



NDC ASPECTS

New Messages for the “Hard to Abate” Sectors

Final Conference | 10th July 2024 | 9:05-10:20 CET



Welcome to the first session today!

My name: Dipl.-Systemwiss. [Stefan KRONSHAGE](#), German Aerospace Center (DLR), Institute of Networked Energy Systems, Stuttgart

New messages for the “hard to abate” sectors

- New perspectives on [options for increased ambition](#) of GHG mitigation in the context of NDCs
- New insights from the [sectors' specific](#) internal logics and structures
- Industry, Transport, Buildings, Agriculture Forestry and Other Land Use (AFOLU)
- Lightning talks! [comes quickly -> high energy \(1.21 GW\) -> goes quickly -> leaves high impact](#)
- Get impulses from statements of invited experts
- Your questions and views are very welcome!

Let's go!



Impacts of global green iron trade in the context of a near-zero steel industry

Dr. Georg HOLTZ, Wuppertal Institute, georg.holtz@wupperinst.org

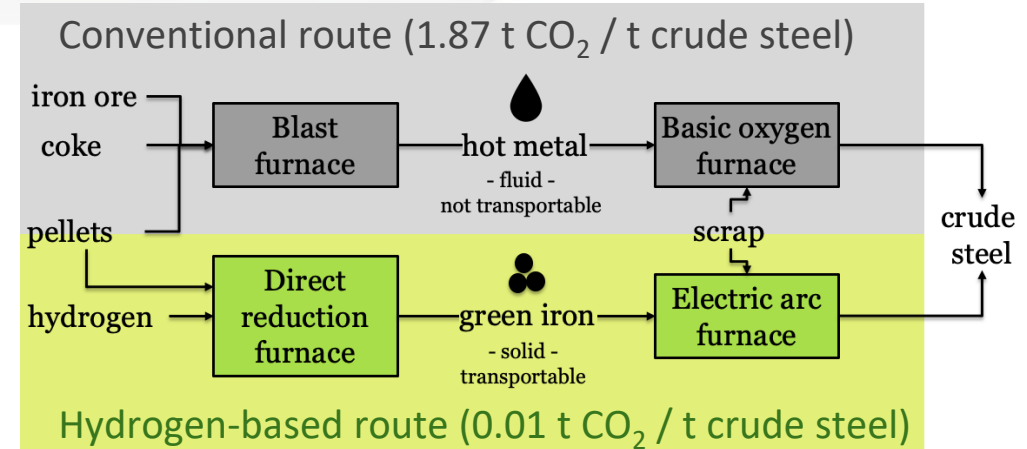
Süheyb BILICI, Wuppertal Institute „our speaker of today“

with an expert comment by

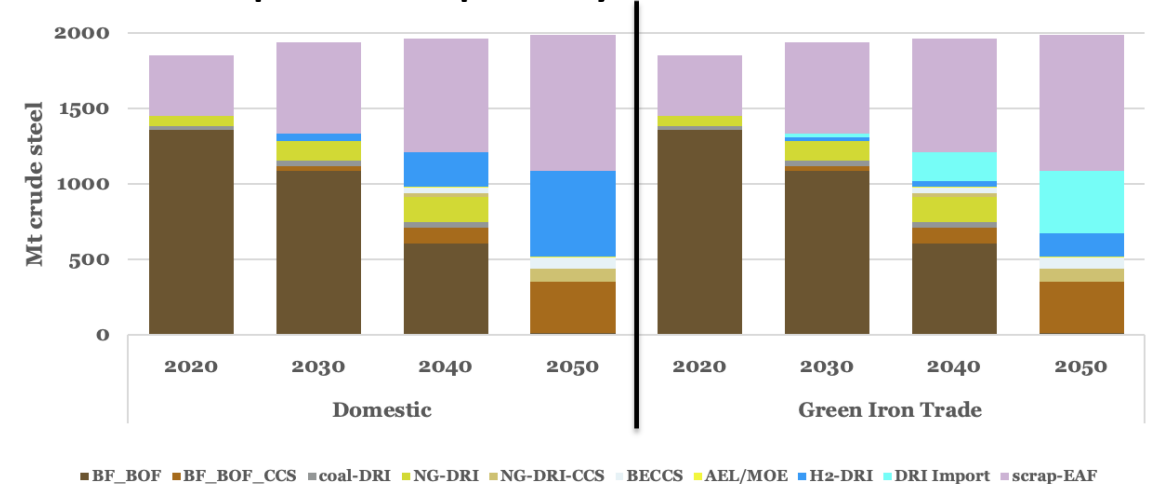
Benjamin Denis, industriAll

Background and Study Outline

- The steel industry is responsible for 7% of the global energy-related CO₂ emissions
- Hydrogen-based direct reduction of iron ore is a promising technology for (near-)zero CO₂ steel production
- The resulting intermediate product (“green iron”) exists in a solid state and can be transported at reasonable costs
- Today’s major iron ore exporters (Australia, Brazil, South Africa) are not only rich in iron ore reserves but also have favourable renewable energy conditions
- This provides opportunities for the global (re-)location of green iron production
- We developed two scenarios of the transformation of the global steel industry towards near-zero CO₂ emissions to assess the potential impacts of a global green iron trade
- “Domestic” scenario: synthesized from existing regional roadmaps, no global green iron trade
- “Green Iron Trade”: same as “Domestic” but green iron trade occurs, based on narratives and (simple) rules



Global steel production pathways in the two scenarios



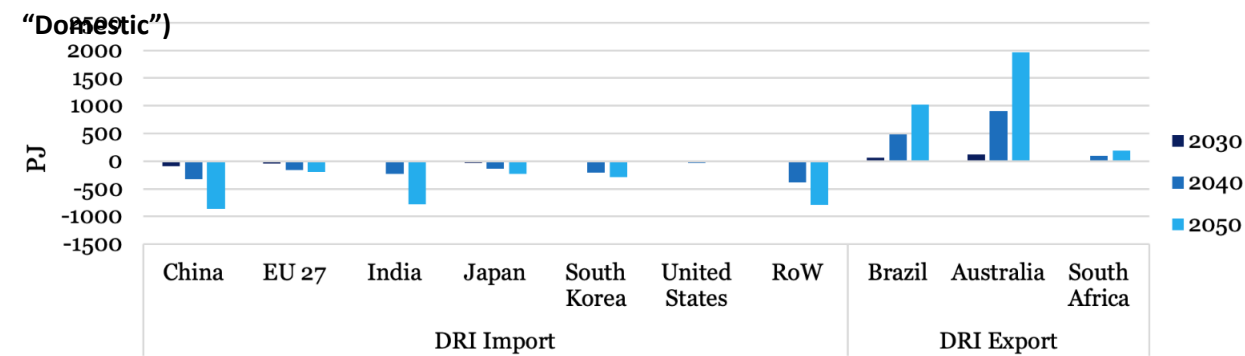
Selected results and conclusions

- (According to our scenario) about 20% of steel could be produced from traded green iron, globally by 2050
- By 2050: 26 Mt/a (~3200 PJ/a) of hydrogen production is relocated to global sweet spots
- 75% reduction of hydrogen demand of the steel industry in green iron importing countries (65% for the EU27; -190 PJ)
- In both scenarios global costs of steel production increase by 100-120 \$/t_{steel} until 2050
- Green iron trade allows to reduce global steel production costs by 4%, compared to the Domestic scenario (3.5% for the EU)

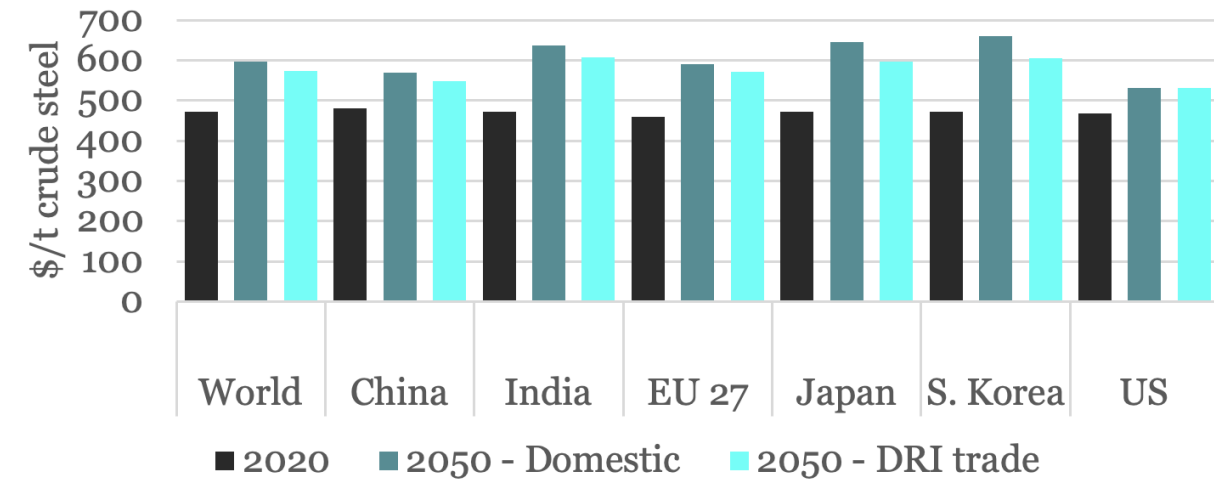
Conclusions:

- Global trade of green iron produced in global sweet spots is a cost-efficient option for near-zero CO₂ steel production
- Green iron trade could induce a significant shift of H₂ consumption between global regions. This possibility should be considered in energy system planning of both green iron importing and exporting countries

Change in hydrogen consumption ("Green Iron Trade" compared to "Domestic")



Specific production costs of crude steel



Freight and logistics decarbonization should become a high priority of national transport strategies

Yann BRIAND, IDDRI, yann.briand@iddri.org

The potential of lighter vehicles in different global regions

Isheeka DASGUPTA, German Aerospace Center (DLR), isheeka.dasgupta@dlr.de

with an expert comment by

Angel CORTEZ, SLOCAT Partnership

Why “freight and logistics decarbonization should become a high priority of national transport strategies” ?

Emissions are growing due to an accelerating demand, increasing length of supply chains and strong dependency to fossil fuel use:

- *About 40% of global transport emissions, including about 10% of international emissions and 30% of national emissions (IPCC, 2022)*

Freight-related strategies as reported in NDCs or LTSs are very limited compared to passenger, overlooked in general (ITF,2021b):

Freight-related strategies often focus on technological transformations only:

- *Such as the development of low-carbon fuels and vehicles (biofuels, low-electricity, hydrogen) or technical solutions to reduce liquid fuel consumption.*

However, IPCC AR6 details that reaching carbon neutrality will require to consider « systemic » changes

- *It relates to our organisations and ways of consuming and producing, our organisations of infrastructures and logistics,*
- *Such as transforming production and consumption systems to reduce goods deliveries and demand, shorten supply chains and facilitate modal shift to non-road and non-motorised logistics*

How “freight and logistics decarbonization **could** become a high priority of national transport strategies” ?

Stop « transport discussions » and structure distinguished, but articulated discussions about « industrial and freight transitions » and « citizen mobility transitions »

Reveal the economic opportunities of a new ecological industrial policy considering freight decarbonization – the example of Brazil

National freight emissions represents 51% of Brazil’s national transport emissions, but is also overlooked

Support a strong biofuel industry and an emerging manufacturing of light electric trucks and electric bus (VW, BYD, MarcoPolo), AND use public procurements and mandatory objectives to drive the markets

- To transition to zero emissions fuels and technologies: Non-fossil fuel energy could reach from 40% up to 100% by 2050

Support new businesses in the fields of resource efficiency, circularity, sharing, local value chain organization, AND develop incentivize for businesses and consumers to initiate the market

- To moderate demand and distances: About 30 to 50% emission reduction potential, *while lowering the pressure on and facilitating the transition to low-carbon fuels*

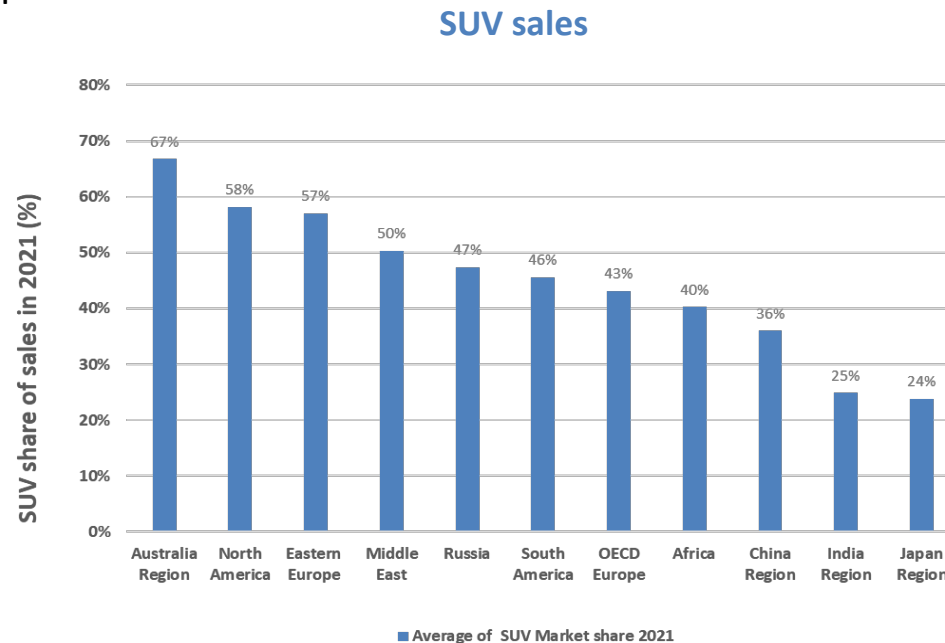
Investing in rail and water infrastructures AND regulates logistics choices and infrastructures access

- To develop non-road and non-motorised logistics: maintaining 40% and reaching up to 55% by 2050, *while lowering the pressure on and facilitating the transition to low-carbon fuels*

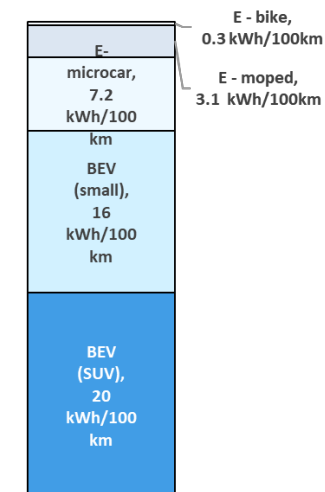
Developing international cooperation signals and opportunities: what about a COP presidency initiative supported by EU?

The potential of light electric vehicles - SUVisation

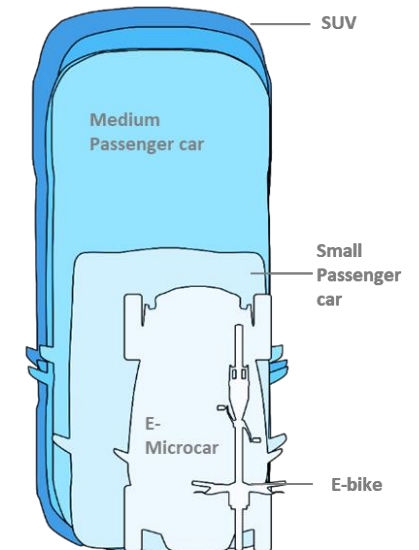
- Passenger transport accounts for 16-27% of GHG emissions worldwide and 60% emissions from land transport.
- Car mileage is going to approximately double till 2100 with increasing travel demand in the Global South. Policies need to be in place to leapfrog a car-centric urban scenario
- 'SUV'isation is a global trend also prevalent in electric vehicle sales and is negating efforts towards increased efficiency developments



Energy consumption



Size

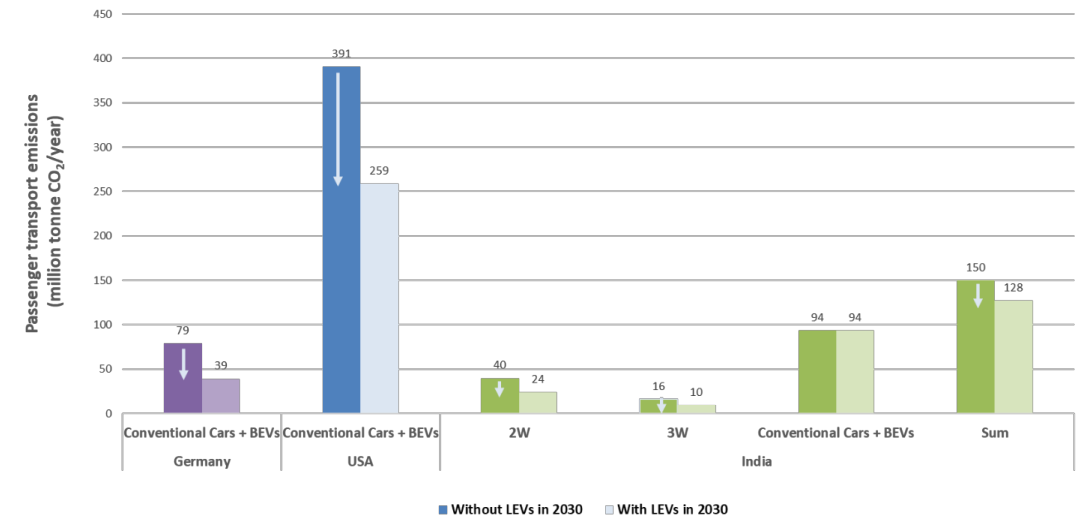
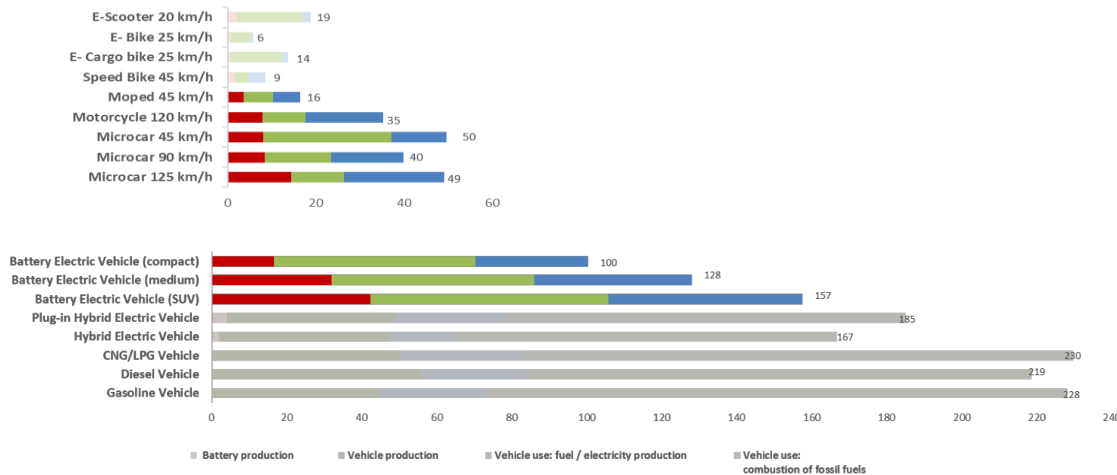


The potential of light electric vehicles

- As a result the LCA emissions of LEVs are very low in comparison to even battery electric vehicles.
- Approximately **50% tailpipe emissions can be reduced in Germany compared to 34% in USA and 15% in India** when car trips are replaced with the most optimum LEV for the trip
- However regulatory, infrastructural, financial and social challenges including gender remain to incorporate these new vehicles

Need to focus

- The point of **decreasing vehicle weight and size** is being lost in policy discussions with challenges of these new category of vehicles and by focusing only on electrification.
- The issue of the **10 - 40 km trip length chunk** is currently unseen in urban planning and policy.



Catalysing deep renovations of buildings ...

Faidra FILIPPIDOU, E3 Modelling (E3M), filippidou@e3modelling.com

... propositions from a Gender Impact Assessment

Stefan KRONSHAGE, German Aerospace Center (DLR), stefan.kronshage@dlr.de

Meike SPITZNER (Wuppertal Institut), meike.spitzner@wupperinst.org, TransportClimateEnergy_gender@t-online.de

with an expert comment by

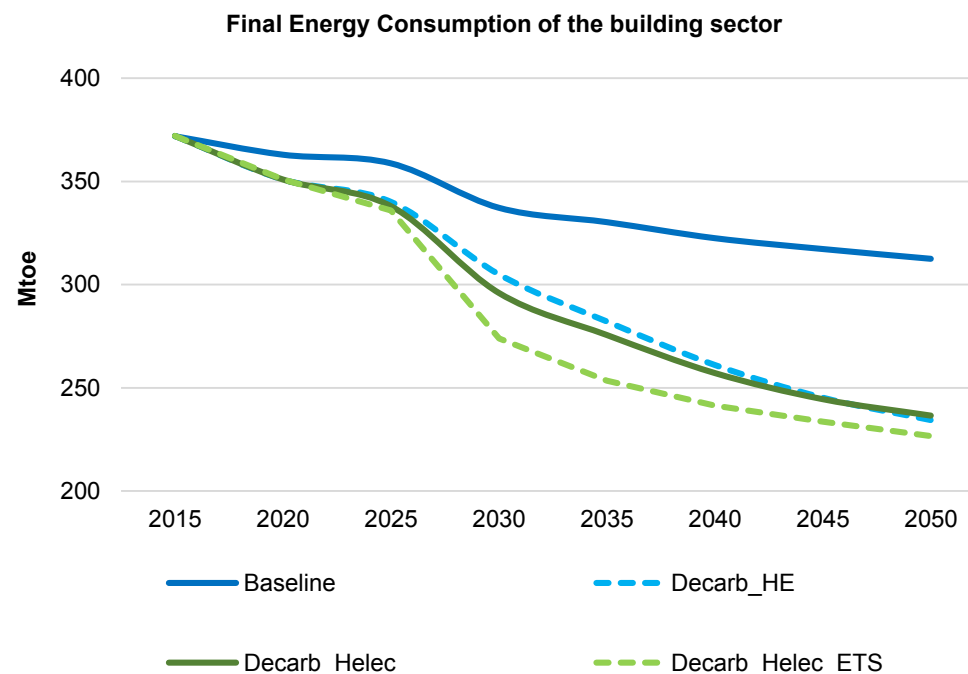
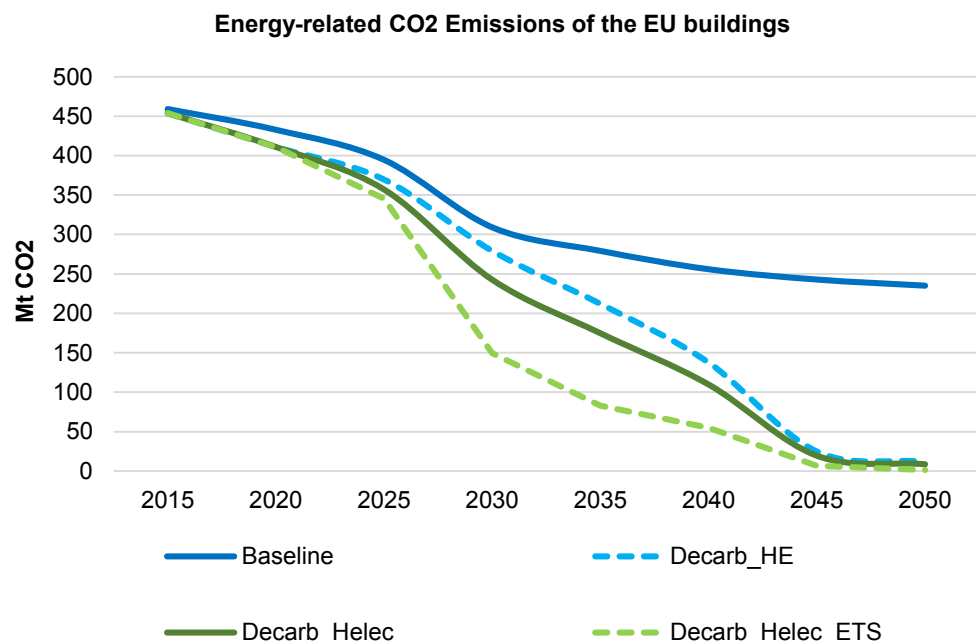
Bogdan ATANASIU, Directorate-General Energy, European Commission

Key messages from EU27 Buildings Modelling – PRIMES BuMo

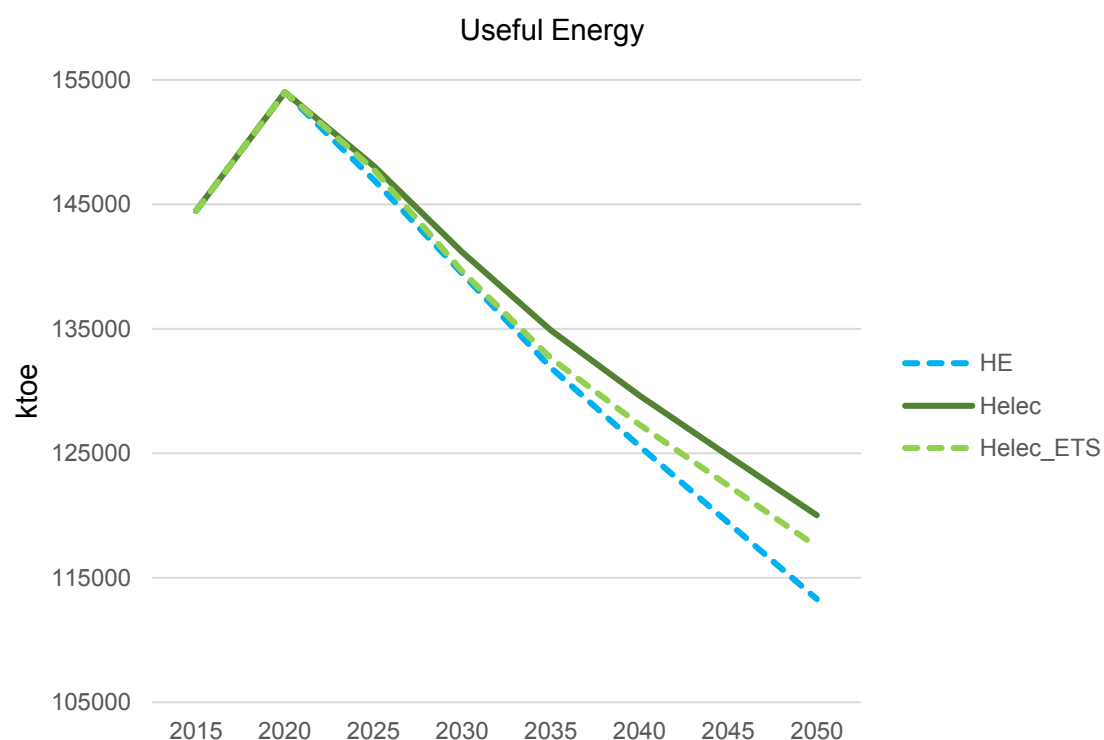
Constant CO2 emissions decrease from 2020 to 2050 for all scenarios

From 2020 to 2030: - 36.5%, 43.5% & 70% decrease in CO2 emissions for HE, Helec & Helec_ETS, respectively

From 2020 to 2050: - 96.5%, 97.5% & 99.7% decrease in CO2 emissions for HE, Helec & Helec_ETS, respectively



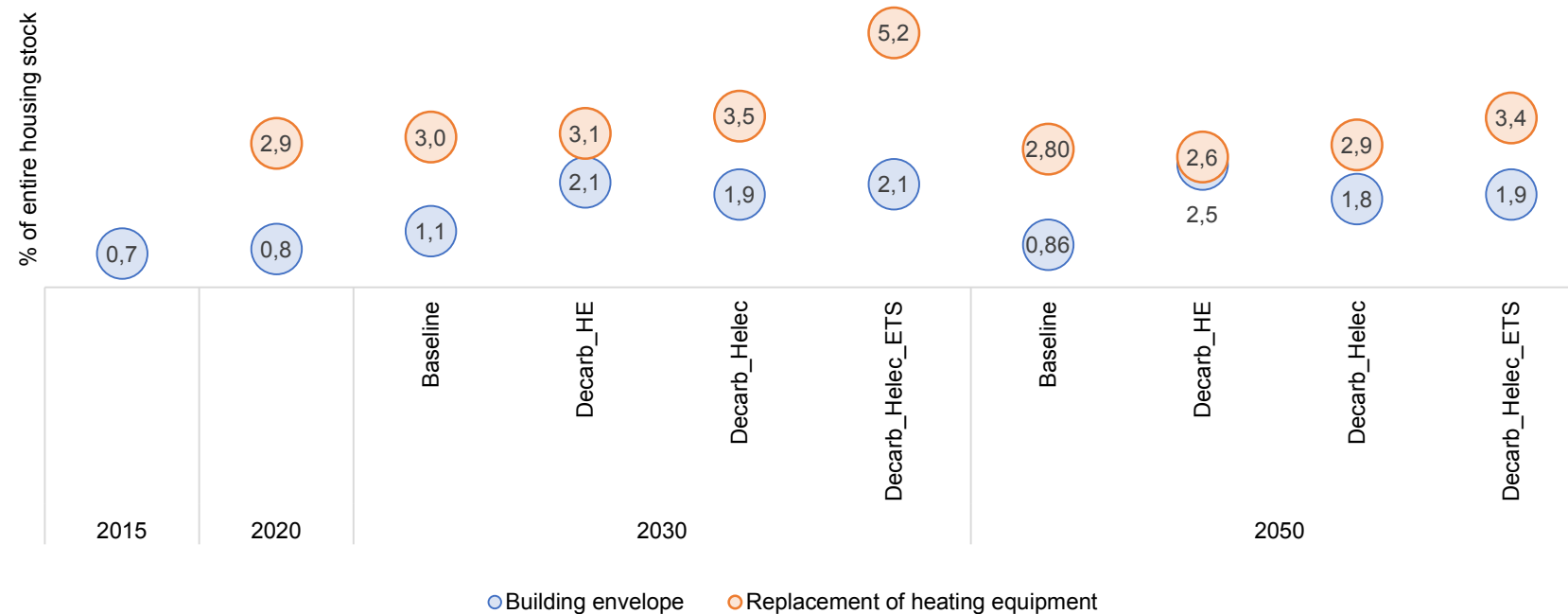
Energy demand – Useful Energy (UE)



- Constant **UE reduction** for all decarbonization scenarios from 2020 to 2050
- **From 2020 to 2030:**
 - Roughly 9.5% reduction for HE & Helec_ETS
 - Approximately 8.5% reduction for Helec
- **From 2020 to 2050:**
 - More than 25% (26.5%) reduction for HE
 - 22% reduction for Helec
 - Roughly 23.5% decrease for Helec_ETS

Key messages from EU27 Buildings Modelling – PRIMES BuiMo

Renovation rates continuously increase in the Decarb_HE whereas in the _Helec & _Helec_ETS remain rather constant at ~2% per year
On the other hand, the replacement rates are picking up both in 2030 and 2050 in the _Helec & _Helec_ETS scenarios.



Deep renovations - Propositions from a Gender Impact Assessment (I)

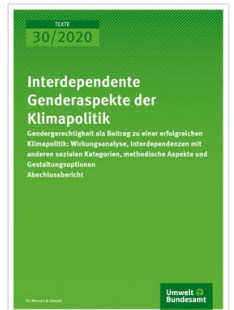
Why gender here?

- **Legally binding EU Gender Mainstreaming** obligation established by Treaty of Amsterdam 1997 and Treaty of Lisbon 2008 Art. 8.
- Gender to be considered as an excellence criteria in the **contents of research activities** under EU Horizon 2020
- Buildings and **homes** and **work spaces** for humans! Humans spend most of their life times in buildings.
- **Residential buildings** form a key space for **social interaction, care and care work**.

Message: **Deep renovation projects** in residential buildings have a **fundamental impact** on the social and (care-)economic household functions. The dimensions of **Gender** in households are **strongly relevant** in such projects.

How have we approached this in **NDC ASPECTS**? On the basis of a structured, scientifically based **Gender Impact Assessment¹⁾**.

- **7 gender dimensions** (bundling the structural societal gender inequality challenges)
- **Gender+** (intersectionality: interdependence with social background, age, income, disabilities...)
- The GIA approach seeks for **concrete measures to overcome the implicate reproduction of inequality**.



1) GIA used here: Gender Impact Assessment for the German Environmental Agency / Umweltbundesamt (UBA, Spitzner et al 2020; Spitzner 2021; NDC Aspects Capacity Workshop “Gender Responsiveness”, held Sept. 10th, 2021)

Limits to forests-based mitigation in Integrated Assessment Modelling: Global potentials and impacts under constraining factors

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Dirk-Jan van de Ven (BC3), BC3 Basque Centre for Climate Change

Thank you! And...

We look forward to hearing from you!

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Thank you very much!

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