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11th INTERNATIONAL FORUM ON ENERGY FOR SUSTAINABLE DEVELOPMENT

VIRTUAL | SEPTEMBER - NOVEMBER 2021

Workshop on Pathways to Effectively Decarbonizing Industry

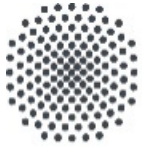
in the framework of the eighth session of the Group of Experts on Energy Efficiency
Geneva and online, 20 September 2021, from 4.30 to 6.00 p.m. (16:30 to 18:00) CEST

Are we ready? Pathways to net-zero manufacturing

featuring: Kerstin Kohler (SICK AG) ◦ Francisco Alanis (Advisian) ◦ Branko Dunjic (Cleaner Production Centre of Serbia) ◦ Michael Heinze (INTENSE AG) ◦ Hannes MacNulty (Green Industry Platform) ◦ Iva Brkic (Carbon Neutrality Project) ◦ Stefan M. Buettner (Task Force Industrial Energy Efficiency & EEP)

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University of Stuttgart
Institute for Energy Efficiency
in Production EEP

Striving for net zero, but why?

Opening & Setting the Scene

**Stefan M.
Buettner**



Societal expectations are rising

Why strive for net zero now?



EU €750 billion Covid recovery fund comes with green conditions

Published on 27/05/2020, 2:37pm

A quarter of spending has been earmarked for climate action and a 'do no harm' clause rules out environmentally damaging investments



The New York Times

Big Business Says It Will Tackle Climate Change, but Not How or When

In Davos, business leaders were newly vocal about the danger, though they gave few details about how they would reform their practices.

Bloomberg Green

Finance

Long-Term Investors Now Hold Sway Over ESG

Investors are having more success on climate change, and increasingly are pushing companies on human rights, diversity and pay equity.

edie

Disclose climate risks or face divestment, investors warn Europe's largest companies

17 November 2020, source [edie newsroom](#)

A coalition of investors representing more than \$9trn of assets has asked some of Europe's largest and highest-emitting companies, like Shell and Maersk, to prove they are aligning with the Paris Agreement and to improve climate risk disclosure.



Climate change: How a green new deal really could go global



Trade unions around the world support global climate strike

Adults, businesses and trade unions asked to join youth climate campaign



What are the implications for my company?



Why strive for net zero now?

What are the implications for my company?

Expected increase in cost of energy-related emissions (excluding electricity)

CO₂- price (nEHS-scenario)
€/tCO₂e

Company size	Energy consumption (non- electricity)	2021	2022	2023	2024	2025	2026	Based on damage:
		25 €	30 €	35 €	45 €	55 €	55-65€	180 €
Small	634 MWh	7,200 €	8,700 €	10,000 €	13,000 €	15,900 €	18,750 €	52,000 €
Medium	13.5 GWh	157,000 €	189,000 €	220,000 €	283,000 €	346,000 €	409,000 €	1.13 mil €
Large	7.5 TWh	78 mil €	93.8 mil €	109 mil €	140 mil €	172 mil €	203 mil €	562 mil €

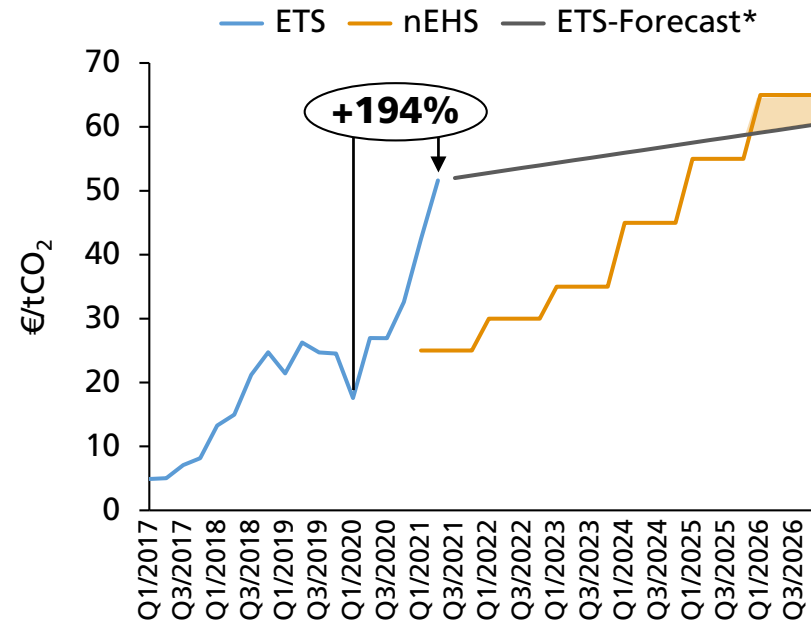
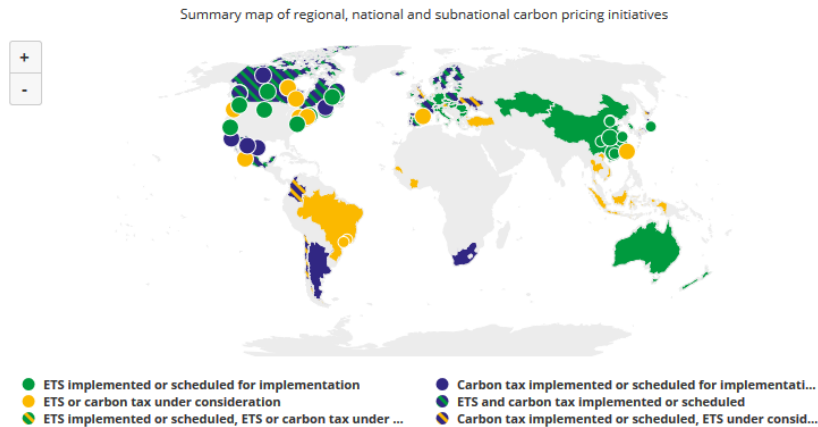
What options do you have?

- Accept additional costs at the expense of profit/margin/product prices
- Substitute energy sources for lower emissions (trade-off CO₂ price vs. additional cost tariff)
- Invest instead of paying the CO₂ price → reduction of the due levy by investing in emission, cost-reducing efficiency, process optimisation, and local energy generation

Source: Deutsches Global Compact Netzwerk 2018

What are the implications for my company?

Growing number of schemes and escalating emission prices



EU Emission Trading System (ETS)

- Rises rapidly with tightening of EU 2030 emissions targets
- Expansion to additional sectors under consideration (currently: electricity + selected industrial sectors)
- €65 price projection for 2030 is likely to be exceeded
- 50% increase in 6
- High uncertainty leads to difficulty in planning

DE-National Emissions Trading Scheme (nEHS)

- Energy-related emissions (excluding electricity)
- Established price plan until 2025/6 (court decision may change this)

*EU Commission ALLBNK Scenario, ETS last updated on 01/06/2021
Source: The World Bank, EU Commission, TradingView

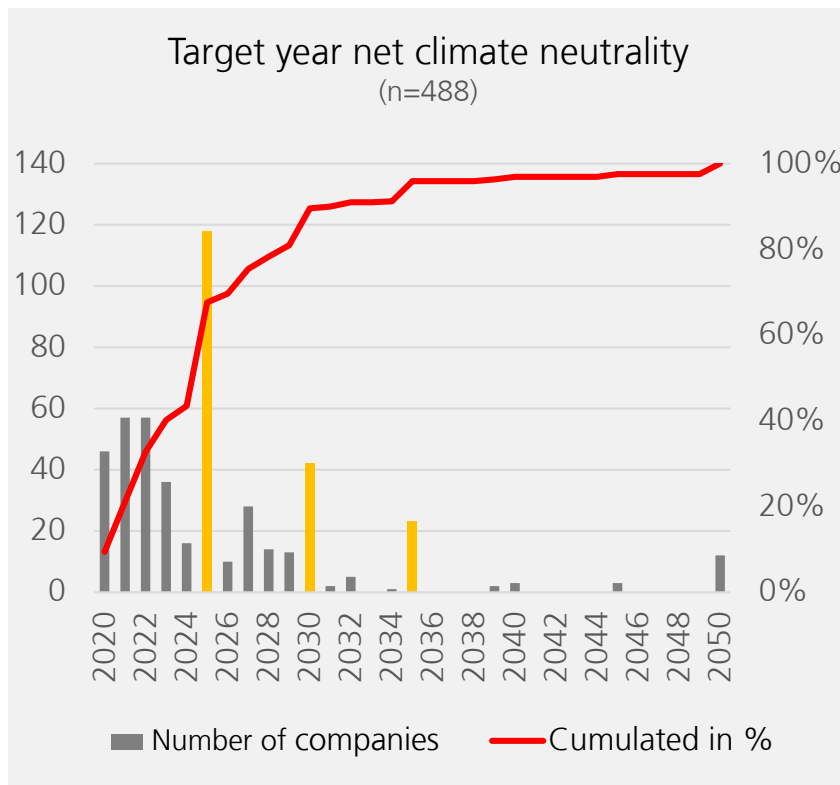
How do companies react?



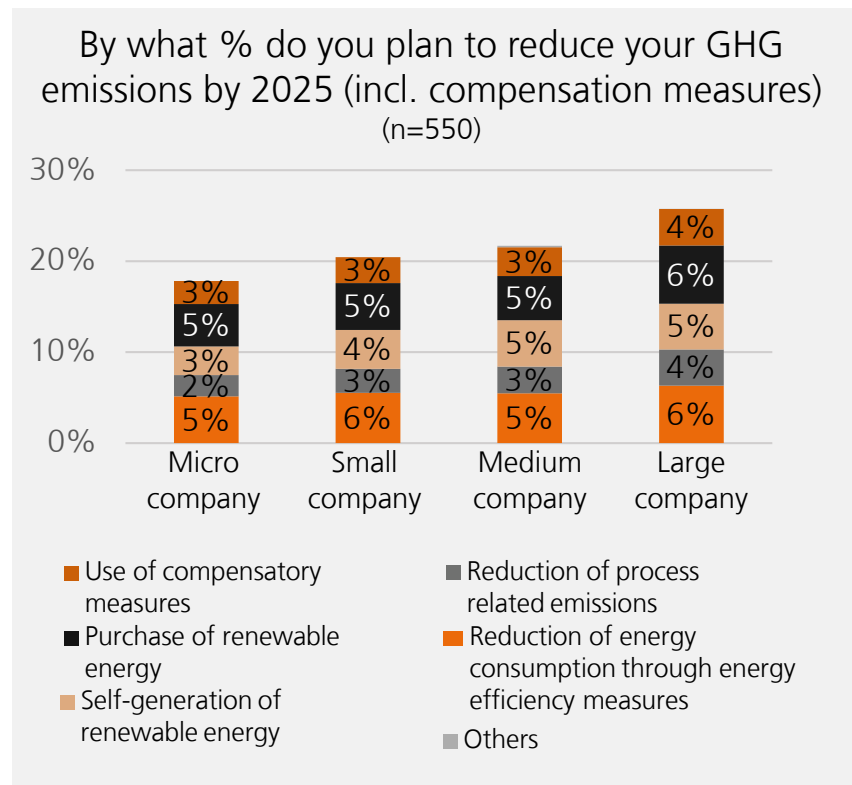
How do German manufacturers react?

LEFT: 60% of companies aim for net-zero – 2/3rd by 2025 (preCOVID)

RIGHT: Companies intend to reduce emissions by ca. 23% by 2025



~50% of the decarbonisation over the next 30 years will occur in the next 5 years



~60% of the planned measures by 2025 are of a local nature

Source: EEP Energieeffizienz-Index der deutschen Industrie 2019/II, -2020/I

Why should local measures be prioritised?

Economic factors could help with sequence:

How do the measures have a lasting effect on running costs?

Mix of Measures for the planned greenhouse gas reduction

- **Reduction:**
 - **Reduction of energy demand reduces emissions**
 - organizational optimizations/one-time investment required
 - running costs (energy) **decrease**
 - **Process adaptation reduces emissions**
 - one-time investment required
 - running costs (energy) **unchanged**
- **Substitution:**
 - **Own production of renewable energies** reduces emissions
 - but one-time investment required
 - running costs (energy) **decrease**
 - **Change of energy source** reduces emissions
 - Energy unit may cost more per unit, !availability!
 - running costs (energy) **increase slightly**
- **Compensation (or do nothing): Emissions still exist**
 - their **compensation** (or CO₂-price were applicable) costs permanently per unit
 - running costs (emissions) **increase**

Further developed according to ACEEE-EIP Industrial Decarbonisation Considerations (2020)

Establishing clarity on the terminologies

Only a common understanding on targets allow reaching them effectively

The New York Times

Japan's New Leader Sets Ambitious Goal of Carbon Neutrality by 2050

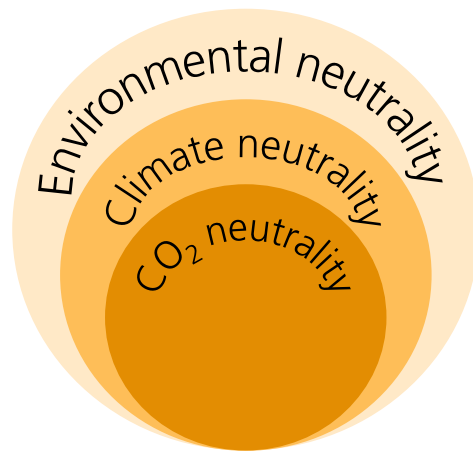
The announcement, coming weeks after a similar pledge by China, will require a major overhaul of the infrastructure in Japan, which remains heavily dependent on fossil fuels.



26 October, 2020



Japan to go climate neutral
with support of net zero cities



Source: EE-IP.org, ICLEI, The New York Times (2020)

Reduction & compensation of:

- 1 CO₂ emissions
- 2 CO₂ + non-fluorinated greenhousegases (CH₄, N₂O) + fluorinated GHGs (HFC, PFC, SF₆, NF₃)
- 3 CO₂ + non-fluorinated GHGs + fluorinated GHGs + all other substances that negatively impact the environment and health e.g., particulate matter, soot, NO_x, SO₂

What target dimension are companies working towards?

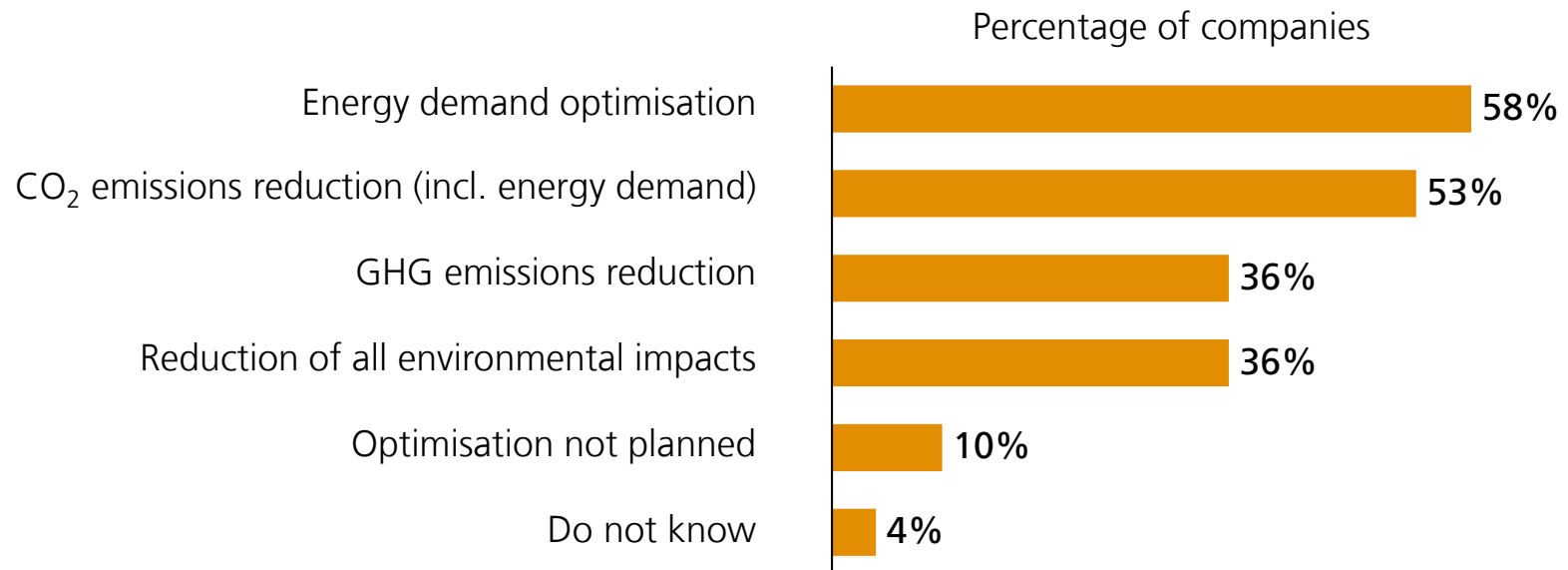


What is the target dimension?

More than 1 out of 2 companies optimise their energy demand and/or work on CO₂ emissions reduction; 10% don't optimise

The EU has set a target to be climate neutral by 2050 and is currently revising the 2030 targets. What are you optimising your company towards - which of the following options apply to your company?

(n=834, n'=1663)



Source: EEP Energieeffizienz-Index der deutschen Industrie 2020/II

Where do we stand?

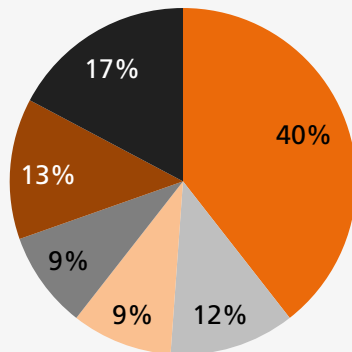


Knowledge of own CO₂ emissions are an important basis

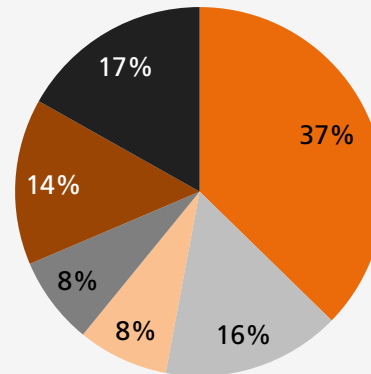
Half of the companies are aware of their own emissions. Especially for energy-related emissions there is there is a need to catch up more quickly

Are you aware of your company's CO₂ emissions?

Process-related
(n=829)



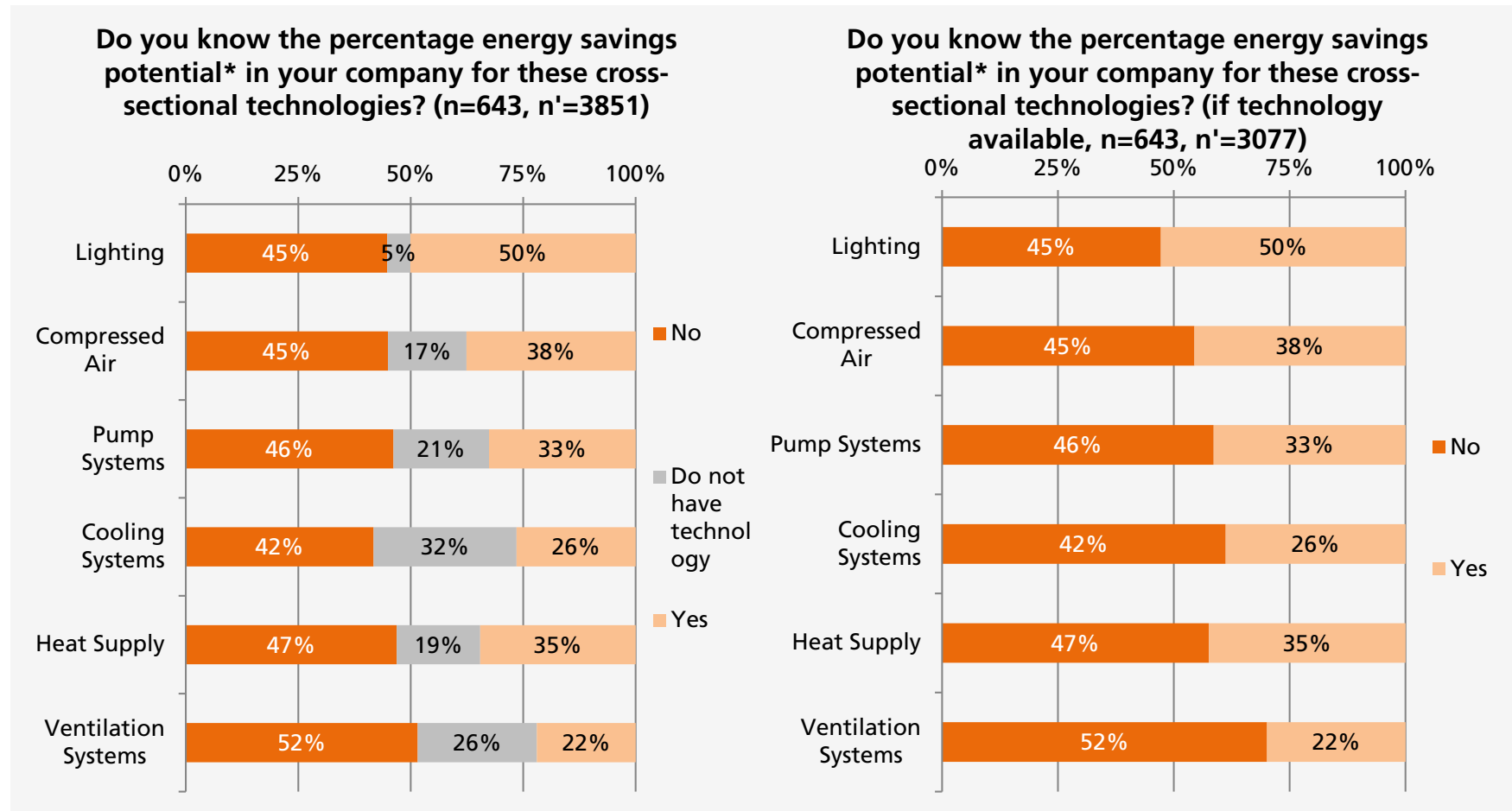
Energy-related
(n=831)



- Yes, the CO₂ emissions for each site of our company are known for the entire company
- Yes, CO₂ emissions are known for the entire company
- No, are not known because we do not know how to capture them
- No, are not known, because the recording is too time-consuming
- No, for other reasons

Awareness level savings potentials of cross-sectional technologies

The majority of companies have no knowledge about their energy saving potentials in the cross-sectional technologies used (exception: lighting)



Source: Energy Efficiency Index of German Industry: 2021/1, EEP(2021) *with the same output/utilisation ratio, i.e. efficiency increase

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Panel discussion

Are we ready? Pathways to net-zero manufacturing

Moderator:



Hannes MacNulty

Senior Industry Advisor, Green Industry Platform, and Co-Chair, Task Force on Industrial Energy Efficiency

Panellists:



Ms Kerstin Kohler

Head of Environmental Management, SICK AG

**Company
Perspective**



Mr Francisco Alanis

Senior Consultant, Advisian (Worley)



Branko Dunjic

Director, Cleaner Production Centre of Serbia

**Local Implementation
Facilitator**



Mr Michael Heinze

Board Member, INTENSE AG

**Digitalisation
Facilitator**

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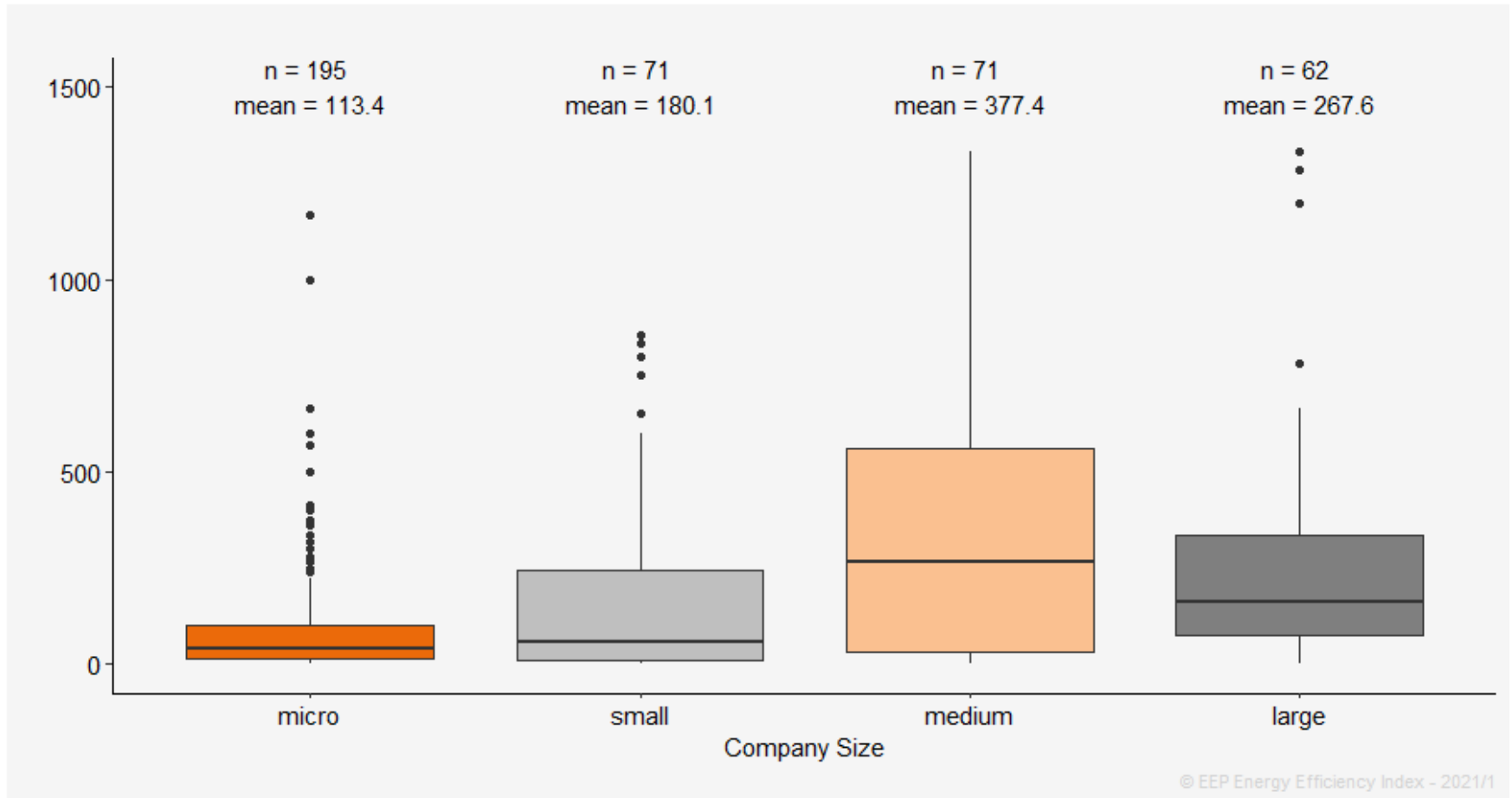
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Energy intensity by company size

Being energy intensive is not limited to large companies



Source: Energy Efficiency Index of German Industry: 2021/1, EEP(2021)

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Mapping out the path to net-zero



Mapping out the path to net-zero

We need to know where we are for a realistic & effective roadmap

- How effective are current policies considered to facilitate an increase in energy efficiency in industry?
- What measures, if any, are being taken by companies to reduce their carbon footprint?
- Are energy, resource and carbon footprint being considered during product development?
- What GHG reduction do companies aim for within the next 5 years?
- Impact of Covid-19 on level of ambition and planned decarbonisation action

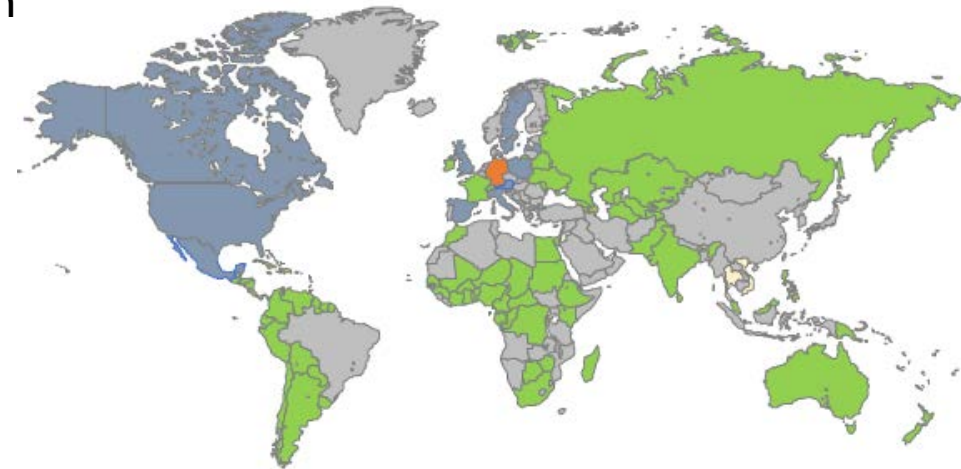
Ingredients to succeed

Understanding the sectors' ambitions, plans and actions

This is where the [*Energy Efficiency Barometer of Industry*](#) comes in:

- Sheds light on the current realities in manufacturing across all company sizes, 27 manufacturing sectors and different energy intensities across Europe
- Attendees reaching out to their constituencies to aide gathering status quo evidence
- The EEBarometer covers 88 countries
- outreach kit can be provided in 10 languages
- outcomes will inform work of UN ECE TF Industry

- Country specific barometer and economic indicator
- Country specific barometer
- Global barometer in widely used languages
- Global barometer in English, French, Spanish, Russian or German

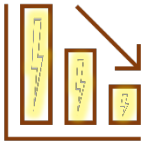
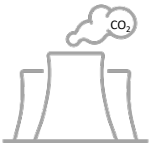


Ingredients of net-zero pathways





Mitigation measures

1 Reduction

	Examples	Effects	
		Economic one-off	Permanent
Energy consumption 	<ul style="list-style-type: none"> Machinery replacement for higher efficiency Installation of heating control system 	<input checked="" type="checkbox"/> One-off investments	<ul style="list-style-type: none"> ↓ Energy costs ↓ Energy-related emissions
Process-related emissions 	<ul style="list-style-type: none"> Steel production via DRI 3D printing 	<input checked="" type="checkbox"/> One-off investments	<ul style="list-style-type: none"> ↕ Energy costs ↕ Operational costs ↓ Process-related emissions


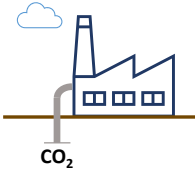
Mitigation measures

2 Substitution

	Examples	Effects	
		Economic one-off	Permanent
Self-generated renewable energy 	<ul style="list-style-type: none"> Installation of PV systems Waste heat recovery 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> One-off investments Additional supporting systems e.g., energy storage, might be needed 	<ul style="list-style-type: none"> ↓ Energy costs ↓ Energy-related emissions Additional maintenance costs
Purchase of renewable energy 	<ul style="list-style-type: none"> Renewable Energy Power Purchase Agreements (PPAs) 	<ul style="list-style-type: none"> <input type="checkbox"/> No one-off investments 	<ul style="list-style-type: none"> ↑ Energy costs ↓ Energy-related emissions

Mitigation measures

3 Compensation

	Examples	Effects	
		Economic one-off	Permanent
Certificates/ Projects 	<ul style="list-style-type: none"> ■ Purchase of carbon credits ■ Worldwide green projects financing 	<input checked="" type="checkbox"/> No one-off investments	<ul style="list-style-type: none"> ↑ Additional company expenses ■ No effect on real energy- & process-related emissions
CO₂ storage, binding & use 	<ul style="list-style-type: none"> ■ Carbon capture, utilisation, and storage (CCUS) 	<input checked="" type="checkbox"/> One-off investments	<ul style="list-style-type: none"> ↑ Additional operating costs ■ No effect on energy costs ↓ Net emissions

Identifying the optimal mix of measures

Each puzzle differs





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Thank You!

Dipl.-Volksw.

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 www.ipa.fraunhofer.de/en/expertise/efficiency-systems.html

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