



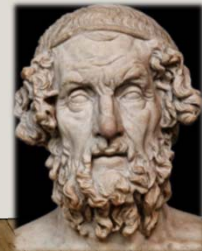
Source: www.boijmans.nl (Jul14, 2020)

Healing the Achilles Heel!

How California and Germany Compare
in Treating Transport Fuels in Cap-and-Trade

*Sven Rudolph, Takeshi Kawakatsu,
Seiji Ikkatai, Elena Aydos, and Achim Lerch*

*Kyoto university, Renewable Energy Economics Seminar
December 21, 2020*



The idea



The Hakubi Project

The goal of The Hakubi Project is to foster and support young researchers who will pioneer new paths in their respective academic fields, by appointing them as program-specific faculty members (five-year term associate professor/assistant professor under the annual salary system) and by supporting their research activities on themes of their own choices.



京都大学大学院 地球環境学学・地球環境学学・三才学林
Kyoto University Graduate School of Global Environmental Studies



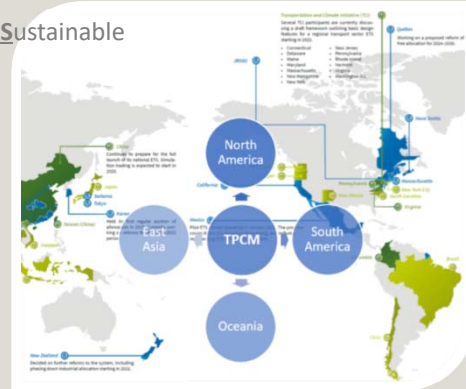
Toward a Trans-Pacific Carbon Market: Politically Feasible and Sustainable

Research steps:

- (1) Define sustainability criteria for carbon markets, apply them to carbon market design, and evaluate domestic schemes in the Pacific region.
- (2) Identify prerequisites for sustainable linking and check existing and upcoming domestic carbon markets for necessary adjustments.
- (3) Analyze political chances and obstacles in the respective jurisdictions and identify strategies to utilize the former and overcome the latter.

Methodological approaches:

- Sustainability Economics, New Political Economy
- Case studies (qualitative, quantitative)



3

Achilles' foe



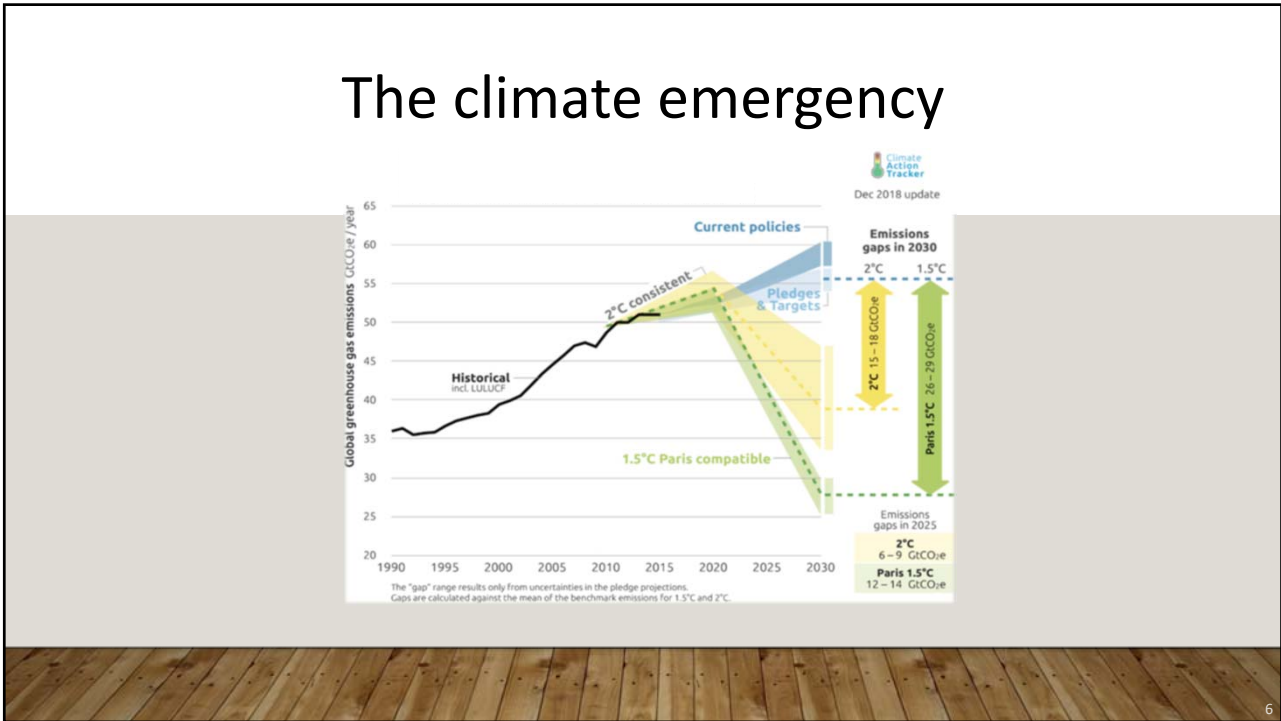
4

The crises

The screenshot shows two web pages. The top page is a Business Insider article titled "Bill Gates issued a stark warning for the world: 'As awful as this pandemic is, climate change could be worse'". It features a photo of Bill Gates speaking. The bottom page is an NBER working paper titled "Valuing the Global Mortality Consequences of Climate Change Costs and Benefits" by Tamma A. Cartleton, Amir Jina, Michael T. Delgado, Michael Greenstone, Trevor Houser, Solomon M. Hsiang, Andrew Hultgren, Robert E. Kopp, Kelly E. McCusker, Ishan B. Nath, James Rising, Ashwin Rode, Hee Kwon Seo, Arvid Vlasov, Jacan Yuan & Alice Tianbo Zhang.

5

The climate emergency



6



„Inacceptable risk“

“The popular idea of **cutting our emissions in half in 10 years only gives us a 50% chance of staying below 1.5 degrees**, and the risk of setting off irreversible chain reactions beyond human control. Fifty percent may be acceptable to you. But those numbers do not include tipping points, most feedback loops, additional warming hidden by toxic air pollution or the aspects of equity and climate justice. They also rely on my generation sucking hundreds of billions of tons of your CO₂ out of the air with technologies that barely exist.

So **a 50% risk is simply not acceptable to us – we who have to live with the consequences.** ...

You are failing us. But the young people are starting to understand your betrayal. The **eyes of all future generations are upon you.** And if you choose to fail us, I say: We will never forgive you.”

(Thunberg 2019)

7



„Brutal act of injustice“



8

Donald J. Trump on Twitter

https://twitter.com/realdonaldtrump/status/265895292191248385?lang=en

Donald J. Trump @realDonaldTrump

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

11:15 AM - 6 Nov 2012

97,934 Retweets 68,021 Likes

13K 98K 68K

“Look, scientists also have a political agenda.” (Trump 2016)

“It will start getting cooler. You just watch;”

“I wish science agreed with you;”

“I don’t think science knows.” (Trump vs. Crawford 2020)

Climate facts?!

95%

“It is **extremely likely** [95% confidence] more than half of the observed increase in global average surface temperature ... was caused by the anthropogenic increase in greenhouse gas concentrations and other anthropogenic forcings together.” (IPCC 2014)

9

“We simply must do everything we can in our power to slow down global warming before it is too late ... The science is clear. The global warming debate is over.”

source: <https://regions20.org/2017/11/24/54085/>

10

Achilles' protection and his vulnerability



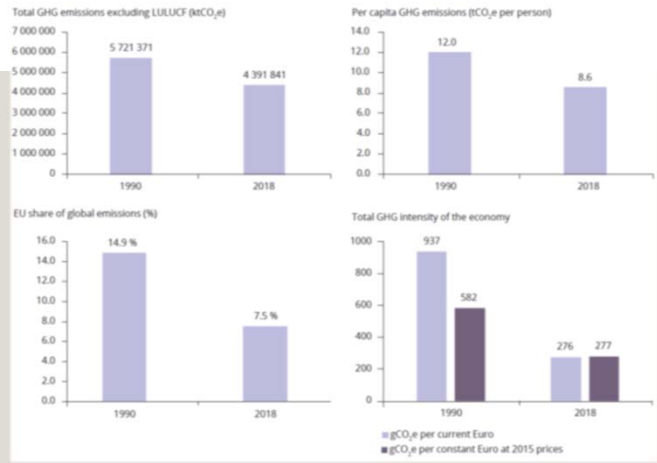
11

The diplomatic success



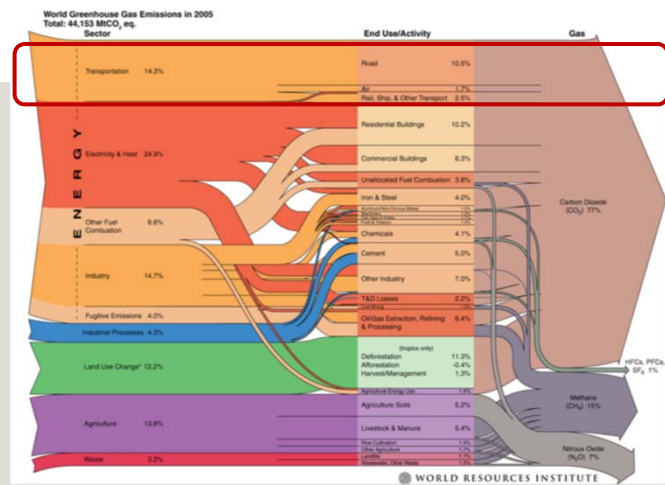
12

E.g. EU-27 success

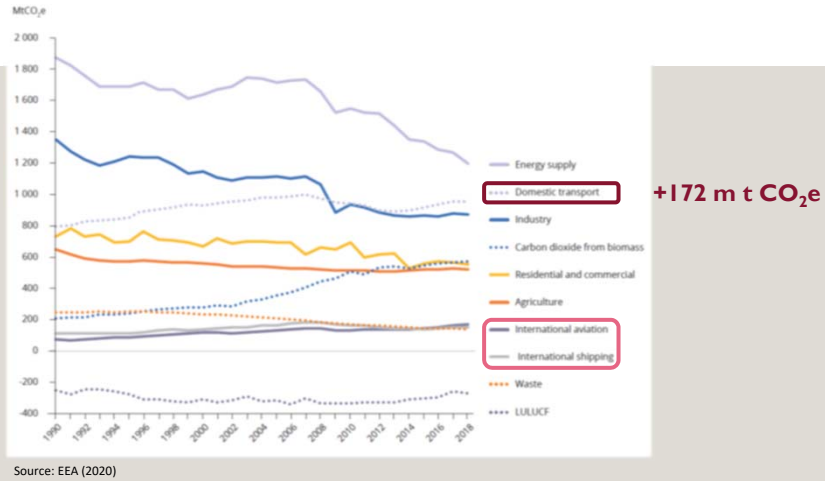


Source: EEA (2020)

Achilles vulnerable heel



EU transport sector CO₂ emissions



Achilles' death



Source: www.mercurynews.com



Source: www.wetter.de

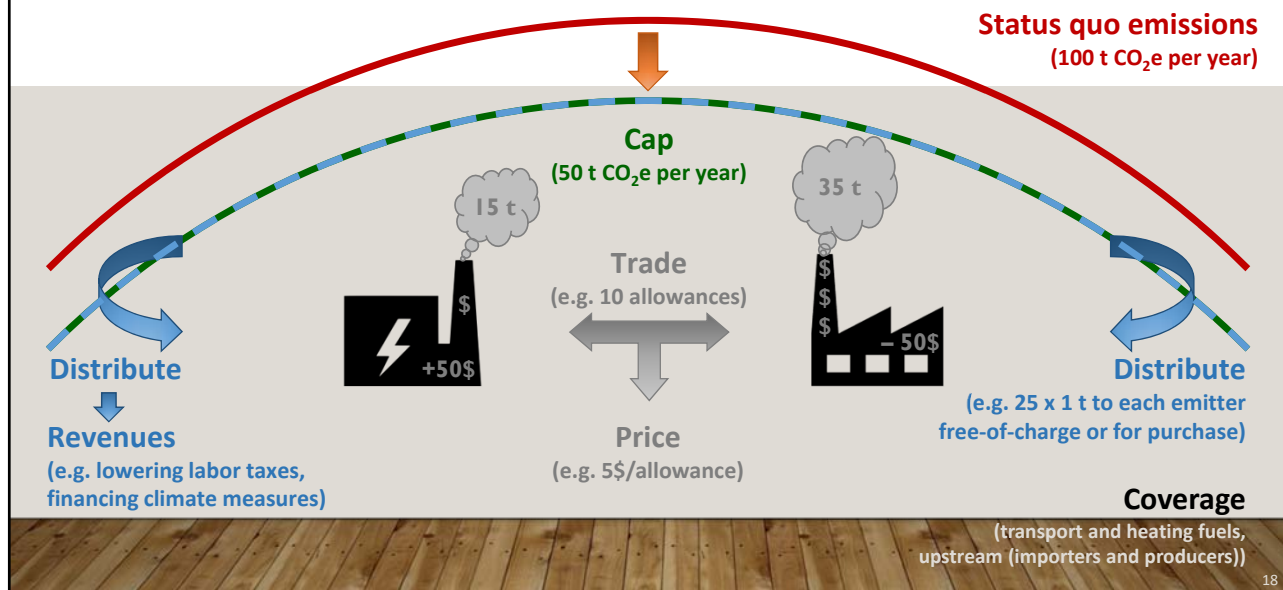


Achilles' new treatment

Source: www.boijmans.nl (Jul14, 2020)

17

How the CaT treatment works



18

CaT allows for decision prioritization, ...

Quelle: www.steadystate.org

Center for the Advancement of the Steady State Economy

meet | discover | track | act | join | give

The Daily News | Steady State Commentary and Related News

Ecological Economics, 6 (1992) 185-193
Elsevier Science Publishers B.V., Amsterdam

Commentary

Allocation, distribution, and scale: towards an economics that is efficient, just, and sustainable

Herman E. Daly ¹
Environment Department, World Bank, Washington, DC, USA
(Received 14 December 1991; accepted 17 April 1992)

Top 10 Policies for a Steady-State Economy

October 28, 2013 / 28 Comments /

by Herman Daly

Let's get specific. Here are ten policies for ending [uneconomic growth](#) and moving to a steady-state economy. A steady-state economy is one that develops qualitatively (by improvement in science, technology, and ethics) without growing quantitatively in physical dimensions, it lives on a diet — a constant metabolic flow of resources from depletion to pollution (the entropic throughput) maintained at a level that is both sufficient for a good life and within the assimilative and regenerative capacities of the containing ecosystem.

Ten is an arbitrary number — just a way to get specific and challenge others to suggest improvements. Although the whole package here discussed fits together in the sense that some policies supplement and balance others, most of them could be adopted singly and gradually.

1. Cap-auction-trade systems for basic resources. Caps limit biophysical scale by quotas on depletion or pollution, whichever is more limiting. Auctioning the quotas captures scarcity rents for equitable redistribution. Trade allows efficient allocation to highest uses. This policy has the advantage

19

can be made sustainable, ...

	Sustainable GHG CaT Design (Quelle: Rudolph et a. 2012, Rudolph/Aydos 2021)
Coverage	mandatory participation all GHG (based on CO ₂ e) all polluters
Cap	-25-40% by 2020, -50-65 % by 2030, -70-85 % by 2040 (base 1990) (CBDR, Paris Agreement) absolute volume cap (Budget Approach) gradual cap reduction (Contraction & Convergence)
Allocation	100% auctioning primary and secondary market equally accessible to all interested parties frequent, non-discriminatory auctions and well-established secondary market platform
Revenue Use	100% revenue recycling earmarked to compensate the poorest plus equal per capita dividend
Flexibility Mechanisms	banking permitted (unlimited) borrowing prohibited offsets limited to sustainable projects ("Gold Standard"), ex ante set-aside from the cap
Price Management	auction price floor (≥ SC-CO ₂ , i.e. 50/60 US\$/t in 2020/2030) price ceiling (≥ PA-CP, i.e. 80/100 US\$/t in 2020/2030)
Compliance	control periods not longer than three years continuous emission monitoring or third-party verified reporting reliable emission and allowance tracking and registration discouraging fines (>p) for non-compliance compensation of excess emissions
Linking	multilateral direct linking provisions (design adjustment in MoU)

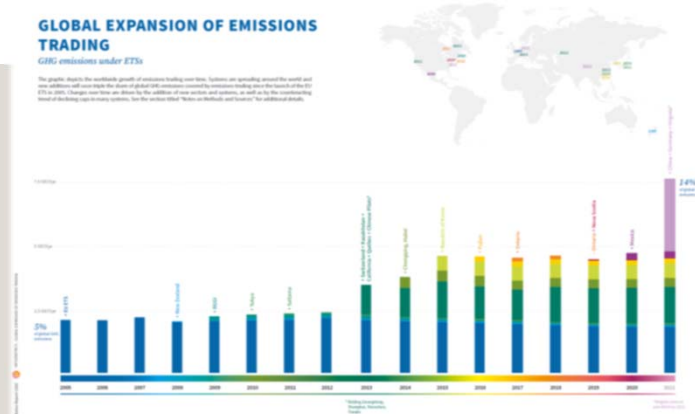
20

has been spreading globally, ...

GLOBAL EXPANSION OF EMISSIONS TRADING

GHG emissions under ETSs

The graphic depicts the worldwide growth of emissions trading over time. Systems are spreading around the world and new entrants will soon make the share of global GHG emissions covered by emissions trading close to the level of the EU ETS in 2016. Changes will have an effect on the addition of new entrants and systems, as well as on the corresponding impact of trading gaps in other systems, for the so-called "leakage or leakage" for additional details.



Source: <https://icapcarbonaction.com>

21

is allowed under the Paris Agreement, ...



Article 6

1. Parties recognize that some Parties choose to pursue voluntary **cooperation in the implementation of their nationally determined contributions** to allow for higher ambition in their mitigation and adaptation actions and to promote sustainable development and environmental integrity.
2. Parties shall, where engaging on a voluntary basis in **cooperative approaches that involve the use of internationally transferred mitigation outcomes** towards nationally determined contributions, **promote sustainable development ...**
3. The use of internationally transferred mitigation outcomes to achieve nationally determined contributions under this Agreement shall be **voluntary and authorized by participating Parties.**

22

can be applied at all governance levels, and ...

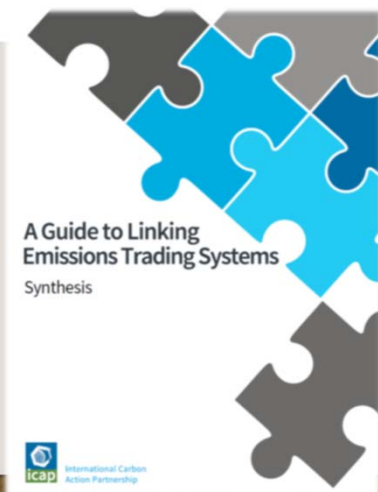


Environmental Federalism

- political **failure** at the **national** level (e.g. US 2010, JP 2010, AU 2014)
- efficient “**voting by feet**” (Tiebout 1956) vs. “**race to the bottom**” (Stewart 1977)
- now “**policy laboratories**” allowing “**tailor-made solutions**” (Adler 2004; Revesz 1992, 1996)!

23

can be linked to further sustainability!



- overall **abatement cost** reduction
- removal of **price differences**
- reduction of **competitive distortions**
- prevention of **carbon leakage**
- Increase of **margin for re-distribution**

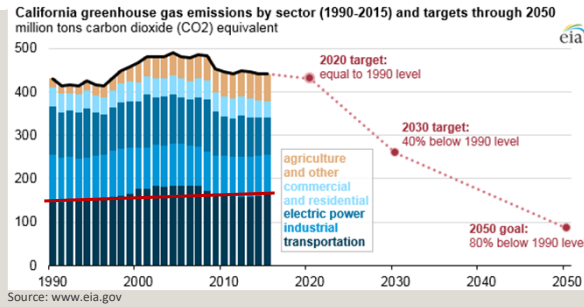
24



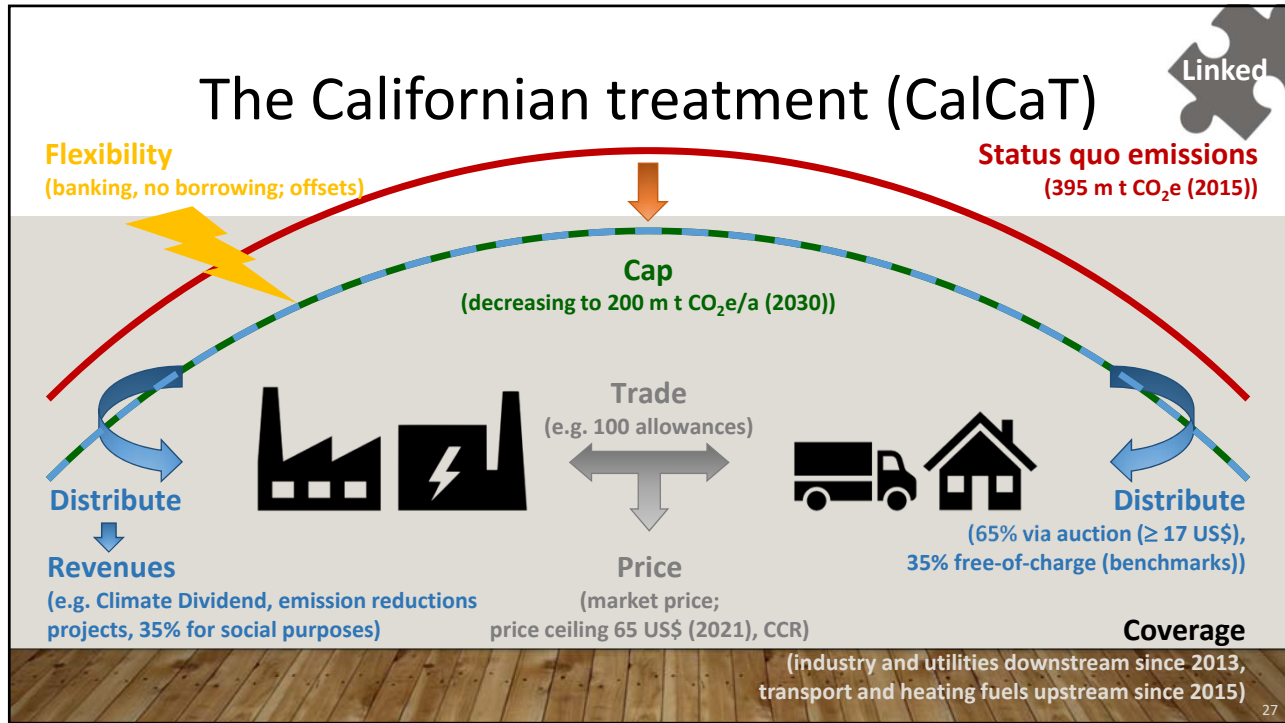
Achilles walking his heel in Germany and California

25

California's Achilles Heel



26



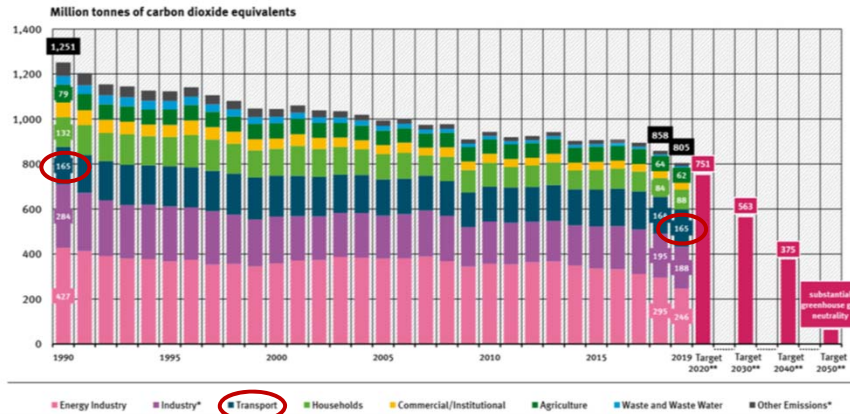
CalCaT's healing success

	AB32/SB32	CalCaT
GHG transport sector 2017 (from 2012 levels)	+ 5 %	
GHG total 2017 (from 1990 levels)	- 6 m t	
GHG goals 2020/30 (from 1990 levels)	0 / 40 %	- 13 / 47 %
Compliance 2013-2020		≈ 100 %
CO ₂ e price		12-18 US\$ / t
GDP	- 2.2 to + 1.1 %	
Net benefits California in 2030		- 4.6 to + 4.9 bn US\$
Net benefits Inland Empire 2016-2020		+ 0.150 bn US\$
Net benefits Inland Empire 2017-2030		-0.3 to +4.8 bn US\$
Revenue share benefitting low-income households by 2019	57 %	
Net effect high/low-income households in 2020	+ 500/400 US\$ / a	
Net effect low-income households in 2030	+ 115 to 280 US\$ / a	

28

Germany's Achilles Heel

Emission of greenhouse gases covered by the UN Framework Convention on Climate

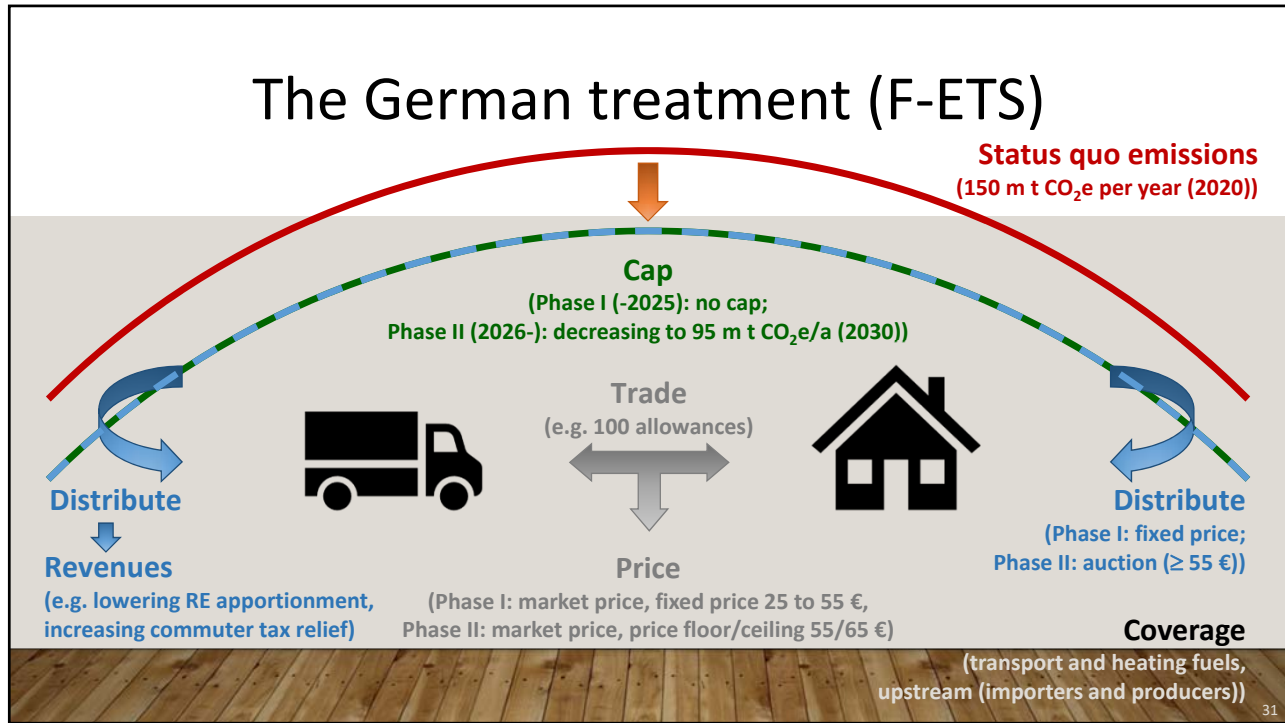


Source: www.umweltbundesamt.de

The German treatment (sector target roadmap)

Annual emission budgets in millions of tonnes of CO ₂ equivalent	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Energy	280		257								175
Industry	186	182	177	172	168	163	158	154	149	145	140
Buildings	118	113	108	103	99	94	89	84	80	75	70
Transport	150	145	139	134	128	123	117	112	106	101	95
Agriculture	70	68	67	66	65	64	63	61	60	59	58
Waste and Other	9	9	8	8	7	7	7	6	6	5	5

Source: BMU (2019)



31

German F-ETS' healing promise

	Sep 2019 draft	Dec 2019 draft
GHG reduction total in 2021	1.5 m t	3.4 m t
GHG reduction total in 2030	28.5 m t	25.0 m t
GHG reductions transport 2030	17.1 m t	18.5 m t
GHG reductions buildings 2030	12.5 m t	13.5 m t
Government annual revenues 2026	12.2 bn €	15.6 bn €
net income burden average	0.7 %	0.4 %
net income burden in low-income households	1.0 %	0.5 %
net income burden on high-income households	0.4 %	0.3 %

Source: table by authors based on DIW (2019, 2020)

32

Healing the Achilles Heel sustainably?

	Sustainable Design	DE F-ETS	CalCaT (F)
Coverage	mandatory participation all GHG (based on CO ₂ e) all polluters	● ● ●	● ● ●
Cap	≥ -25-40% by 2020, -50-65 % by 2030, -70-85 % by 2040 (base 1990) absolute volume cap (Budget Approach) gradual cap reduction (Contraction & Convergence)	● ● ●	● ● ●
Allocation	100% auctioning primary and secondary market equally accessible to all interested parties frequent, non-discriminatory auctions; well-established secondary market	● ● ●	● ● ●
Revenue Use	100% revenue recycling earmarked to compensate the poorest plus equal per capita dividend	● ●	● ●
Flexibility Mechanisms	banking permitted (unlimited) borrowing prohibited offsets limited to sustainable projects ("Gold Standard"), cap set-aside	● ● ●	● ● ●
Price Management	auction price floor (≥ SC-CO ₂ , i.e. 50/60 US\$/t in 2020/2030) price ceiling (≥ PA-CP, i.e. 80/100 US\$/t in 2020/2030)	● ●	● ●
Compliance	control periods not longer than three years continuous emission monitoring or third-party verified reporting reliable emission and allowance tracking and registration discouraging fines (>p) for non-compliance compensation of excess emissions	● ● ● ● ●	● ● ● ● ●
Linking	multilateral direct linking provisions (design adjustment in MoU)	●	●

33



Source: www.boijmans.nl

Healing the Achilles Heel!

California "pioneered" multi-sector cap-and-trade incl. transport!

- + sustainable design except for price corridor (and cap)
- + cost-efficiency, regressivity prevention (via revenue use)
- transport emission increase, low CO₂e price

The new German Fuels-ETS is promising, ...

- + sustainable design except for cap and revenue use
- + transport emission reduction, high CO₂e price
- cost-inefficiency, insufficient regressivity prevention (via revenue use)

but could be made more sustainable by three major revisions!

- ⇒ replacing the price escalator by a cap in line with the sector target
- ⇒ raising the price ceiling to ≥ 80 € (2030)
- ⇒ earmarking all revenues to compensate the poorest and climate dividend

34

If well dosed,
sustainable cap-and-trade
can heal climate policy's Achilles Heel and
prevent the fatal wound!



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35



An alternative cure!

The transport sector could be included in the EU ETS!

- + cost-efficiency, reduction of allowance surplus
- reduction obligation shift to other sectors
- extra burden for low-income households, if not compensated

Still, a truly sustainable EU ETS design could be a remedy!

- ⇒ price corridor from SC-CO₂ to PA-CP
- ⇒ full auctioning with revenue earmarked to compensate poorest plus dividend
- ⇒ extended linking (e.g. with California/Quebec)

36