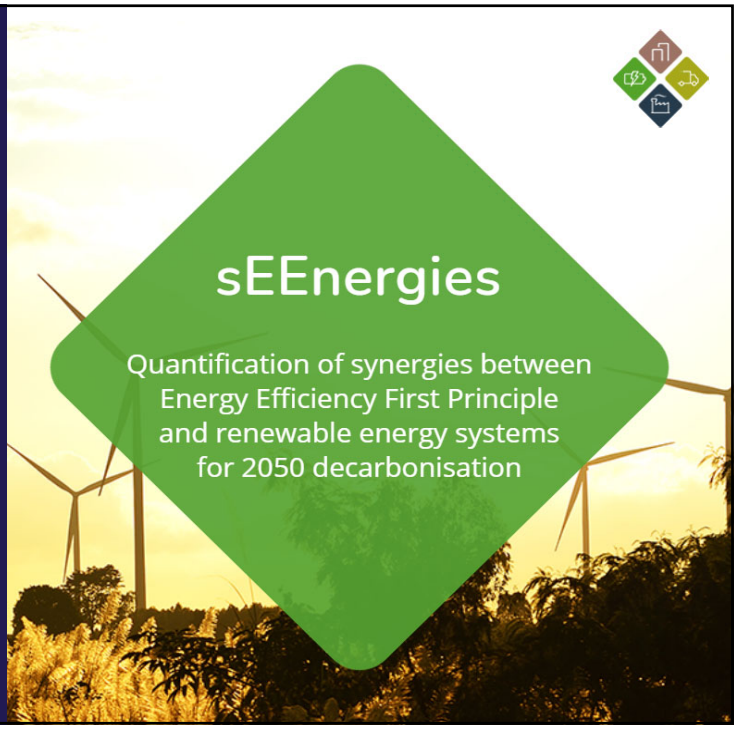
sEEnergies REPowerEU and 2030 policy takeaways

Energy Efficiency First SUMMIT, 31 May 2022



ENERGY EFFICIENCY FIRST

#EE1ST SUMMIT

How to implement the Energy Efficiency First principle and boost Europe's Energy Security

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Time	Title	Speakers
15:15	Coffee break	
16:00	**REPowerEU 2030: EE1st Principle, Energy Security in the light of the Russia-Ukrainian War** • sEEnergies REPowerEU and 2030 policy take-aways	Brian Vad Mathiesen, Professor, Aalborg University
16:30	**REPowerEU – the EU Commission answer to energy security in Europe**	Hans Van Steen, Principal Adviser, EU DG Energy
	Round table: Is EU on track for harvesting energy efficiency first potentials in REPowerEU?	• Hans Van Steen, Principal Adviser, EU DG Energy • Michaela Holl, Senior Associate, Agora Energiewende • Jeppe Juul, Vice President, Transport & Environment • Wolfgang Eichhammer, Head, Competence Centre Energy Policy and Energy Markets, Fraunhofer ISI • Eline Blanchard, Senior Policy & Project Officer, EFIEES - European Federation of Intelligent Energy Efficiency Services • Brian Vad Mathiesen, Professor, Aalborg University
18:00	Wrap up and conclusions	

REPowerEU 2030: EE1st Principle, Energy Security in the light of the Russia-Ukrainian War

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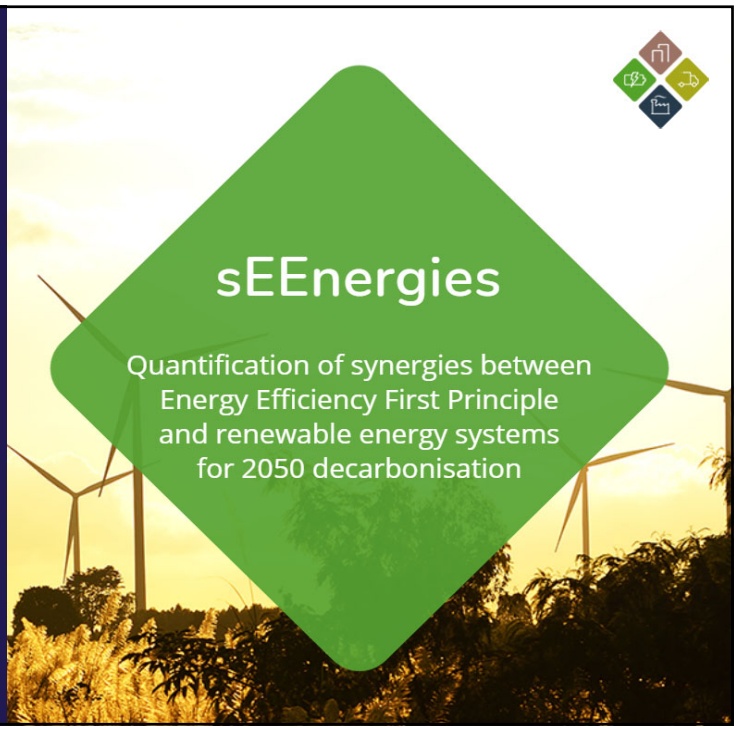
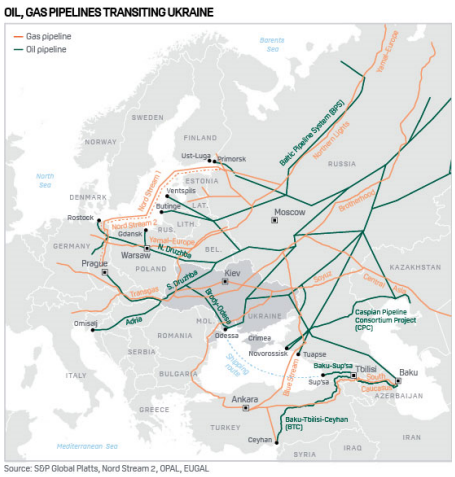
Brian Vad Mathiesen, Aalborg University

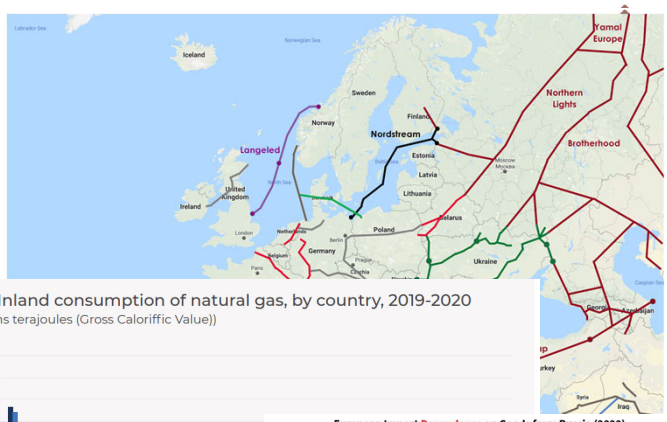


Europe is hungry for oil and gas

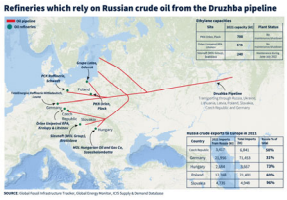


Main gas pipelines in Europe, 2020. Source: W3Ask.com

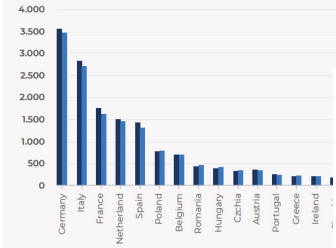
Europe is hungry for oil and gas



Refineries which rely on Russian crude oil from the Druzhba pipeline

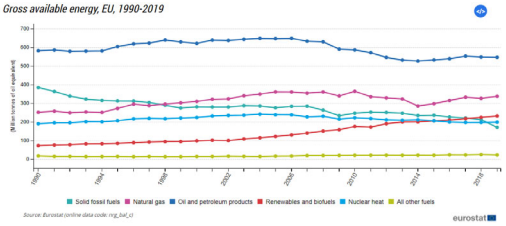


Gross Inland consumption of natural gas, by country, 2019-2020
(Thousans terajoules (Gross Caloriffic Value))

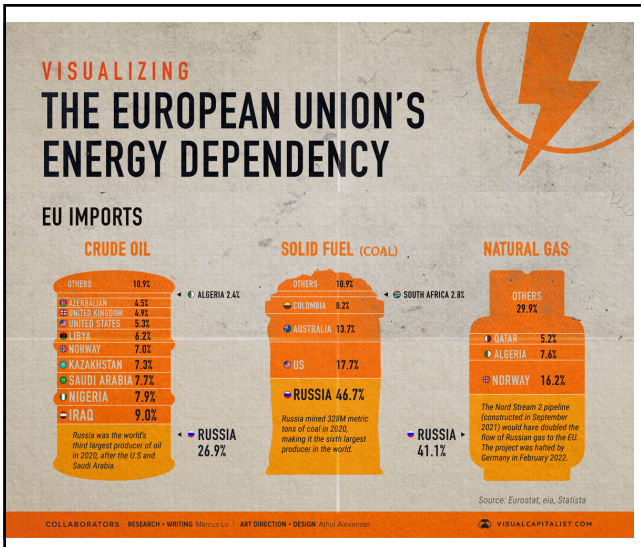


Kilde: Eurostat (online data code: nrg_cb_gasm)

Gross available energy, EU, 1990-2019



European Import Dependence on Goods from Russia (2020)



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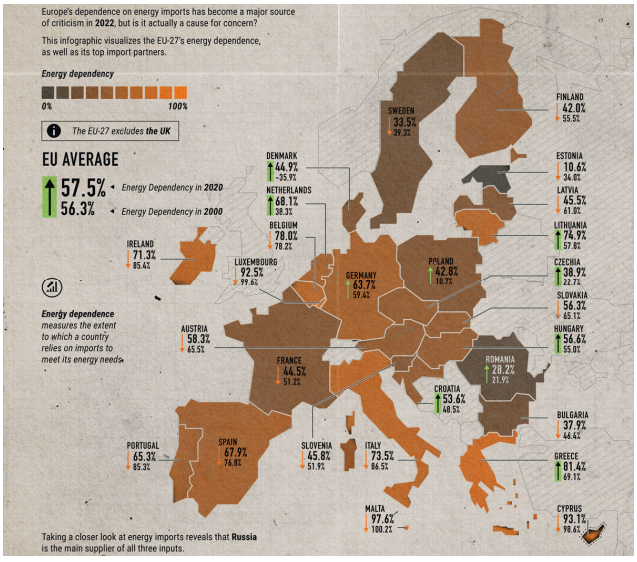

Sourcer: Eurostat, EIA, Statista

Energy efficiency in the supply chain

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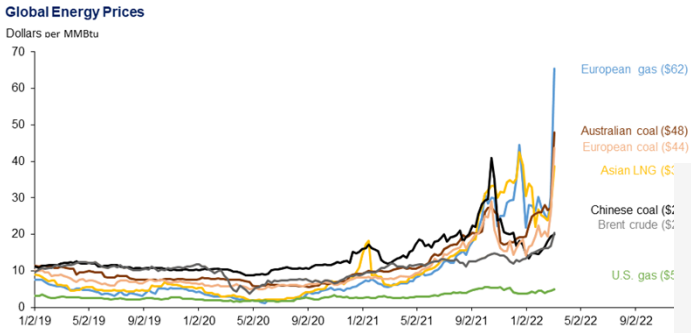

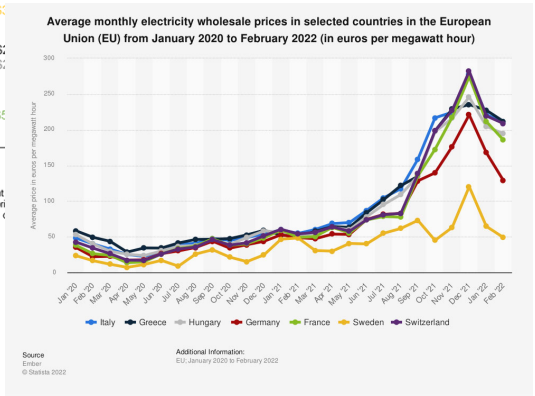

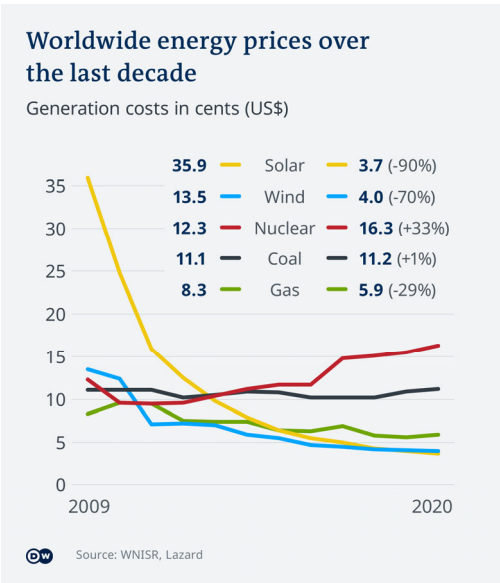

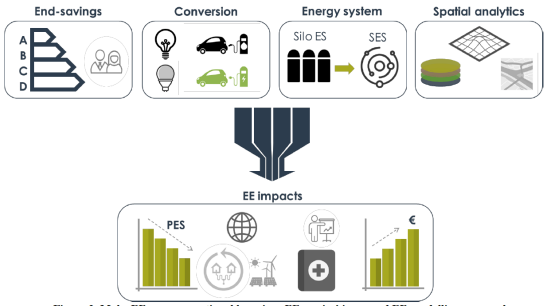

Figure 2. Make EE more operational by using sEEnergies' improved EE-modelling approach

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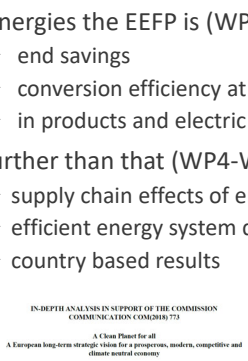
Energy efficiency in the supply chain

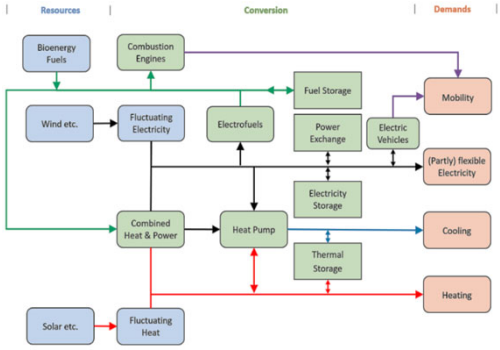
In sEEnergies the EEFP is (WP1-WP3):

- end savings
- conversion efficiency at the end consumer
- in products and electric vehicles

and further than that (WP4-WP6):

- supply chain effects of end use savings
- efficient energy system designs
- country based results





One common point of reference:
Analysing the EEFP in the entire supply chain in a future situation requires a consistent approach to future developments. In sEEnergies selected scenarios from "A Clean Planet for all" are used as a common reference across countries in Europe and across sectors in the energy sector.

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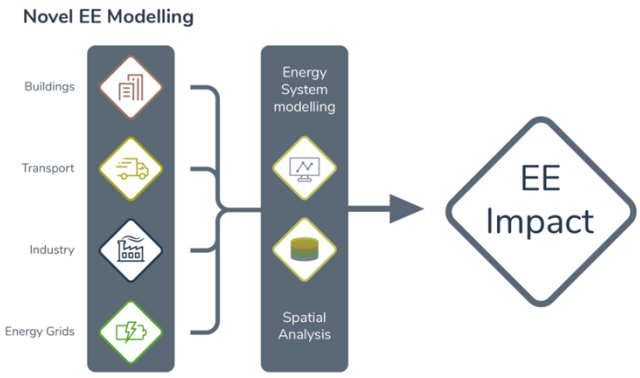
Overview of project setup and model approach

Quantification and operationalization of the potentials for energy efficiency in buildings, transport, and industry.



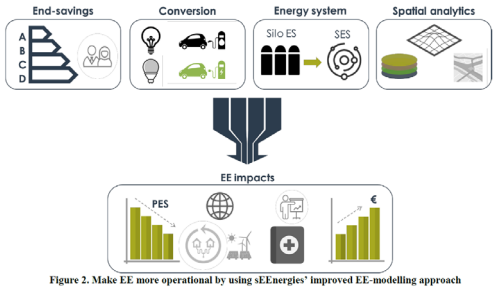


Figure 2. Make EE more operational by using sEEnergies' improved EE-modelling approach

The project combines sectorial bottom-up knowledge with hour-by-hour modeling of the energy systems and spatial analysis in the EU.

The project includes analysis of non-energy benefits of the energy efficiency first principle in the different demand sectors

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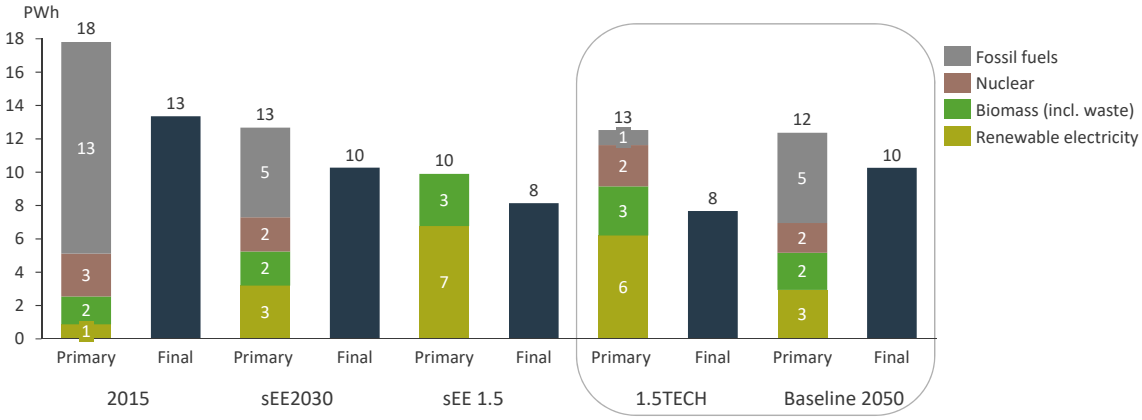
Primary and final energy comparison



A Clean Planet For All

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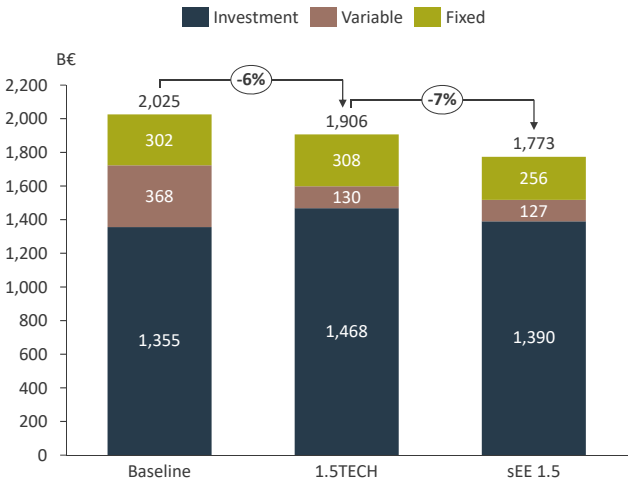
Annualised costs

- ❖sEE1.5 is more cost effective compared to 1.5TECH
- ❖ In the heating sector sEE1.5 has less energy savings and better synergies due to district heat and use of excess heat



REPowerEU

- In light of Russia's invasion of Ukraine and the geo-political implications inherent to energy system regulation, the European Commission proposed, in March 2022, the REPowerEU plan to make Europe independent from Russian fossil fuels, seeking to:
  - diversify gas supplies,
  - accelerate the roll-out of renewable gases,
  - replace gas in heating and power generation.
- The efforts outlined in this plan aim to boost energy efficiency gains, increase the share of renewables, increase LNG imports and pipeline imports from non-Russian suppliers, address infrastructure bottlenecks, and, most notably, to scale up renewable hydrogen and biomethane.

REPowerEU 2030 targets:

- lower EU gas consumption towards 2027 and 2030 by >50% = 216 bcm.
- 45% share of renewables = 1236 GW of total renewable energy generation + bioenergy.
  - 510 GW of wind capacity.
  - 592 GW of solar photovoltaic installed.
- EU energy consumption (excluding the UK) should be no more than 978 Mtoe of primary and 752 Mtoe of final energy consumption.
- 10 million tonnes of domestic renewable hydrogen production and 10 million tonnes imported.
- 35 bcm of sustainable biomethane production.
- 2027 target: double current deployment rate of individual heat pumps = cumulative 10 million units over the next five years.

EU Policies we address in sEEnergies

- Paris Agreement
- European Green Deal – Fit for 55
  - Energy System Integration Strategy
  - Offshore Renewable Energy Strategy
  - Renovation Wave Strategy
  - Sustainable and Smart Mobility Strategy
  - ReFuelEU Aviation Initiative
  - FuelEU Maritime Initiative
  - Hydrogen Strategy
- National Energy and Climate Plans
- Trans-European Networks in Energy
- Energy Efficiency Directive
- Renewable Energy Directive
- Energy Performance of Buildings Directive (EPBD)
- Eco-Design Directive
- Energy Labelling Directive
- Fuel Quality Directive
- Industrial Emissions Directive
- Energy Union Strategy
- Heating and Cooling Strategy

sEEnergies 2030: Buildings

- In total, we have a higher ambition to decarbonize the building stock by 2030, with a more cost-effective system for buildings by increasing **district heating** from 13% (2019) to **20%** and increasing **heat pumps** share from 5% (2019) to **26%**, instead of a sole focus on end demand reductions in existing buildings and individual heat pumps.
- We should target **the implementation of heat savings and heat pumps** and accelerate the implementation rate of heat pumps from a 100% increase in the implementation rate, as suggested by REPowerEU, **to approx. 150%.**
- Fit-for-55 target of 14% decrease in final energy consumption of buildings is unrealistically high, we should instead have policies on **diversifying heat supply in buildings with DH**, rather than targeted policies for on-site renewable energy production.
  - sEE1.5 heat savings in buildings in 2030: **10% heat savings***
  - We have a **60% reduction of individual fossil fuel boilers** in 2030 compared to 2019.

*TWh final energy demand

Policy recommendations: Buildings

- EPBD:
  - Better balance between end savings and supply with more realistic and ambitious targets for end consumption
  - Rather than having a higher target, the directive should focus on implementation of existing targets.
  - Stronger monitoring and knowledge-sharing between Member States on best practices.
  - Move away from focus on NZEB and on-site renewable energy production toward stronger targets on the building envelope.
- New heat Planning Directive
  - Focus on heating as a part of the energy system and zoning mechanisms for different types of heat supply.
  - Support framework for DH with mandatory demand to have local ownership and governance models and to use of state-of-the-art technology for EE and DH
- Financial infrastructure support mechanism for establishment of new district heating systems

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sEEnergies 2030: Transport

- The electrification rate must be accelerated, with our model finding **at least 80 million electric vehicles** necessary on the roads by 2030, an increase by **more than 150%** than the European Green Deal target of 30 million zero-emission cars.
- Fuel cell vehicles should remain a niche, due to their reliance on hydrogen and lower energy efficiency. Focus should be on direct and battery electrification where possible (including heavy duty trucks)
- Electrofuels should be reserved for hard to electrify modes like aviation and shipping
- If energy-efficient urban development is followed, it is expected that passenger car transport demand will peak in 2030 in most of Western and Central European countries

sEEnergies

Policy recommendations: Transport

- Targeted policies to promote urban densification and efficient demand growth.
- Targeted policies for light-duty vehicles and heavy-duty transport (currently there are targeted policies on aviation and navigation).
- Only allow the registration of zero-emission vehicles (cars, vans, motorbikes, mopeds, etc.) by 2030.
- Financial support the electrification of trucks, navigation, and aviation by battery-electric propulsion systems, e-road systems, and charging stations.
- Eliminate targets that allow for biofuels, biogas and LNG in transport.
- Clear targets to support alternative fuel infrastructure developments, e.g. methanol for trucks and ammonia and methanol for navigation.
- Electrofuels should be prioritized for aviation and navigation.
- Refocus TEN-E to stop the support of road infrastructure (motorways), and instead support the development of local public transport infrastructure (e.g. metro, tram) as well as trans-European high-speed rail.

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Policy recommendations: Industry

- New directive targeting improved EE in industry with the following elements
  - Shift focus from measures that promote the use of hydrogen, toward measures that support the electrification of industries by use of large-scale heat pumps and direct electricity use
  - Hydrogen and bioenergy should be reserved for hard to abate processes
  - Reward the use of excess heat for district heating,
  - Push industrial symbiosis
  - Phase out low efficiency combustion technologies (Eco-design)
  - Promote onsite use of concentrated solar and PV on large roofs
- Align socio-economic potentials with business economic payback times
  - Set targets that ensure high costs on greenhouse gas emissions
  - Set lower boundary targets for levies on combustion (a levy to promote electricity and halt increased bioenergy use)
- EU wide financial support mechanism for large-scale electrification of industry targeted at vulnerable sectors

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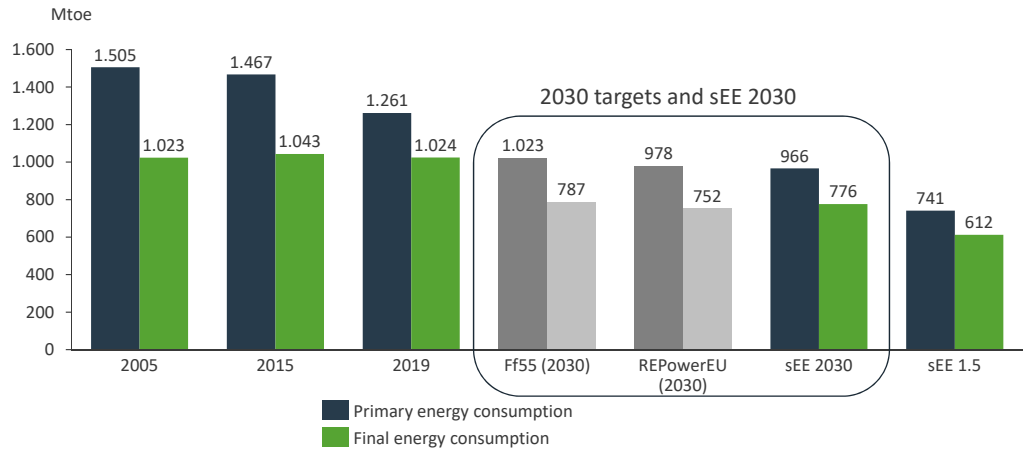
sEEnergies – a system redesign

- Targeted EE measures sector by sector combined with an energy system redesign provide a more efficient 2030 and 2050 energy system comparing primary and final energy consumption.
- It is pivotal that REPowerEU and the decarbonisation targets in Fit-for-55 / and the European Green Deal in 2030:
  1. do not hinder the long-term 2050 target
  2. provide short-term energy security in Europe
- sEEnergies addresses REPowerEU and EU 2030 goals by means of known technologies with energy efficiency and renewable energy without increasing coal consumption.
  - Avoid additional hydrogen production – the Fitfor55 level is on the right level
  - Avoid all new gas consumption – also hydrogen
  - Avoid hydrogen for heating purposes
  - Stronger focus on supply systems with district heating
  - More realistic 2030 final energy demand savings targets
  - Stronger electrification of transport and industry
- *In 2030 sEEnergies provides a slightly lower GHG emissions and biomass level while reducing the natural gas consumption level in line with REPowerEU*

REPowerEU targets and sEEnergies

- *Hydrogen:* We are able to reach the same level of natural gas consumption as suggested in REPowerEU without undefined hydrogen import.
  - Current policies are creating new import dependencies (goal in REPowerEU 78% RE based hydrogen)
  - If we assume 90% of imported hydrogen is produced via natural gas, then current policies are promoting the replacement of imported natural gas with indirect import of natural gas.
  - We strongly suggest **energy efficiency improvements and extensive electrification** over the replacement of one gaseous fuel with another.
- *Renewables:* Compared to the EU targets in REPowerEU and the EU 1.5TECH scenarios set for renewable energy, sEEnergies recommends **greater levels of fluctuating renewables** for 2030 and 2050.
- *Biomethane:* We are able to reach the same target for sustainable biomethane production as set by REPowerEU of **35bcm** by 2030.

Primary and final energy consumption EU27



Climate targets

We are aiming at **zero emissions in 2050**, in line with the current policies for a climate neutral EU, including the European Green Deal and Paris Agreement.

Current EU goal for 2030 (Fit-for-55): 55% reduction in GHG emissions from 1990 levels.

Our results show a **59% reduction in GHG emissions** from 1990 energy sector (buildings, transport, industry) levels.

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Non-Energy Impacts

- Taking into account additional impacts can reinforce drivers and counterbalance barriers to more EE investments.
- Impact categories assessed: greenhouse gas emissions, air, noise, and water pollution, material consumption, land use, employment, working environment conditions, quality of life, GDP, energy security and energy prices.
- Across the three sectors, it was found that energy efficiency measures can have positive impacts in terms of reduced GHG emissions, air and noise pollution, and material consumption, which bring significant implications on European societies, economies, and environments related to climate change, human health, biodiversity, among others.
- Positive impacts were also estimated on working conditions and employee performance, where EE measures that generated health benefits, such as reduced noise pollution, were translated to the working environment.
  - For example, the reduction in noise pollution, implied by a halt in motorway and airport expansion as well as measures that reduce car traffic volume, can translate to positive impacts on employees' concentration levels, productivity, and creativity.

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Non-Energy Impacts

- Across the three sectors, EE measures were shown to have varying impacts on (human) quality of life and livability.
  - Reductions in air, noise, water and soil pollution, GHG emissions, material extraction, and landscape fragmentation and destruction, as well as the socio-economic implications of employment growth and improved working conditions, contribute to a 'livable space' that ensures a healthy environment and guarantees good job opportunities for residents.
  - Negative implications can arise from increased property and rental prices when buildings are refurbished, ultimately driving gentrification of urban areas, as well as from urban densification that can incur societal issues, such as lack of safety.
- Efficiency measures that reduce energy usage can also help to alleviate potential trade imbalances and help to limit exposure to geopolitical tensions and volatile energy markets.

Thank you