

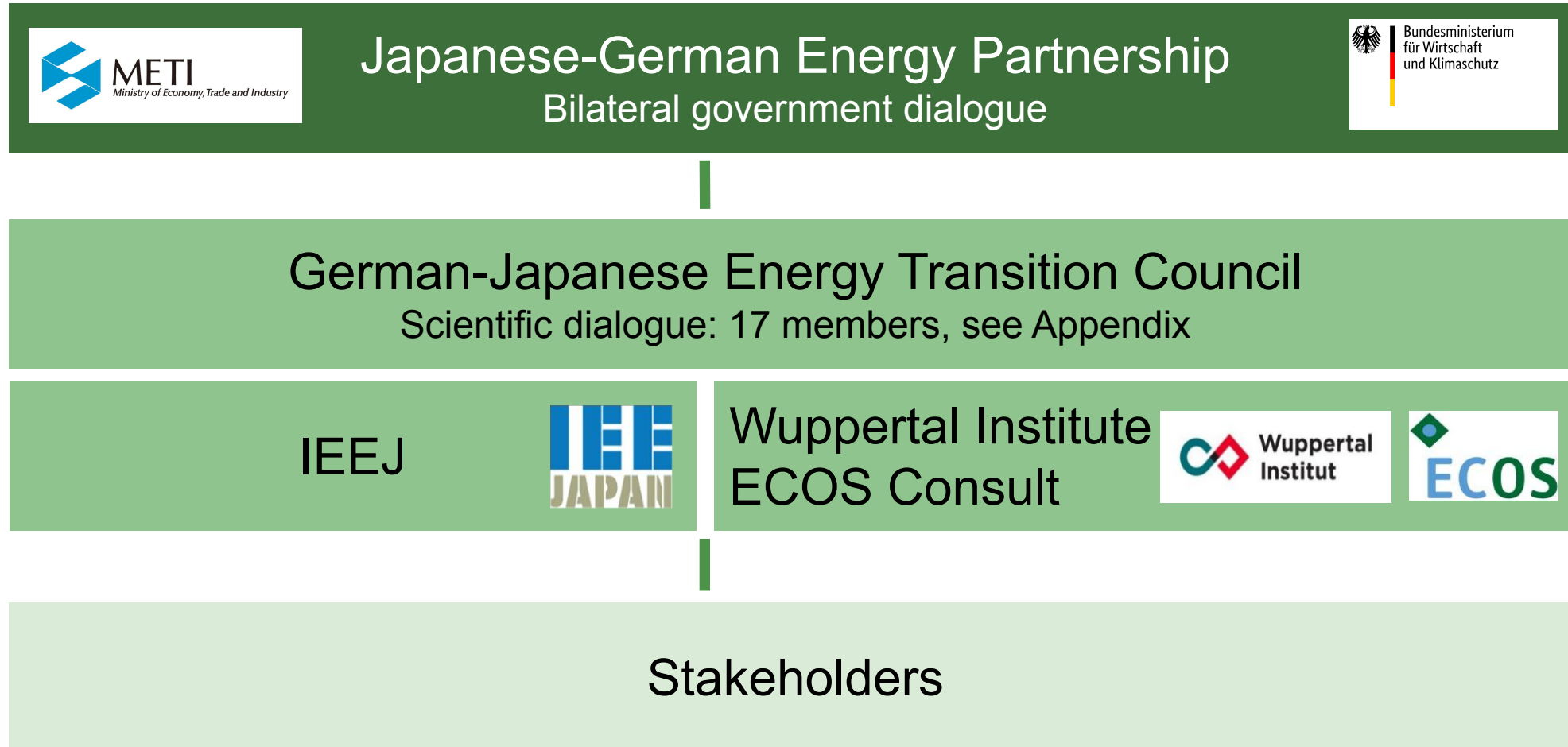


Stakeholder dialogue, February 18, 2025

Policy Frameworks around Carbon Pricing Mechanisms and their Effects on the Industry Sector in Japan and Germany

Role of the GJETC

Mutual learning platform to accelerate energy transition.



Agenda

1. **Background**
2. **Sectors and ways of carbon pricing, and existing and planned schemes in EU/Germany and Japan**
3. **Categories and mechanisms of impacts, and measures to improve societal acceptance**
4. **Policy recommendations by the GJETC**
5. **Questions for the stakeholder dialogue**

1. Background

- Ambitious energy transformation and climate mitigation goals/targets need **stronger measures**
- Carbon pricing may improve **cost-effectiveness** but also generate revenues to **stimulate the investments** needed for achieving the goals/targets
- Carbon pricing may have **intended impacts** to reduce carbon emissions but also **unintended impacts** on competitiveness and social distribution of benefits and costs, putting acceptance at risk
- **Policy design** and the use of revenues need to address the unintended impacts to **improve acceptance**

2. Sectors and ways of carbon pricing

- **Sectors:**

- 1) Energy (power, heat generation)
- 2) Industry
- 3) Buildings
- 4) Transport
- 5) Others (agriculture, waste, land use change)

- **What is ‘carbon pricing’? We suggest:**

According to the OECD (2023), it is encompassing

- 1) fuel excise taxes,
- 2) carbon taxes and
- 3) emissions trading systems.

‘Net effective carbon rates’ as defined by OECD also include energy subsidies

2. Existing and planned carbon pricing schemes

- EU will soon cover all sectors with emissions trading schemes I and II; is introducing carbon border adjustment mechanism (CBAM) for energy-intensive goods
- Japan will introduce carbon pricing for industry and energy, covering all sectors too

	EU/Germany	Japan
ETS	<ul style="list-style-type: none"> • EU-ETS I (Existing) • National nETS (Existing) • EU-ETS II (from 2027, mostly replacing nETS) 	<ul style="list-style-type: none"> • GX ETS (voluntary scheme from 2023, full operation from 2026) • Auction of Emission Allowances for Power Producers (from 2033)
Tax	<ul style="list-style-type: none"> • Energy Tax • Electricity Tax 	<ul style="list-style-type: none"> • Oil and coal tax including add on rate of Tax for Climate Change Mitigation (Existing) • GX Surcharge (from 2028)

2. Carbon Pricing Schemes in Germany/the EU



- **Energy Tax**

€61.35/kl for light fuel oil, €654.5/kl for gasoline, €470.4/kl for diesel, €5.5/MWh for gas, €0.33/GJ for coal

- **Emissions trading schemes**

- Downstream EU-ETS I for power and heat generators above 20 MW_{th}, industrial emissions, intra-EU aviation.
- National upstream ETS for sectors not covered by EU-ETS I. For most sectors, will be replaced by
- Upstream EU-ETS II for most sectors not covered by EU-ETS I, especially buildings and transport
- Revenues to be used for supporting climate change mitigation measures

Scheme	EU-ETS I	National nETS (BEHG)	EU-ETS II
Start Year	2005	2021	2027
Target Sectors	Power and heat generators above 20 MW _{th} , industrial emissions, intra-EU aviation	Buildings, transport, all fuels not covered by EU-ETS I in other sectors (Industry, agriculture and fisheries)	Buildings, transport except aviation; industry companies not covered by EU-ETS I
Items to Levy	CO ₂ , N ₂ O, F-gases	CO ₂	CO ₂
Levying Method	To be purchased through paid auctions for emission allowances	To be levied based on CO ₂ emissions (until 2025) Auctions for em. allowances (from 2026)	To be purchased through paid auctions for emission allowances
Price Setting	Bidding (paid auctions)	Set by law (until 2025) Price floor and ceiling by law (2026) Bidding (paid auctions) from 2027	Bidding (paid auctions)

2. Carbon Pricing Schemes in Japan

- **Petroleum and Coal Tax**

JPY 2,800/kl for oil, JPY 1,860/t for gas, JPY 1,370/t for coal (incl. JPY 300/tCO₂ Global Warming Measures Tax)

- **GX Promotion Act**

In May 2023, Japanese government enacted the GX Promotion Act in May 2023, allocating ¥20 trillion in advance GX investment support.

This funding is to be sourced from the following carbon pricing revenue to redeem GX economic transition bonds.

	GX Surcharges on Fossil Fuels	Auction of Emission Allowances for Power Producers (Part of GX ETS)
Planned Start Year	FY2028	FY2033
Target Businesses	Companies and groups of companies Emitting over 100,000 t-CO ₂ /year	Power Generation Companies
Items to Levy	CO ₂ emissions from fossil fuels	CO ₂ emission allowances allocated to power generation companies
Levying Method	To be levied based on CO ₂ emissions	To be purchased through paid auctions for emission allowances
Price Setting	government-set rate of levy	Bidding (paid auctions)

2. Existing carbon pricing schemes

Effective *carbon* rates in both countries

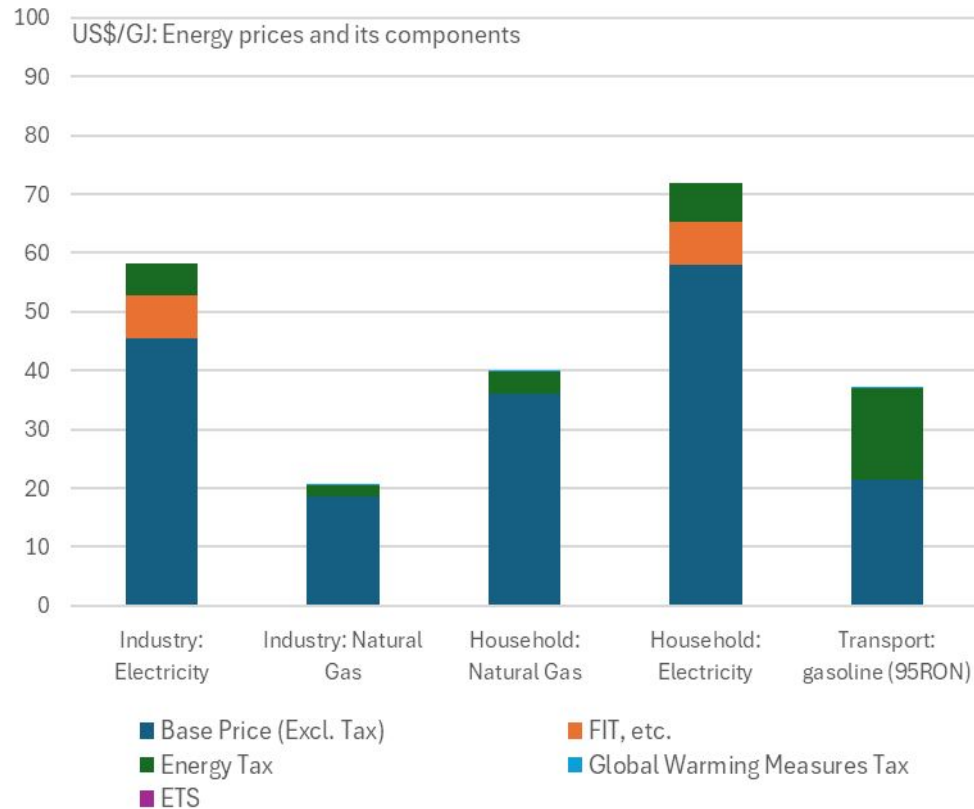
- There were also subsidies during the energy price crisis 2022ff., but they are being reduced

Source: OECD (2024)

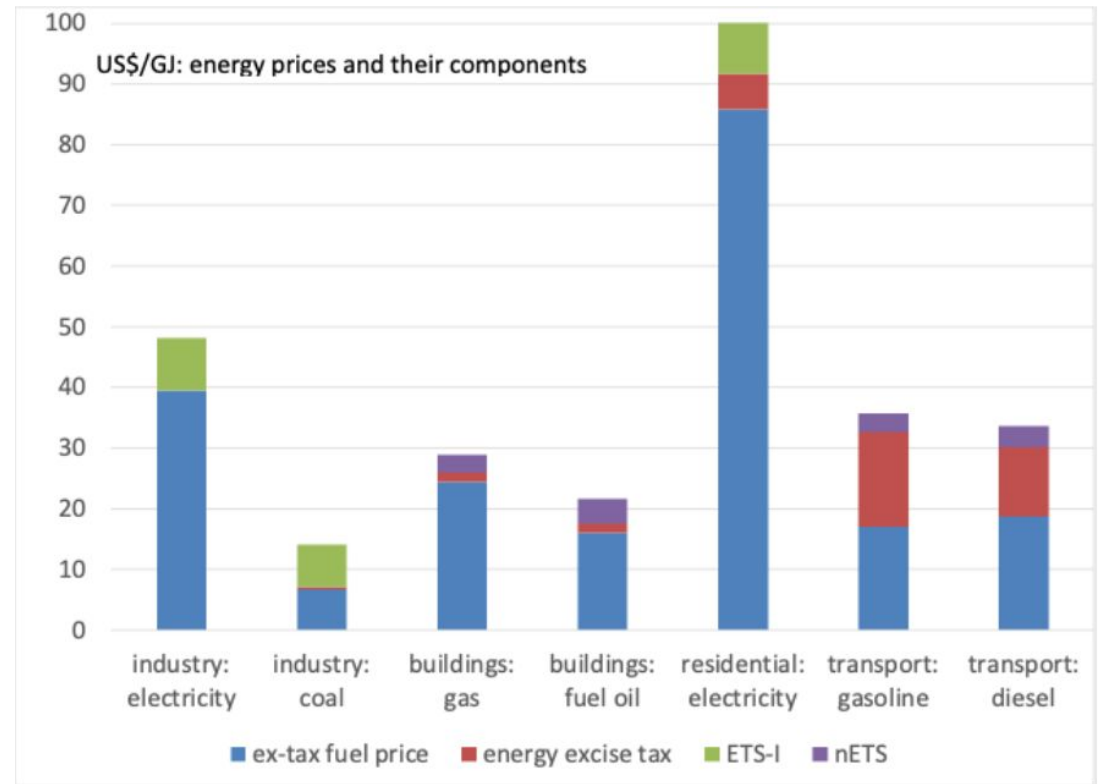
2. Existing carbon pricing schemes

Effective *energy* rates in both countries

Japan



Germany



Excluding VAT (19%)

3. Categories and mechanisms of impacts, and measures to improve societal acceptance



- **Impacts:**

- 1) Reducing carbon emissions - *desired*
- 2) Competitiveness – *side impact*
- 3) Social/distributional impacts – *side impact*

They all depend on the way, in which revenues are used

- **Measures to improve societal acceptance:**

For example,

- 1) economic compensation via reducing energy taxes or prices
- 2) support in reducing emissions
- 3) economic compensation via lump-sum refunds per capita/household/company

They include an appropriate use of the revenues

3. Costs of carbon emissions

Costs of damage caused by climate change or marginal GHG abatement costs as benchmark for carbon pricing?

1.5 °C: OECD estimates carbon price US\$ 226-385/tCO₂e in 2030

2.0 °C: High-Level Commission on Carbon Prices recommends US\$ 63-127/tCO₂e

Damage costs

Abatement costs (RITE (2024) analysis)

German Environmental Agency
2024:

- €300/t CO₂ at 1% time preference rate
- €880/t CO₂ at 0% time preference rate

Comparison of Marginal CO₂ Reduction Costs Across Countries (2040)

	Japan's 2040 Reduction Rate	Japan	USA	China	EU	Others
Growth Scenario	-60%	294	294	294	298	294
	-73%	364	293	293	298	293
	-80%	504	292	292	296	292
Low Growth Scenario	-60%	410	410	428	410	410
	-73%	602	410	428	410	410
	-80%	850	409	428	409	409

Unit: USD/tCO₂ (prices in 2000)

It is based on the assumption that the major developed countries, including the U.S., U.K., and EU, will achieve carbon neutrality by 2050 in terms of GHG emissions.

- At a 60% reduction rate, the marginal CO₂ reduction costs are nearly equal across countries, indicating a globally consistent level of reduction.
- At a reduction rate of 73% or higher, Japan's marginal reduction costs surpass those of other countries, reflecting its more ambitious reduction targets.

3. Effectiveness of carbon pricing in reducing carbon emissions

Effectiveness much higher if embedded in a policy mix

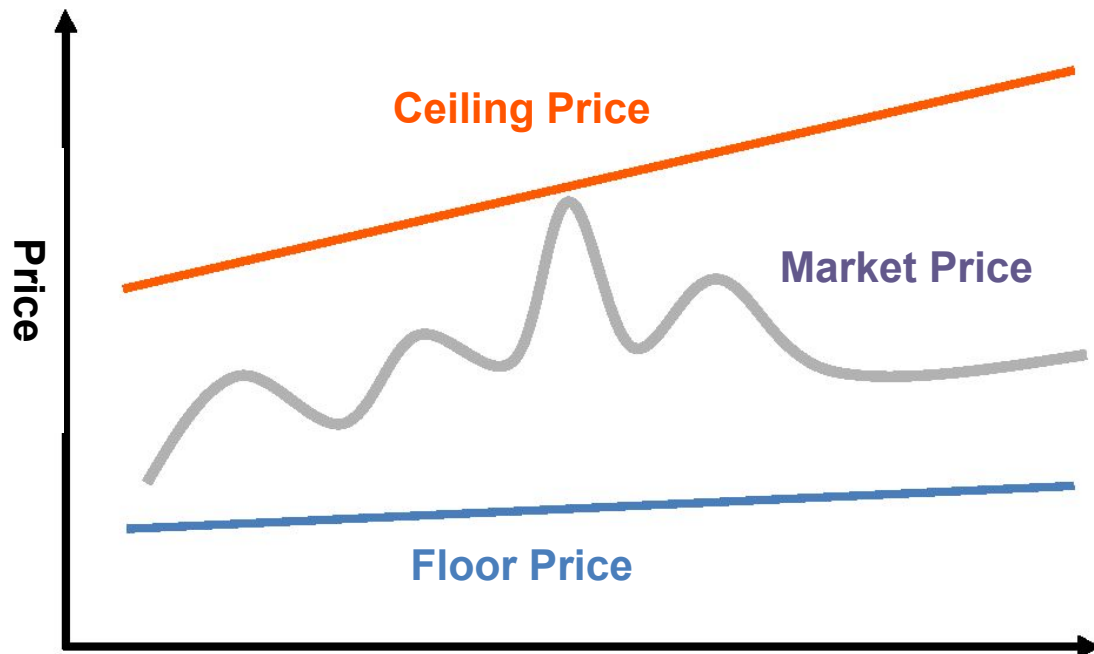
Germany: **€50-100/tCO₂e in 2030** may be enough with policy mix

⇔ Studies on carbon pricing alone: up to €300/tCO₂e

High-level policy mix (IEA (2011)):

3. Effectiveness of carbon pricing in reducing carbon emissions: design of GX ETS as an example

- In the 2nd phase of the GX ETS starting in FY2026, companies with direct emissions of 100,000t-CO₂ or more will be required to participate in mandatory emissions trading.
- The number of companies subject to the scheme will be 300 to 400, which is expected to account for around 60% of Japan's total GHG emissions.
- The methodology for free allocation, through benchmarking and grandfathering, as well as the determination of the upper and lower price limits, are currently being formulated.



Price Ceiling

- Paying a predetermined ceiling price during periods of price surges ensures compliance.

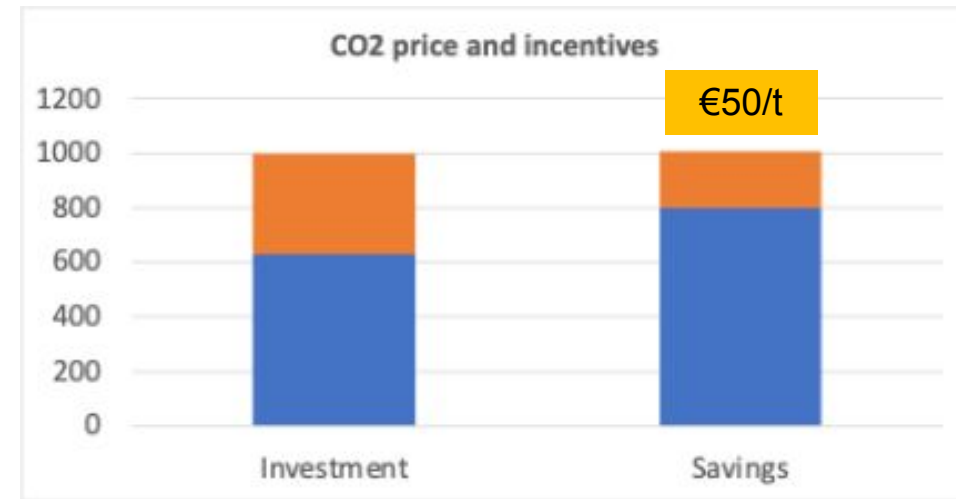
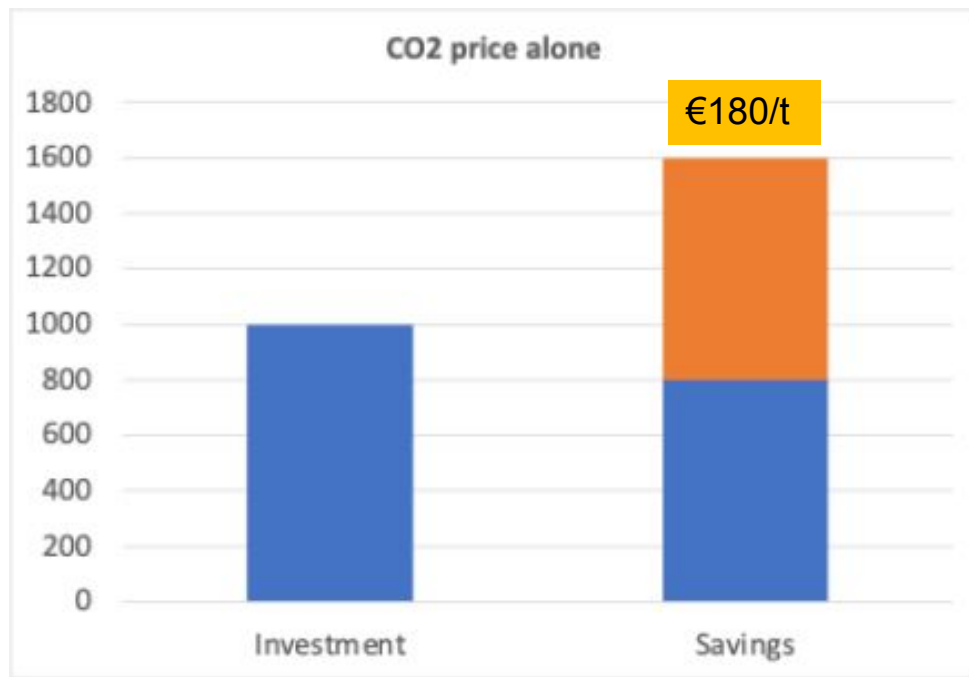
Price Flooring

- A reverse auction is conducted if the market transaction price remains below the floor price for a certain number of days.
- If the price continues to stagnate despite the reverse auction, strengthening future allocation criteria will be considered.

3. Effectiveness of carbon pricing in reducing carbon emissions

Effectiveness much higher if embedded in a policy mix

Germany: 2 ways to double cost-effectiveness of a building efficiency investment



Levelized annual amounts of investment and cost savings in Euros. Left – doubling the energy price via a high carbon price, right – increasing the energy price by 26% and subsidising the investment with 37%, using the revenues from carbon pricing. In both cases, the benefit-cost ratio doubles from 0.8 to 1.6.

Source: own calculations based on a typical buildings energy efficiency investments

3. Concerns on competitiveness and how to deal with them

Concerns

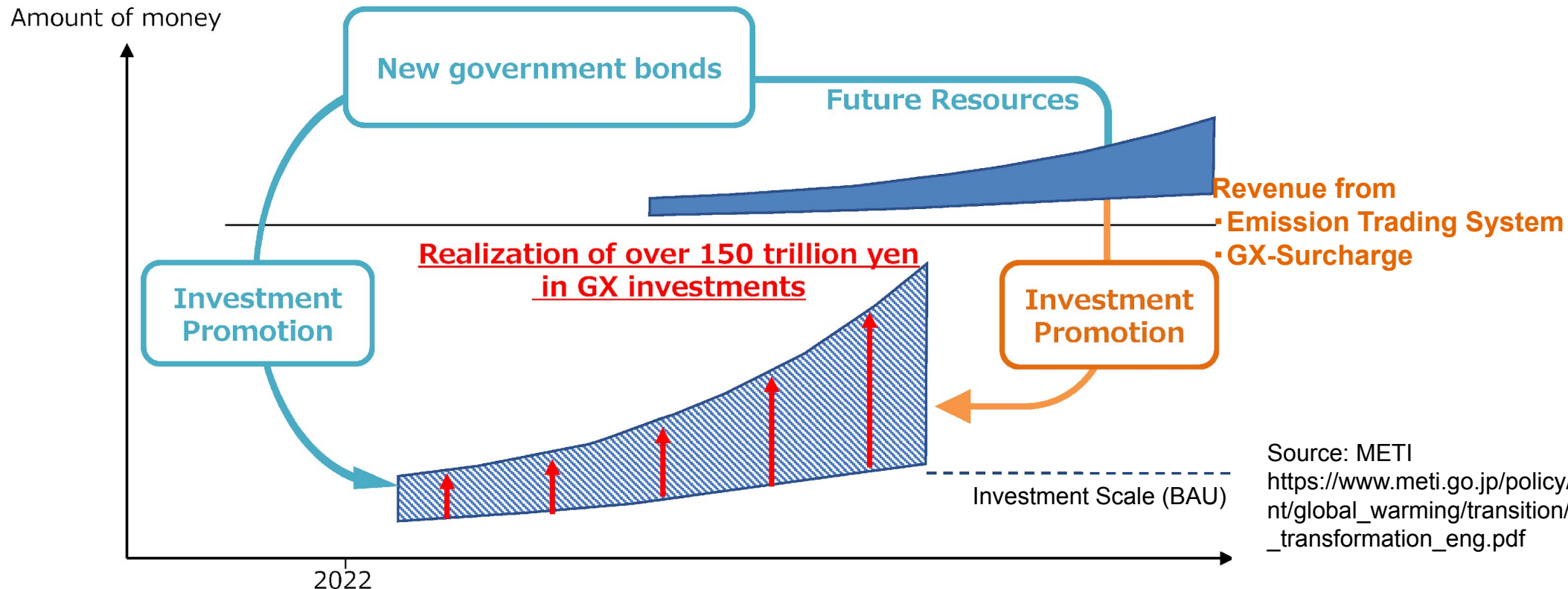
- Similar concerns in both countries: higher production costs mean less competitiveness and/or profits
- However, recent German federal bank research found no negative impact until 2020 (EUA prices <30 €/t)
- Conversion to cleaner production may allow higher prices and new business opportunities for companies supplying GHG reduction technologies

Solutions

- The combination of carbon pricing with financial and technical support for abatement (either directly funded from carbon pricing or at least introduced simultaneously or even before the carbon pricing, as in Japan) seems key for acceptance of carbon pricing by businesses.
- EU has also introduced the CBAM, addressing import of carbon-intensive goods. However, so far no mechanism for refunds of carbon price for exports.

3. Concerns on competitiveness and how to deal with them: The linked GX Bonds and Carbon Pricing as an example

- GX Economy Transition Bonds have been issued since February 2024, with a total of 20 trillion yen expected to be raised by 2032 to achieve Net Zero in 2050.
- The investment areas cover 22 sectors, including steel, transportation, lifestyle, energy (hydrogen, nuclear, next-generation renewable energy, CCS) etc.
- To date, yen 3 trillion has been allocated in advance (incl. yen 100 billion allocation for the conversion to innovative electric furnaces).



Source: METI
https://www.meti.go.jp/policy/energy_environment/global_warming/transition/pathways_to_green_transformation_eng.pdf

3. Measures to improve societal acceptance

Combination of carbon pricing with using the revenues for

- 1) financial support for climate action and
- 2) lump-sum refunds to households (at least the lower to middle income strata) and companies, or reducing electricity prices for businesses, seems most appropriate

- Three main options, qualitative assessment with three criteria:

Option	Economic efficiency	Climate mitigation impact	Distribution effects	Consequences for acceptance of carbon pricing
Reducing energy excise taxes or levies	- to +	- to +	- to 0	0
Financial support for climate action, energy efficiency, innovation	+ to ++	++	- to +	- to +
Lump-sum refunds	+	0	+	+

5. Questions for the stakeholder dialogue (1)

1. What are expectations and concerns among businesses (e.g. EITE companies in industry and SMEs)?

- Implication for business operation, sales of products, and international competitiveness
- Interplay between the ETS and taxes

2. Which kinds of distributional effects could arise?

- e.g. between countries; between industries; between companies and consumers; between income strata among households
- What would be their impact on societal acceptance and competitiveness?
- What could be done to alleviate them
 - in industry (e.g. direct subsidies, CCfD, CBAM)
 - for households to cope with carbon pricing on electricity or increased prices of industrial products (e.g. direct subsidies, lump-sum repayments)?
- What are the potential impacts of the CBAM on climate mitigation and competitiveness:
 - In the EU?
 - In Japan?
 - In developing countries and emerging economies?

5. Questions for the stakeholder dialogue (2)

- 3. Which way of using the revenues from carbon pricing is most effective for both social acceptance/preserving competitiveness and climate change mitigation?**
- direct financial support for climate change mitigation/energy security investments and innovation (e.g. supporting SMEs, homeowners by grants, audits, tax reliefs, one stop shops etc.)?
 - reducing energy taxes and levies, particularly on electricity?
 - refunding to households via annual lump-sum payments per household - only low-income households or all?
 - other; which?
- 4. To speed up decarbonization, many experts conclude that carbon pricing must be embedded in a comprehensive package of companion policies.**

What designs or methods are needed for its smooth and effective implementation?



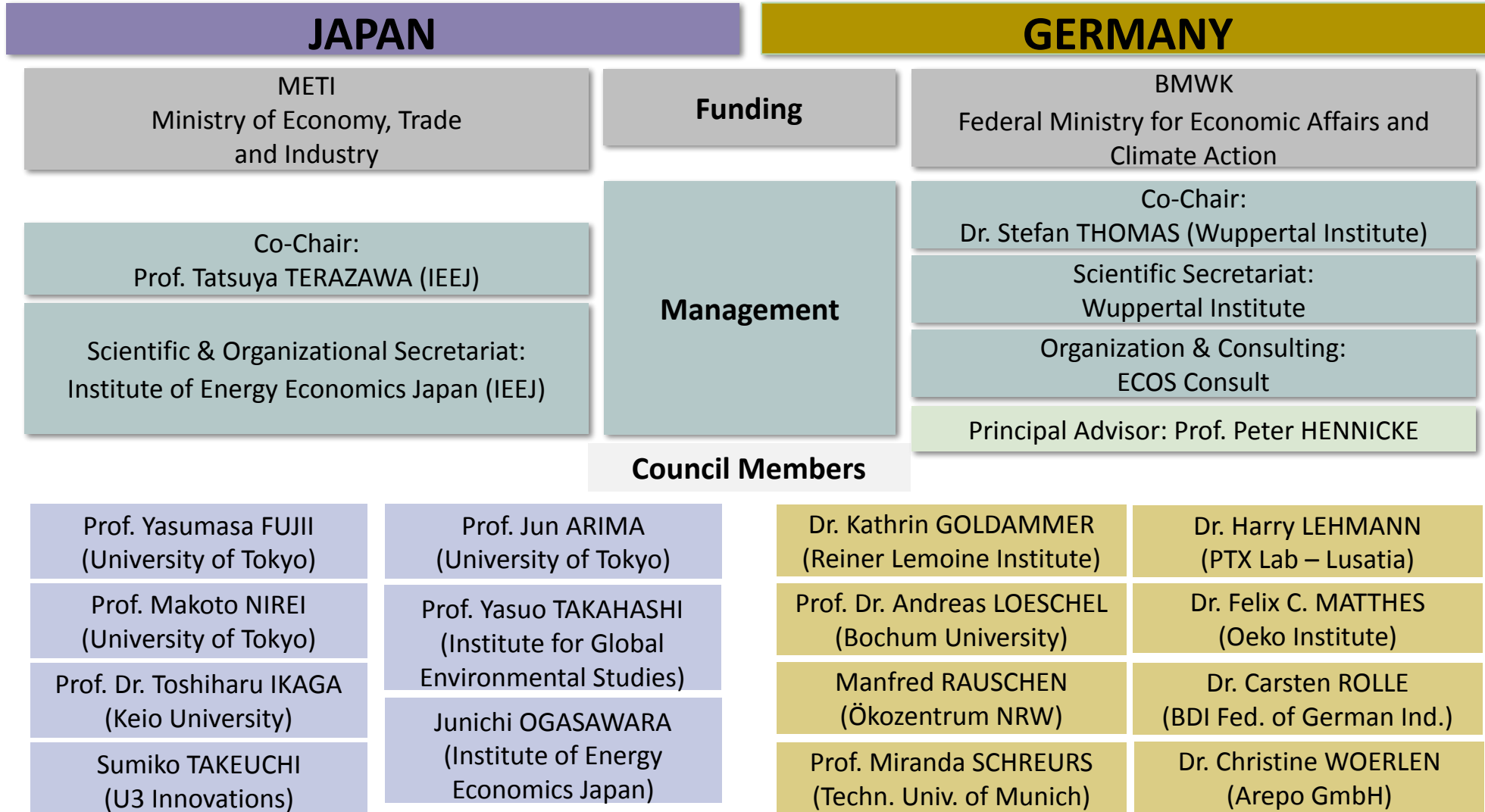
For further information please visit gjetc.org

Thank you for your attention

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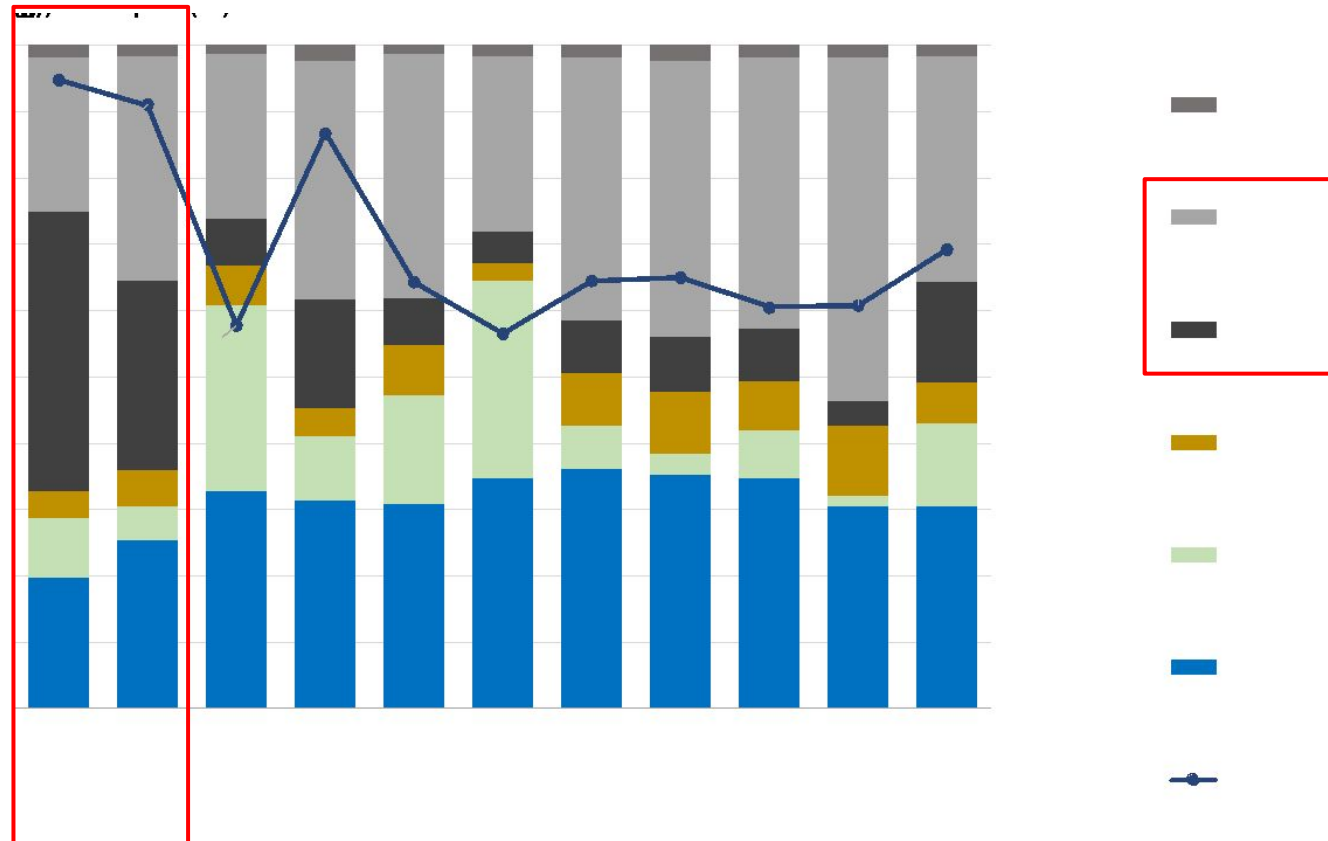
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Appendix: Members, organisation, and funding



3. Potential social and distributional impacts: Data from Japan

Annual Per Capita Utility Cost in the Residential Sector in Japan (2020)



Northern Japan

- Implementing carbon pricing requires careful attention to the potential reduction in disposable income from rising energy prices and the regressive impacts on lower-income households.
- In northern Japan and rural areas, where demand for fossil fuels such as kerosene and gasoline is high, carbon pricing may have particularly greater social impacts.

Source: Ogawa, J., Hoshino, Y. (2024). Regional Energy Demand Analysis Using Household CO₂ Analysis : Implications for Carbon Pricing Policy in Japan. Paper presented at the 40th JSER Conference on Energy System, Economy and Environment.

3. Concerns on social impacts and how to deal with them

Concerns

- Similar concerns in both countries: higher energy costs mean less disposable income; regressive across income strata
- Investment in energy efficiency or renewable energies for carbon abatement, as intended by the carbon pricing, would reduce costs and alleviate energy poverty; but may be difficult for lower income groups

Solutions

- Combination of carbon pricing with financial and technical support for abatement (either directly funded from carbon pricing or at least introduced simultaneously) seems key for acceptance of carbon pricing by citizens.
- Particularly if carbon price needs to exceed €50/t, lump-sum refunds, which may specifically benefit low- to middle-income groups, may become more important to both cushion distribution effects and improve social acceptance
- Special carbon pricing on luxury consumption or on highly carbon intensive investments?