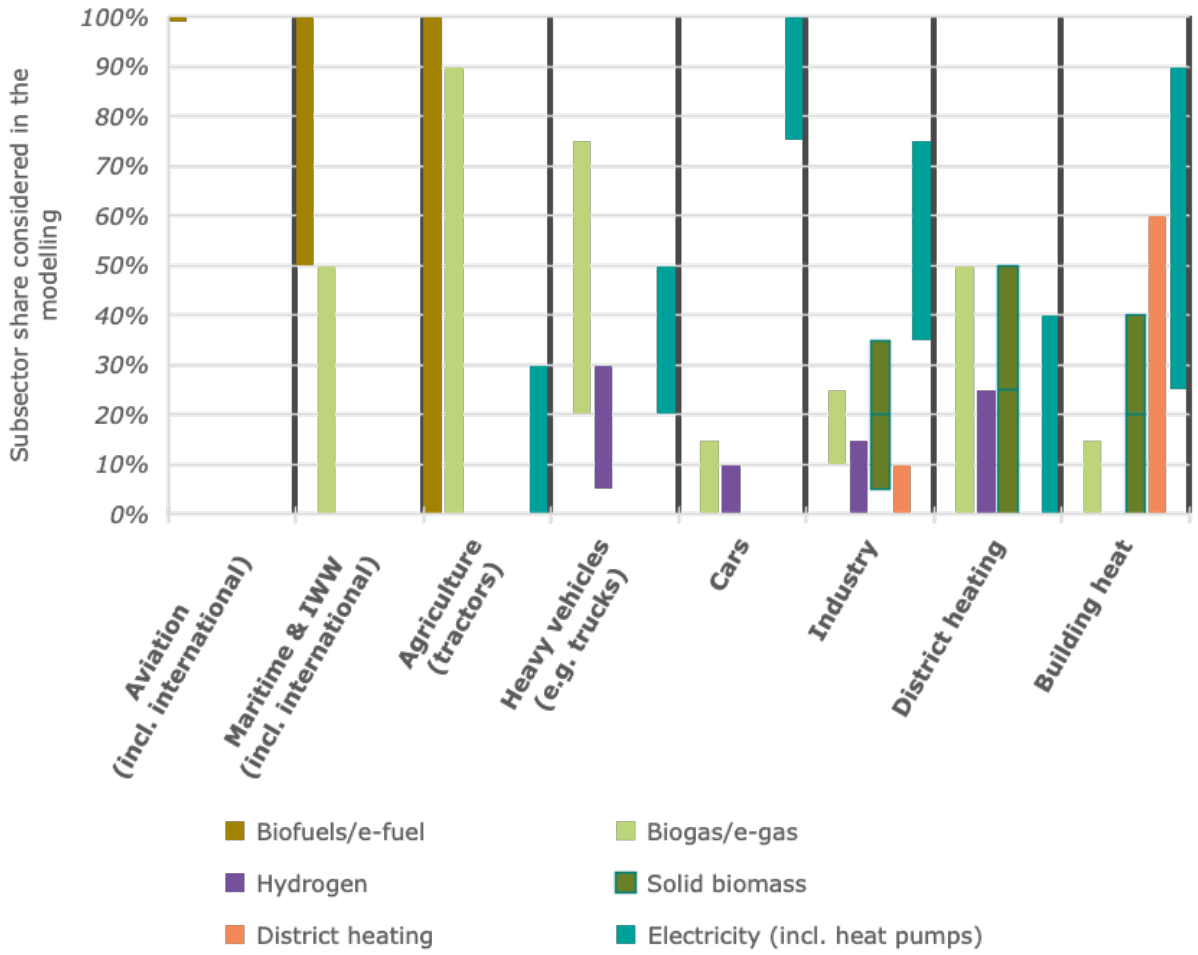
EU27 (TWh) *Primary Energy Production by Renewables and Share in the Energy Mix*



- **Swift increase,** in line with EU 2030 objective
- Based on **potentials** and **possible pace** of development
  - **Mostly electricity**
  - **Significant role of biomass**
- Related to an analysis about **energy carriers**

Supply needs to be consistent with carriers potentials

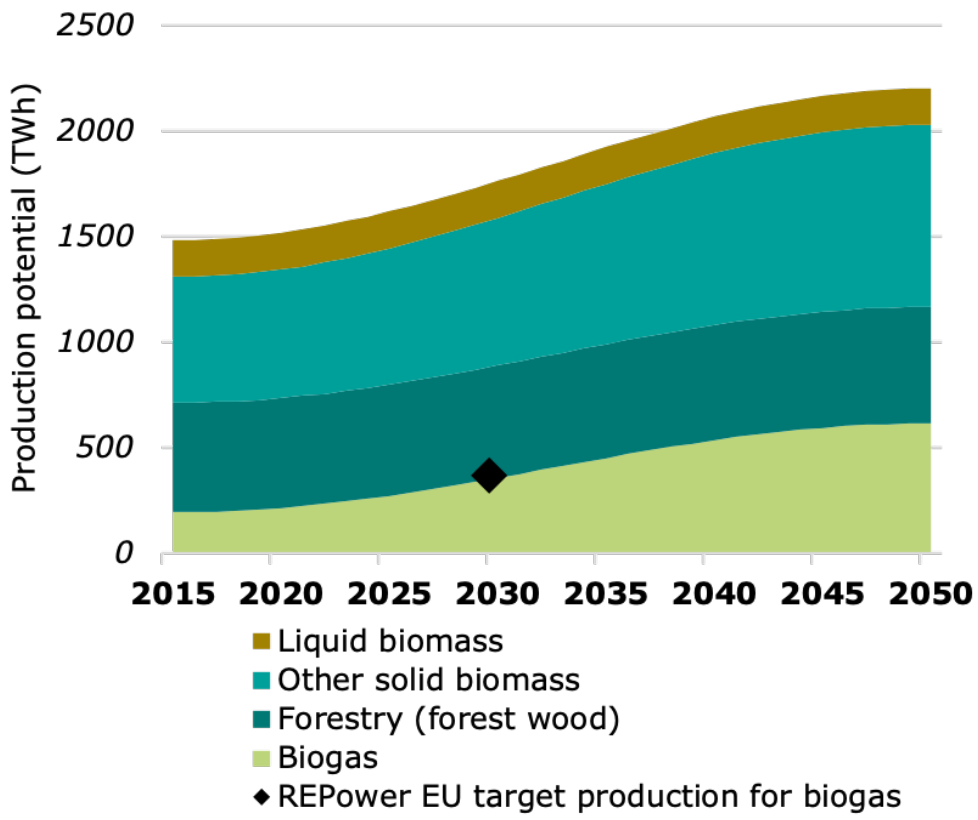
CLEVER estimates of main corridors for the share of a carrier in a subsector in 2050



- **Balancing carriers**, based on:
  - Sectoral constraints
  - Material concerns
  - Technology readiness level
  - Costs
- **Examples:**
  - **Aviation**: no other option than biofuels / e-fuels
  - **Space heating in buildings**: heat pumps have the main potential but other options have a role to play

Sustainable bioenergies have an essential role to play

Sustainable bioenergy production potentials in CLEVER for EU27+UK (TWh/year)

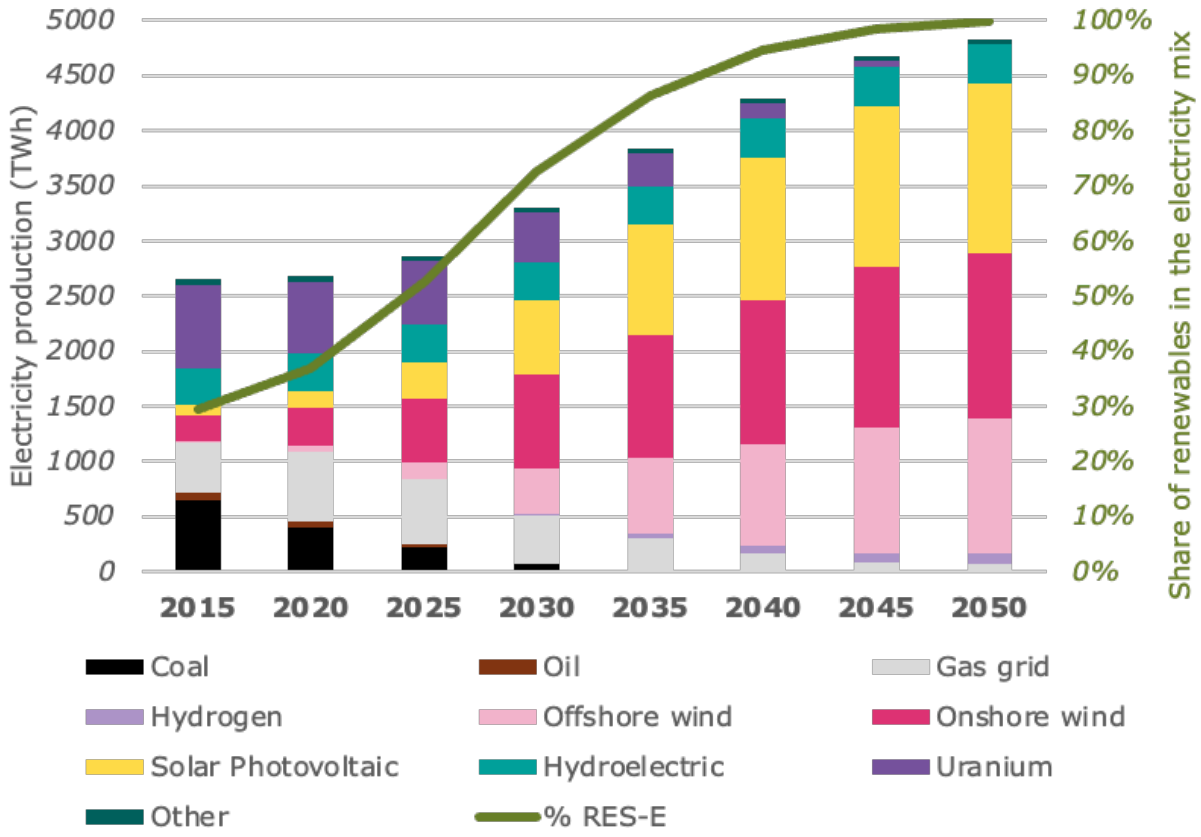


- Biomass assumptions
  ⇔ lowest EU evaluations (JRC, 1.5LIFE EC)

- **Solid biomass** mostly from **byproducts**
- **Bioliquids restricted to** (remaining) **aviation**
- **Biogas** in line with **REPowerEU** (35bcm)
  - mostly from **cover crops**
  - mostly for **freight**

Electric renewables are the backbone of 100% RES

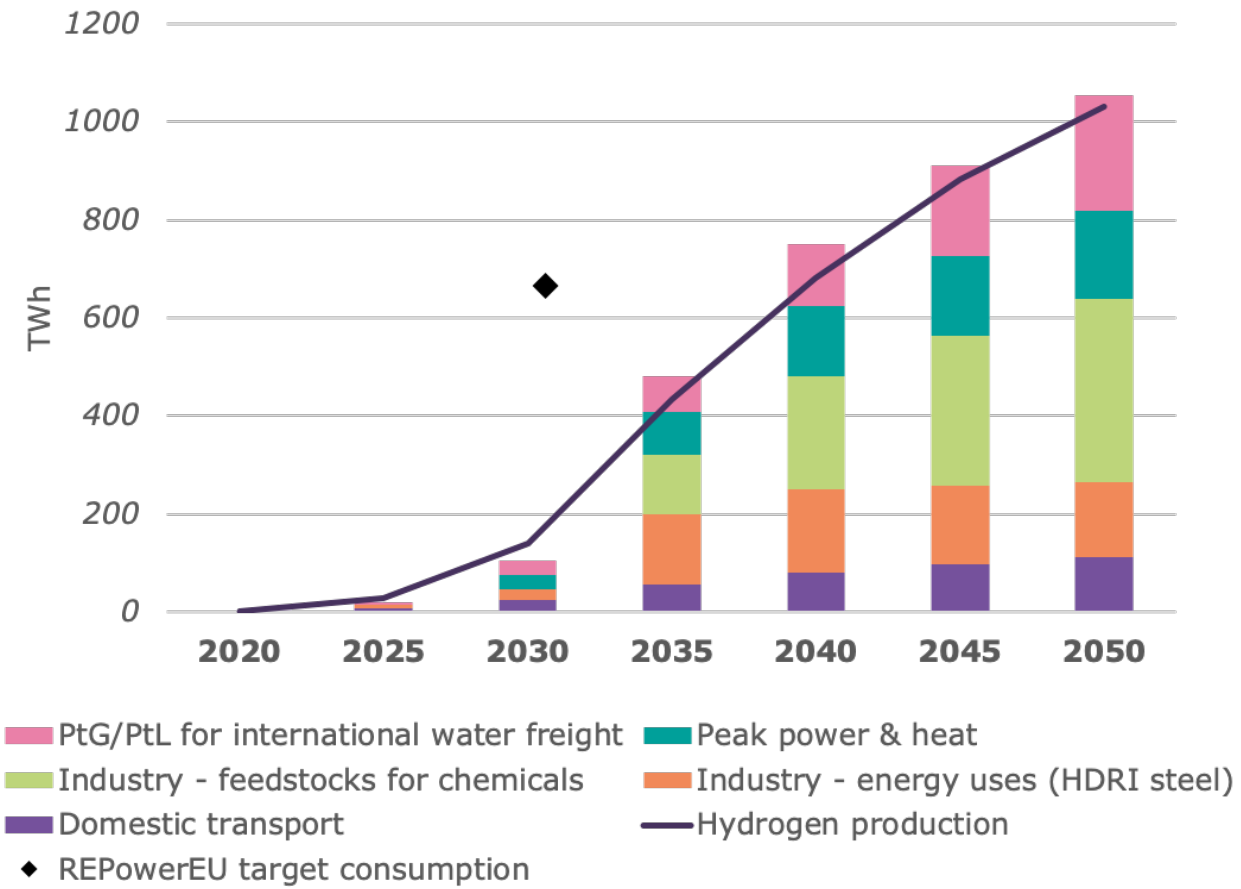
Evolution of electricity production by source and associated share of renewables in electricity for EU27 in CLEVER



- **PV, onshore and offshore wind** can get Europe to 100% RES-E by 2040
- Coal and fossil gas **phase out**
- No need for **new nuclear or CCS**
- Maintaining a dispatchable capacity corridor to **secure system adequacy**

H_2 is essential but limited to sectors which need it most

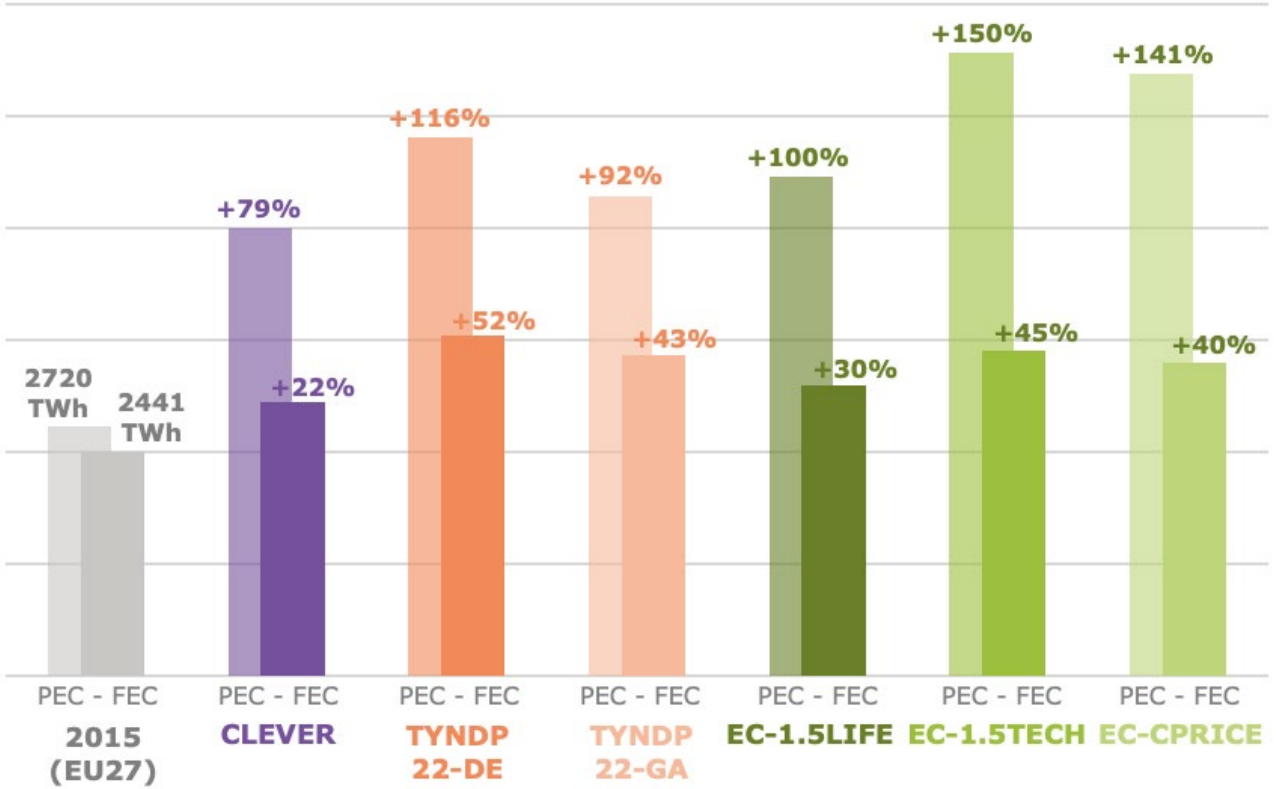
Evolution of green H_2 consumption and production for the EU27



- **140 TWh in 2030** for the EU27 *(<< 666 TWh REPowerEU)*
- **Mostly feedstocks for chemicals and water freight** *(PtX)*, **steel and methanation/storage and peak power plants**
  - ➔ Minimises further pressure on electric renewables

Electrification can be kept within reach

Comparison of the evolution of electricity consumption and production between 2015 and 2050 in CLEVER, TYNDP, and EU Commission (EC) scenarios



PEC : gross production of electricity - FEC : net electricity contribution in final energy consumption
Scope EU-27 for the CLEVER result, TYND and EC-CPRICE, EU-28 for EC-1.5LIFE and TECH.

- Thanks to **sufficiency**, **efficiency** and **bioenergies**
- Minimises:
  - **Costs**
  - Adaptation of **electricity networks**
  - **System adequacy issues** and **peak power capacities**
  - **System renewal** *(heat pumps, EVs, RES-E, etc.…)*
  - **Materials needs** (*e.g. lithium, nickel, cobalt, copper, etc.…)*

Major recommendations

Accelerating the deployment of RES → Deliver the ambitious targets of RED & REPowerEU

Optimise the local use of RES

- *Ensuring **multi-level planning** & **mapping of production potential** and **grid expansion***

Accelerate permitting processes for all renewables, repowering, grids and storage

- *Without compromising on **system security** or **environmental impact***

Favour balanced development of RES throughout the territory in all regions

- *In large countries, by **territorialising support mechanisms***

Promoting citizen participation in RES projects → Support full development potential & social acceptability

Develop Renewable Energy Communities (RECs) & Citizen Energy Communities

- *special assistance for local projects*

Implement EU rules on individual and collective self-consumption

- ***empowering citizens** to produce and consume their own renewable energy*

Incentivise partial local ownership in RES projects

- *Facilitate access to **support mechanisms & investment** to community energy projects*

Ensuring the EU market design is fit for 100% RES

- *Combine PPAs and CFDs based on clear perimeters and risk sharing schemes **CFDs should be reserved for RES** and not indexed on spot price*
- *Targeted schemes for **vulnerable consumers***

Clever

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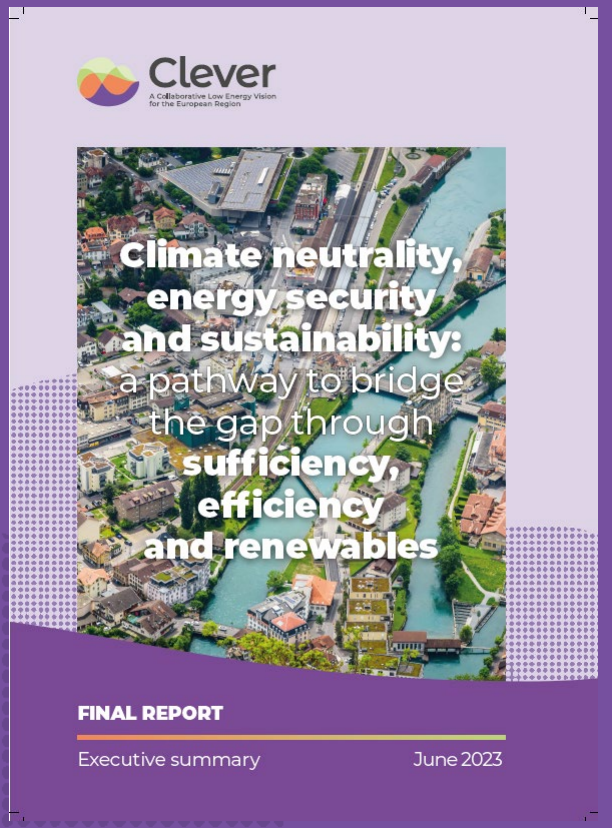
Final report inc. Exec Summary

Scenario results
at EU27, EU30 and national level

Online data visualisation

Technical notes:
residential, mobility, industry, AFOLUB



Q&A session

16:40-16:55

Policy panel

16:55-17:55

Bridging the climate neutrality, energy security and sustainability gap through energy sufficiency, efficiency and renewables: between ambition and feasibility?

Moderation : **Arianna Vitali Roscini**, Coalition for Energy Savings

Intro:
CLEVER key lessons and recommendations

Stephane Bourgeois négaWatt, FR

SER can make Europe…

- **Be on a trajectory consistent with 1.5°C** through the early mobilisation of SER levers
- **Reach net GHG neutrality by 2045**, with -90% net as a core 2040 milestone, inc. -85% gross reduction to minimise carbon sinks risks
- **Halve its energy demand**, with **sufficiency** as core enabler -20-30% in FR-DE-UK
- **Fully independent from all forms of energy imports**, including from PtX
- **Fully renewable**, based on existing 2030 targets for wind, solar and biogas (not H2); **100% RES-E by 2040** with electrification at sustainable level, **minimising infrastructure development** and **pressure on material resources**, and **maximising acceptance**
- **More equitable and solidary**, easing and smoothening the transition.

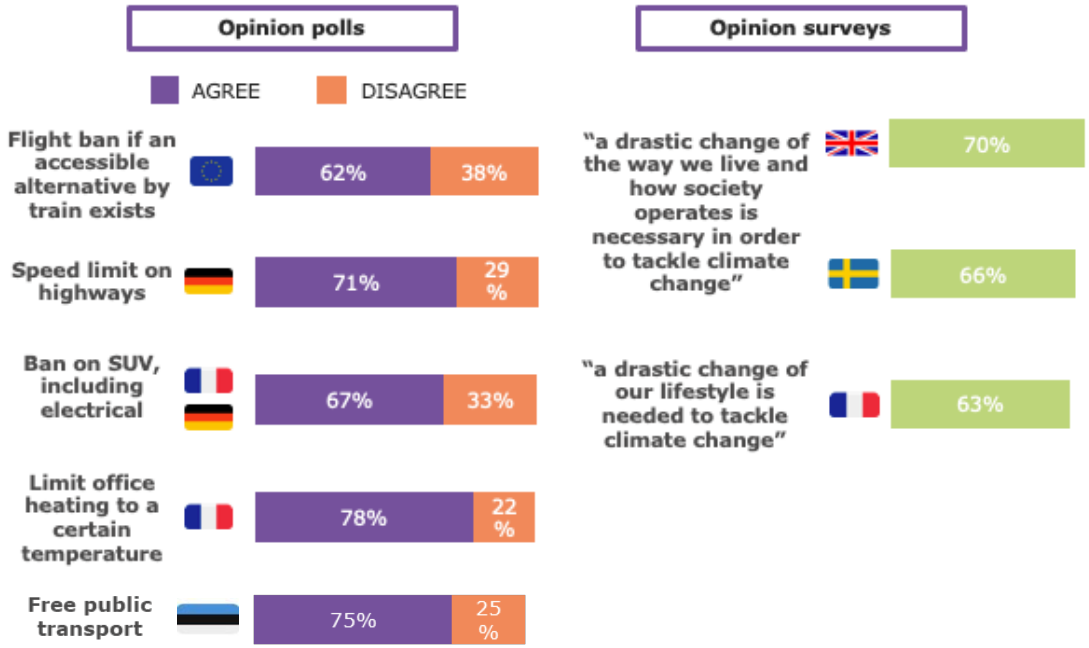
Major Recommendations

EU 2030

- Swift and ambitious **national FitFor55 implementation + NECPs**
- **EED**, **EPBD**, **ESPR, GDIP, RED, REPowerEU (wind, solar, biogas, ≠ H2)**

EU 2040

- **-90% net as minimum 2040 GHG target**, including -85% gross reduction
- **-45% FEC** and **80% RES**



Acceptance of sufficiency measures

Demand first and sufficiency mainstreaming

- **EC scenario building**
- **EU Governance** (corridors?) and **NECPs**
- **Sectoral legislation**

Policy panel

Bridging the climate neutrality, energy security and sustainability gap through energy sufficiency, efficiency and renewables: between ambition and feasibility?

Jakop G. Dalunde
MEP (Greens-EFA), Member of TRAN and ITRE committees - *European Parliament*

Robert Nuij
Deputy Head of Unit for Energy Efficiency - *DG ENER, European Commission*

Clément Serre
Economist, Energy Economics and Modelling - *DG ENER, European Commission*

Ursula Woodburn
Director - *CISL Europe, CLG Europe (Corporate Leaders Group)*

Dimitri Vergne
Team Leader Sustainability - *BEUC (European Consumer Organisation)*

Moderation:

Arianna Vitali Roscini
Secretary General - *Energy Savings Coalition*

Questions from the floor

Closing

17:55-18:00

Stéphane Bourgeois

Clever

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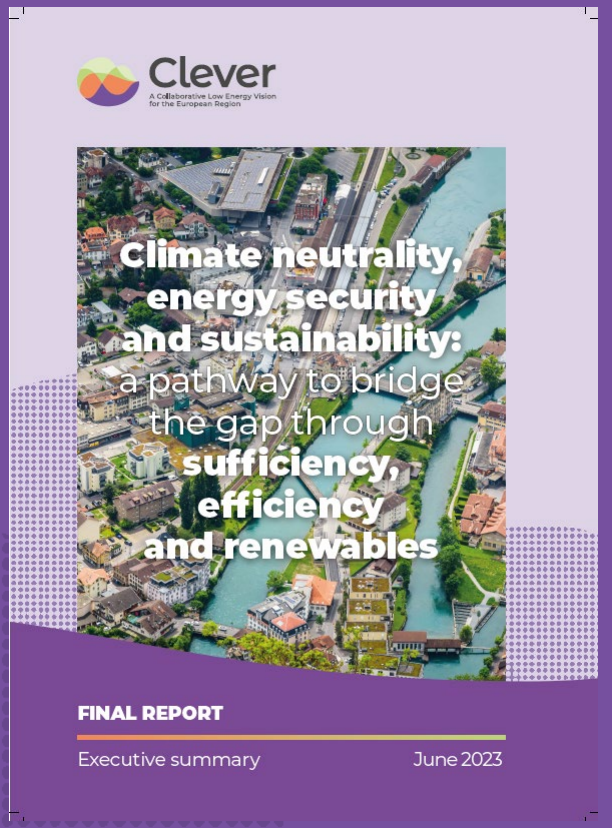

#CLEVERscenario — contact@clever-energy-scenario.eu — clever-energy-scenario.eu

We look forward to continue the work with you!

Keep the partners network going

- Technical exchanges with NGOs, think-tanks, institutions

Engage in EU policy debate

- 2040
- European Elections

Dig further

- Batteries / materials
- Sufficiency
- System adequacy
- Macro-economics / investment
- Land use

Engage in academic work

- Paper in progress
- More open data?

Clever | A Collaborative Low Energy Vision for the European Region

Thank you!

...and the CLEVER team

Now let's have drinks! ☺