

Policies for sustainable mobility leveraging bounded rationality: some results from the PROBOUND project

PROBOUND

*Promoting the energy transition by leveraging bounded rationality
and appropriately redesigned policies*

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Emissions from passenger transport do not fall enough

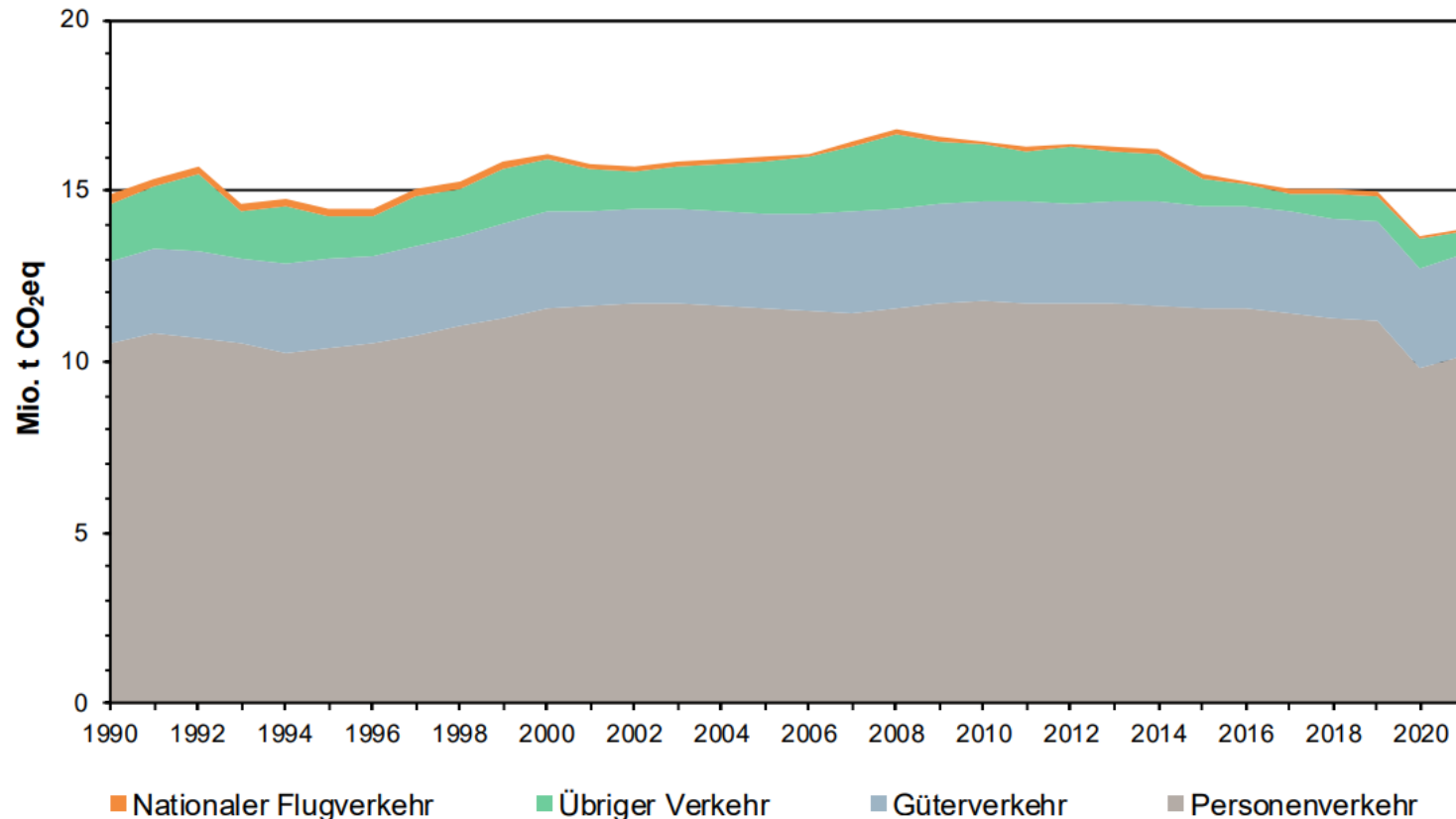
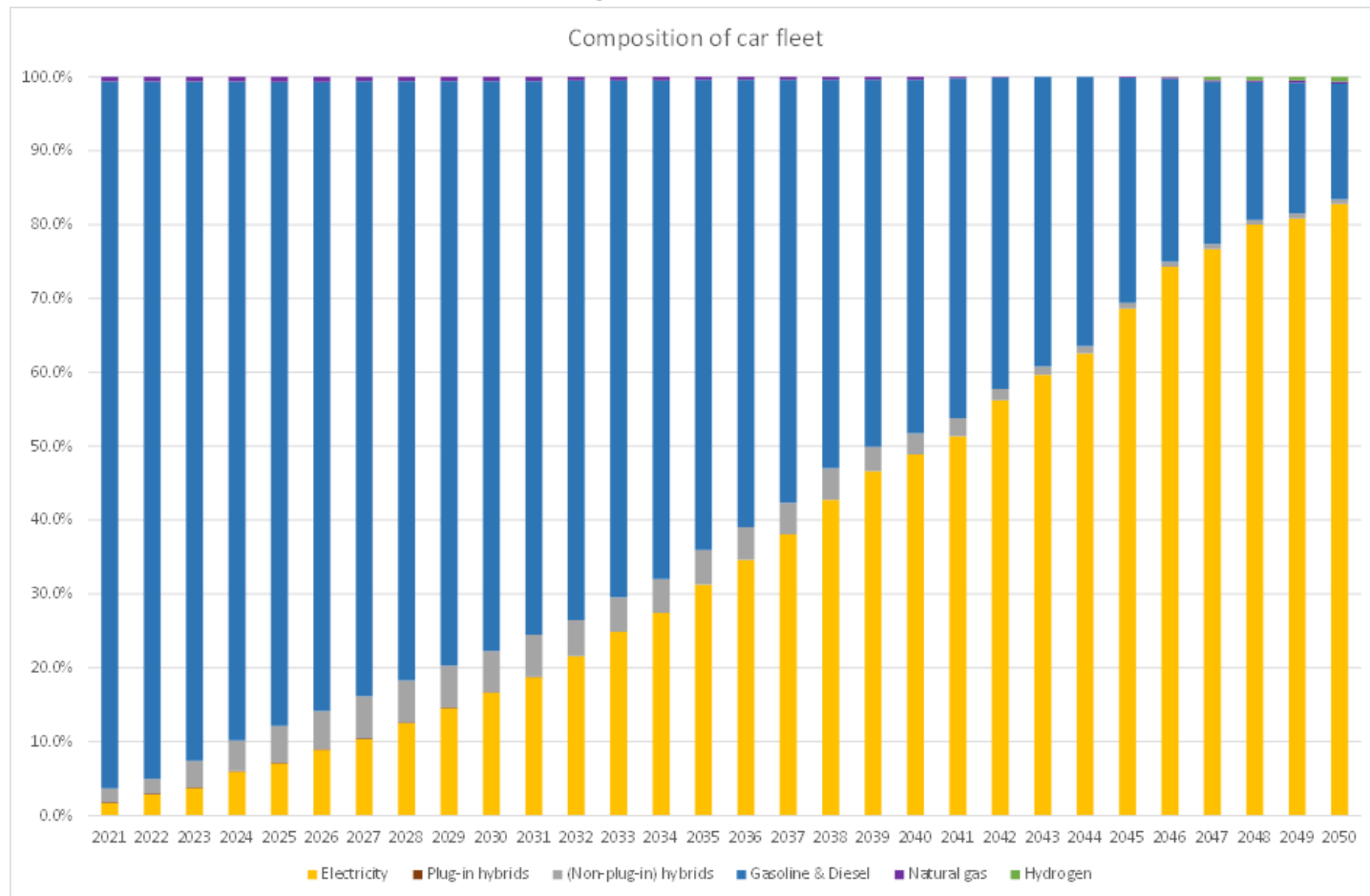


Abbildung 2-5: Entwicklung der Treibhausgasemissionen aus dem Sektor Verkehr, aufgeteilt nach den Kategorien Personenverkehr (Personenwagen, Motorräder, Reisebusse), Güterverkehr (Lastwagen und Lieferwagen), übriger Verkehr (Bahn, Schifffahrt, Linienbusse, Pipelinetransport, Militär inklusive militärische Flüge, Tanktourismus und statistische Differenz) und nationaler Flugverkehr (zivile Flüge).

Source: BAFU, Kenngrößen zur Entwicklung der Treibhausgasemissionen in der Schweiz 1990–2021, Aktualisiert im April 2023, p. 17.

Electrification is on the way



Household fleet composition in the baseline

Source: PROBOUND Final report, May 2023. Bottom-up results from aggregation of individual purchase decisions of bounded rational consumers choosing from a moving set of about 100 models, reflecting announcement of new vehicles. Relevant for the choices are technical and market parameters (e.g. brand), whose perception and evaluation is influenced by media and dealership.

But it can be accelerated by policies leveraging the bounded rationality of people

Year in which the majority of the car fleet is electric

		Year of EV majority in the fleet
Baseline		2041
Design	Policies	Year of EV majority in the fleet
BUB1	Positive messages in neutral media	2037
BUB2	Positive mess. in posit. media	2037
BUB3	Positive mess. in neg. media	2037
BUB4	More exposure to posit. media	2037
SLOCH1	Charging opport. tenants	2038
SLOCH2	Charging opp. work	2038
SLOCH3	Charging opp. shopping	2037
SLOCH4	Charging opp. homeowners	2038
FACH1	Fast Charging financial supp.	2035
FACH2	FC nat. stand.+fin. Supp.	2035
VIS1	Visib. Fast Charging 2 km radius	2038
VIS2	Visib. Fast Charging 5 km radius	2038
LAB1	Communication Campaign label	2037
LAB2	Label "A" only for zero emissions vehicles	2038
INDE1	Emission list at dealers	2037
INDE2	Charging map at dealers	2037
INDE3	Payment simplification at dealers	2037
TT1	EV trials	2034
TT2	Micro-mob. trials	2038
TT3	GA trials	2040
TCO1	EV subsidy	2038

Even in the very short term

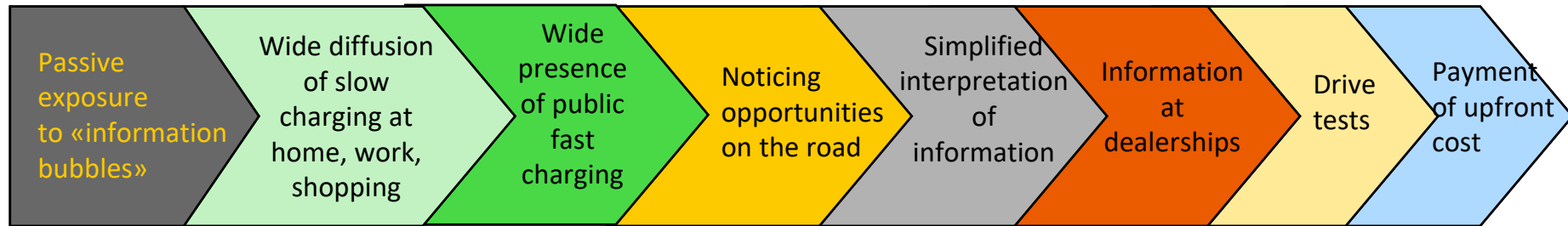
Fleet composition in terms of BEV shares

		2023	2024	2025	2026	2027	2028	2029	2030	2040	2050
Baseline		3.7%	5.9%	7.0%	8.9%	10.3%	12.5%	14.5%	16.6%	48.9%	82.8%
Design	Short description										
BUB1	Positive messages in neutral media	5,5%	8,4%	11,0%	14,4%	17,0%	20,6%	23,4%	26,3%	61,9%	88,4%
BUB2	Positive mess. in posit. media	5,5%	8,4%	11,1%	14,4%	17,3%	20,8%	23,6%	26,5%	62,9%	88,6%
BUB3	Positive mess. in neg. media	5,4%	8,3%	11,0%	14,3%	16,8%	20,4%	23,2%	26,2%	63,0%	88,6%
BUB4	More exposure to posit. media	5,3%	8,2%	11,0%	14,1%	17,0%	20,4%	23,3%	26,3%	63,0%	88,7%
SLOCH1	Charging opport. tenants	4,9%	7,0%	8,5%	12,0%	14,5%	17,6%	20,6%	23,5%	59,0%	85,1%
SLOCH2	Charging opp. work	4,6%	6,7%	8,1%	11,6%	14,3%	17,4%	20,5%	23,4%	59,0%	84,4%
SLOCH3	Charging opp. shopping	4,7%	6,9%	8,6%	12,1%	14,7%	17,9%	21,0%	24,0%	60,1%	85,0%
SLOCH4	Charging opp. homeowners	4,5%	6,7%	8,3%	11,9%	14,6%	17,6%	20,7%	23,8%	59,2%	84,8%
FACH1	Fast Charging fin. supp.	5,5%	7,9%	10,3%	14,9%	18,9%	23,3%	27,8%	32,0%	74,0%	90,0%
FACH2	FC nat. stand.+fin. supp.	5,8%	8,3%	10,7%	15,2%	19,4%	23,6%	28,3%	32,4%	74,0%	90,6%
VIS1	Visib. Fast Charging 2 km radius	5,4%	8,3%	11,0%	14,2%	16,8%	20,4%	23,3%	26,3%	62,4%	88,4%
VIS2	Visib. Fast Charging 5 km radius	5,5%	8,4%	11,2%	14,4%	17,4%	21,0%	23,9%	27,0%	62,8%	88,3%
LAB1	Comm. Campaign label	5,2%	7,8%	10,2%	13,7%	16,5%	20,3%	23,2%	26,1%	62,0%	87,9%
LAB2	Label "A" only for zero emissions vehicles	5,1%	7,7%	9,9%	13,0%	14,9%	17,7%	20,2%	22,7%	60,2%	87,0%
INDE1	Emission list at dealers	5,5%	8,5%	11,3%	14,8%	18,0%	21,6%	24,5%	27,5%	64,1%	88,8%
INDE2	Charging map at dealer	5,4%	8,4%	11,1%	14,3%	17,1%	20,7%	23,5%	26,5%	64,3%	89,3%
INDE3	Payment simplification at dealers	5,5%	8,5%	11,2%	14,5%	17,5%	21,2%	24,2%	27,3%	64,9%	89,8%
TT1	EV trials	5,9%	8,7%	11,4%	16,2%	20,5%	24,9%	29,8%	34,4%	77,6%	91,6%
TT2	Micro-mob. trials	4,8%	6,9%	8,2%	11,7%	14,4%	17,5%	20,6%	23,5%	58,9%	84,6%
TT3	GA trials	4,1%	6,3%	7,5%	9,7%	11,2%	13,7%	15,6%	17,7%	54,7%	86,8%
TCO1	EV subsidy	6,6%	9,5%	12,4%	16,0%	18,8%	22,2%	25,0%	27,5%	58,5%	85,2%

Source: PROBOUND Final report, May 2023.

The eight policies tested

Eight touchpoints in the purchase process



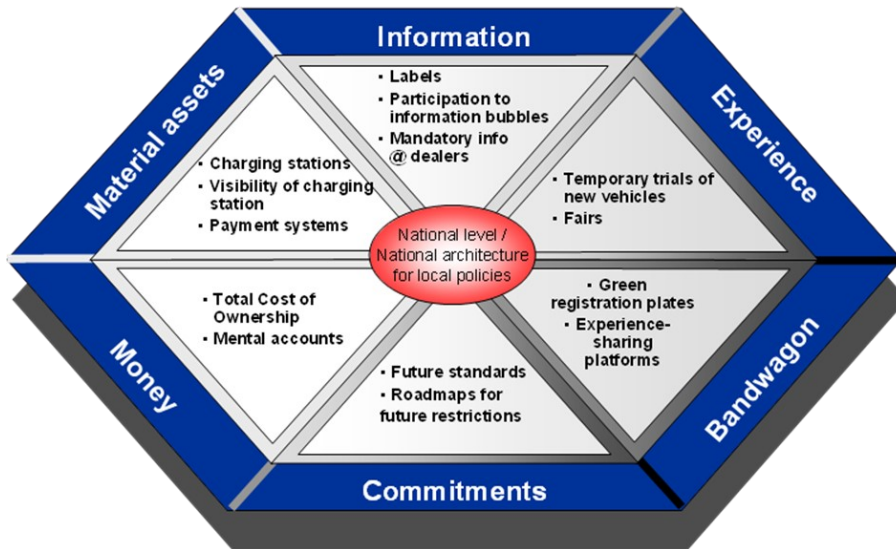
Policies

- Shifting contents & exposure to «information bubbles»
- Incentivise and mandate charging points (slow & fast)
- Road signs
- Energy Labels
- Mandatory information at dealerships
- Trial tests
- Modification of Total Cost of Ownership

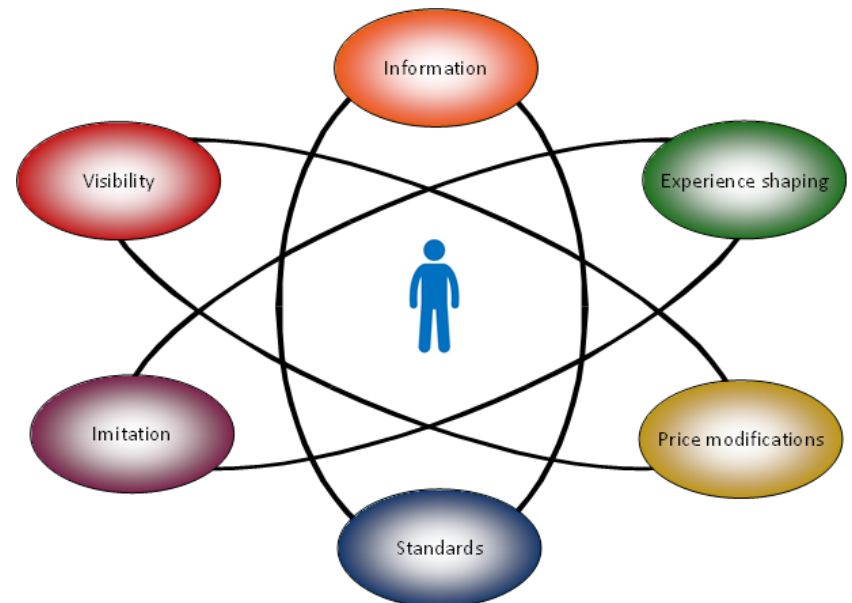
Some policies rely on nudging, others don't.

Cognitive biases in play: confirmation bias, availability bias, salience bias, bandwagon effect, etc. (see p. 43 of the Final report for the full comparative table)

The policies tested derive from an operationalization....



... of an approach in which people are choosing drawing not only on monetary values but also have endogenous preferences, influenced by their own experience and perception, as well as by social diffusion of judgements.

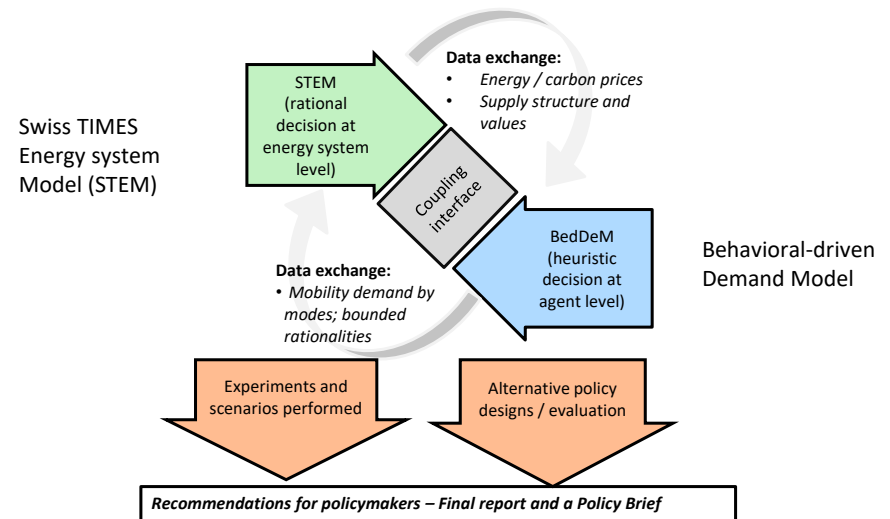


Key policy messages

- Bounded rationality substantially change the way people react to policy measures and approaches
- Soft policies based on communication and visibility can have positive effects on the diffusion of key energy transition items
- Their effect is in the same order of magnitude of traditional subsidies
- The same policy approach can be used to what you consider a game-changer to decarbonize mobility

Methodological insights

- We produced national level, sectoral and cross-sectoral, aggregate values from individual decision making embedding applied psychology
- Linking models, even in tight co-simulation, is feasible by taking a modular approach
- The co-simulation allows to grasp the best of two worlds: the high granularity of agent-based models (including yearly values) and the broad energy feedbacks coped with the energy system model



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