2050 CliMobCity

Interreg Europe

European Union
European Regional
Development Fund

Studies on CO_2 reduction in Berlin

Dr. Fritz Reusswig
Potsdam Institute for Climate Impact Research (PIK)

23 September 2020

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Potsdam, 23 September 2020

KLIMANEUTRAL LEBEN IN BERLIN

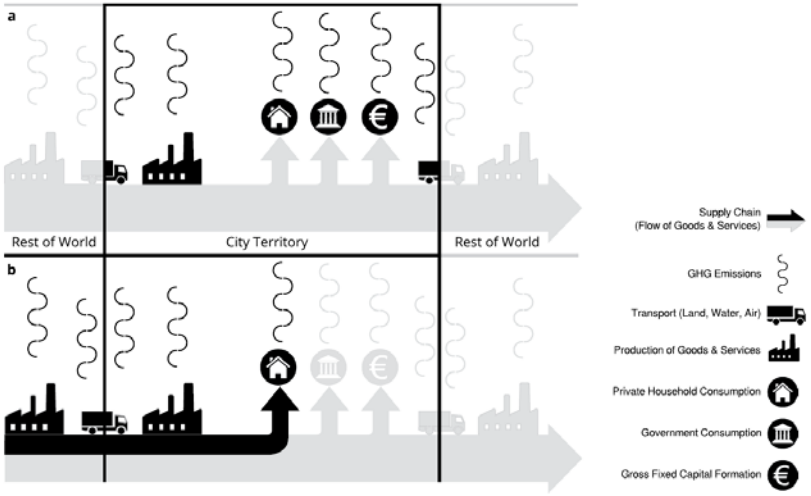
Context

- Berlin, the German capital, is not only the biggest German city (3.8 m), but also one of 16 federal states (own legislation).
- PIK has been involved in recent attempts of the Berlin senate to
  - Decarbonize the city (mitigation)
    - Feasibility study climate neutrality (→ 2050)
    - Berlin Energy and Climate Program, concrete measures (BEK) (→ 2030)
    - Pilot study on private carbon footprint reduction real lab (KLiB)
    - Update BEK after Paris (without PIK)
  - Increase ist climate resilience (adaptation)
    - Adaptation Concept for Berlin (AFOK)
    - Update City Development Plan (STEP Klima 2.0) (consultancy)
    - Pilot project with allotment gardeners (co-production)
- Other PIK research addresses Berlin in many ways

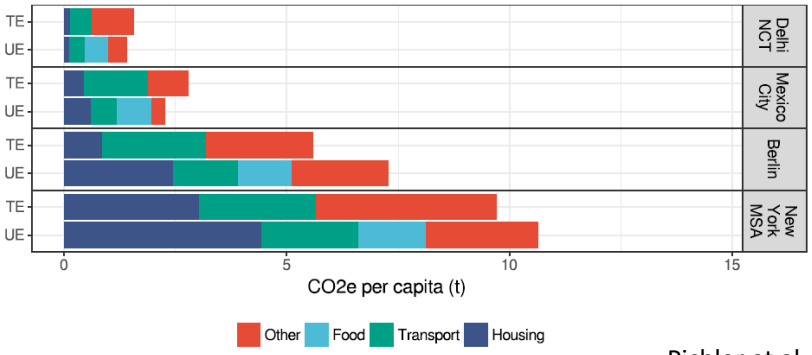
Carbon footprints

- Various carbon accounting approaches
- Two major ones:
  - Territorial emissions
    - Focus: territory + electricity
    - Exclusion: other extra-territorial processes
    - Adopted mainly by (local) political bodies
  - Upstream emissions
    - Focus: Consumption based processes
    - Exclusion: other territorial processes
    - Adopted mainly by science and (national) statistics/political bodies
- Global pattern:
  - Developing countries: TE > UE
  - Developed countries: TE < UE

Territorial emissions (TE)



Upstream emissions (UE)

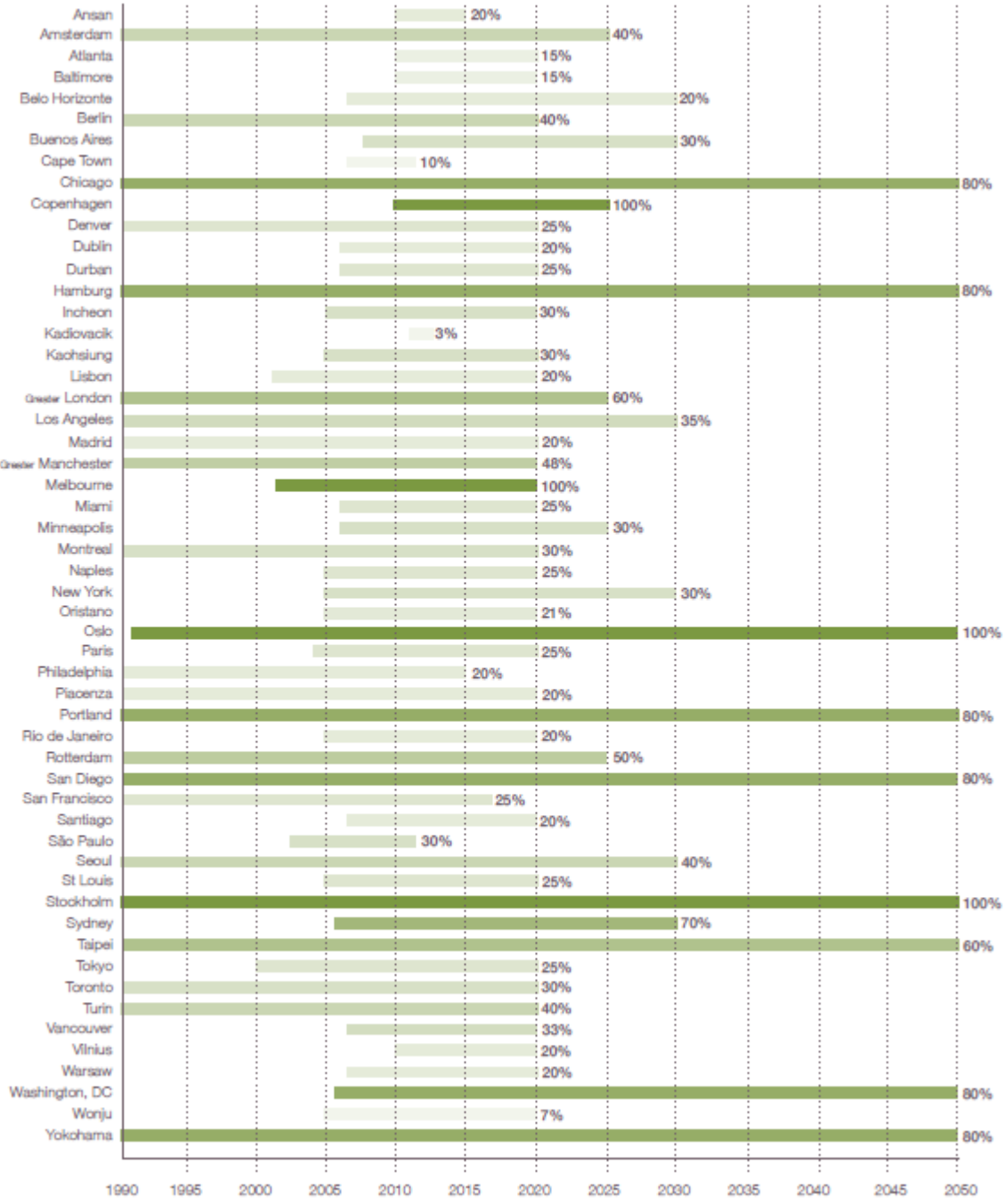


Pichler et al. 2017

Case study I: Feasibility study ‚Climate Neutral Berlin 2050‘

- Comissioned by Berlin Senate
- Lead PIK
- Various partners
- Scope: Political goal climate neutrality until 2050 (pre-Paris: 2 °K goal), questions
  - Is it possible?
  - Sectors?
  - Scenarios?

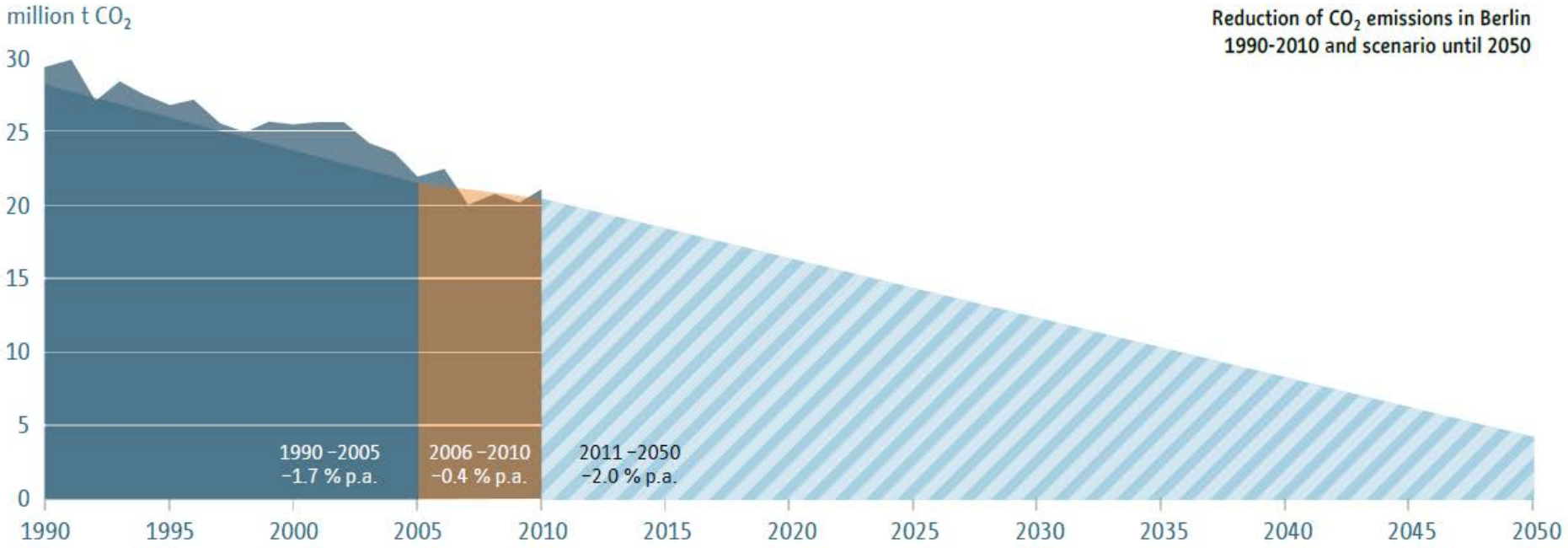
Climate-Neutral Berlin 2050
Results of a Feasibility Study

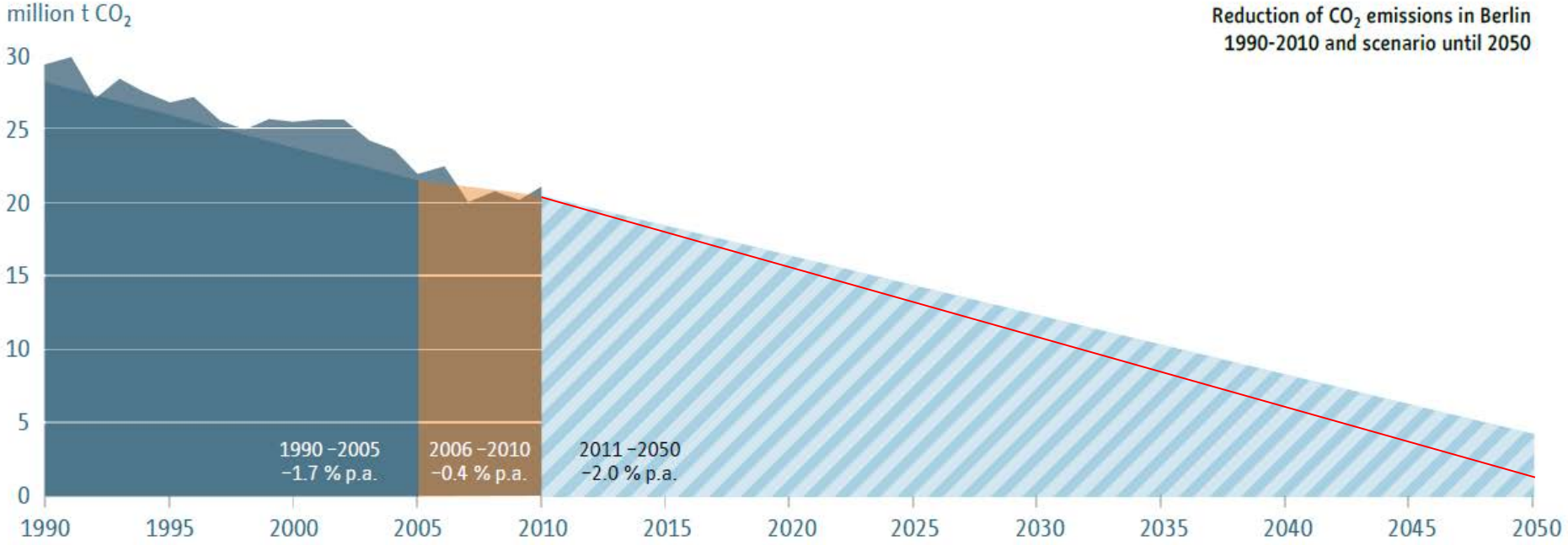

Ansan 20%
Amsterdam 40%
Atlanta 15%
Baltimore 15%
Belo Horizonte 20%
Berlin 40%
Buenos Aires 30%
Cape Town 10%
Chicago 80%
Copenhagen 100%
Denver 25%
Dublin 20%
Durban 25%
Hamburg 80%
Incheon 30%
Kadlovacik 3%
Kaohsiung 30%
Lisbon 20%
Greater London 60%
Los Angeles 35%
Madrid 20%
Greater Manchester 48%
Melbourne 100%
Miami 25%
Minneapolis 30%
Montreal 30%
Naples 25%
New York 30%
Oristano 21%
Oslo 100%
Paris 25%
Philadelphia 20%
Piacenza 20%
Portland 80%
Rio de Janeiro 20%
Rotterdam 50%
San Diego 80%
San Francisco 25%
Santiago 20%
São Paulo 30%
Seoul 40%
St Louis 25%
Stockholm 100%
Sydney 70%
Taipei 60%
Tokyo 25%
Toronto 30%
Turin 40%
Vancouver 33%
Vilnius 20%
Warsaw 20%
Washington, DC 80%
Wonju 7%
Yokohama 80%
1990 1995 2000 2005 2010 2015 2020 2025 2030 2035 2040 2045 2050


CO_2
BERLIN
-85 %
2050
COPENHAGEN
-100 %
2025
ROTTERDAM
-50 %
2025
NEW YORK
-30 %
2030
AMSTERDAM
-40 %
2025

CO_2 Emissions: Cities and countries

City	CO_2-Emissions		Country	CO_2-Emissions
Tokyo	65,9		Austria	66,9
New York City	54,3		Bangladesh	56,1
Moscow	44,6		Bulgaria	44,7
London	43,4		Ireland	40,0
Bangkok	42,7		Switzerland	39,0
Rotterdam	29,6		Angola	30,4
Paris	24,6		Tunisia	25,9
Berlin	20,7		Croatia	20,9
Hamburg	16,9		Bolivia	15,5
Delhi	15,4		Slovenia	15,3
Vienna	10,0		Luxemburg	10,8
Amsterdam	5,0		Paraguay	5,0
Stockholm	2,9		Mosambique	2,9
Copenhagen	2,5		Bahamas	2,5
Potsdam	0,87		French-Polynesia	0,9
Eberswalde	0,23		Central African Republic	0,26


million t CO_2
Reduction of CO_2 emissions in Berlin
1990-2010 and scenario until 2050
30
25
20
15
10
5
0
1990 –2005
–1.7 % p.a.
2006 –2010
–0.4 % p.a.
2011 –2050
–2.0 % p.a.
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050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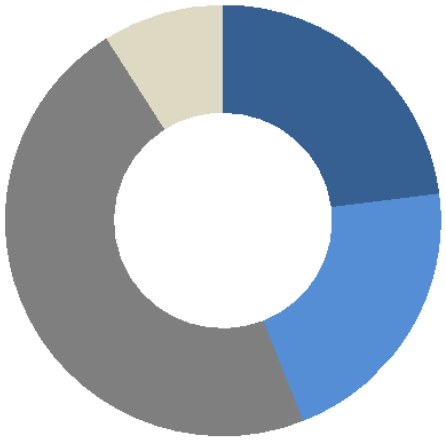
1990
1995
2000
2005
2010
2015
2020
2025
2030
2035
2040
2045
2050

Department of statistics

Private households:	41 %
Industry:	8 %
Services:	28 %
Traffic:	23 %

Our approach



Private households:	9 %
Buildings:	47 %
Economy:	21 %
Traffic:	23 %

Target scenario 1
The centralised, efficient city

Energy
- More CHP for electricity and district heating
- Strong PV roll-out
- Power-to-heat: 20 % central; less decentral

Urban development & buildings
- Moderate redensification
- Focus: inner city
- Open space maintenance
- Moderate refurbishment
- Constant living space per capita

Economy
- Big corporations dominate
- Strong individual companies

Private households
- Focus on technological efficiency (rebound)
- Smaller household sizes
- Eco-consumption mainly in leading social milieus

Traffic
- Private car still dominant, but no fossil fuels
- Slight increase in multi-modality (e.g. sharing concepts)
- Air travel: fossil share higher, more restrictions

Target scenario 2
The decentralised, cross-linked city

Energy
- Less CHP for electricity and district heating, more decentralised local heat networks
- Massive PV roll-out
- Power-to-heat: 20% central; more decentral

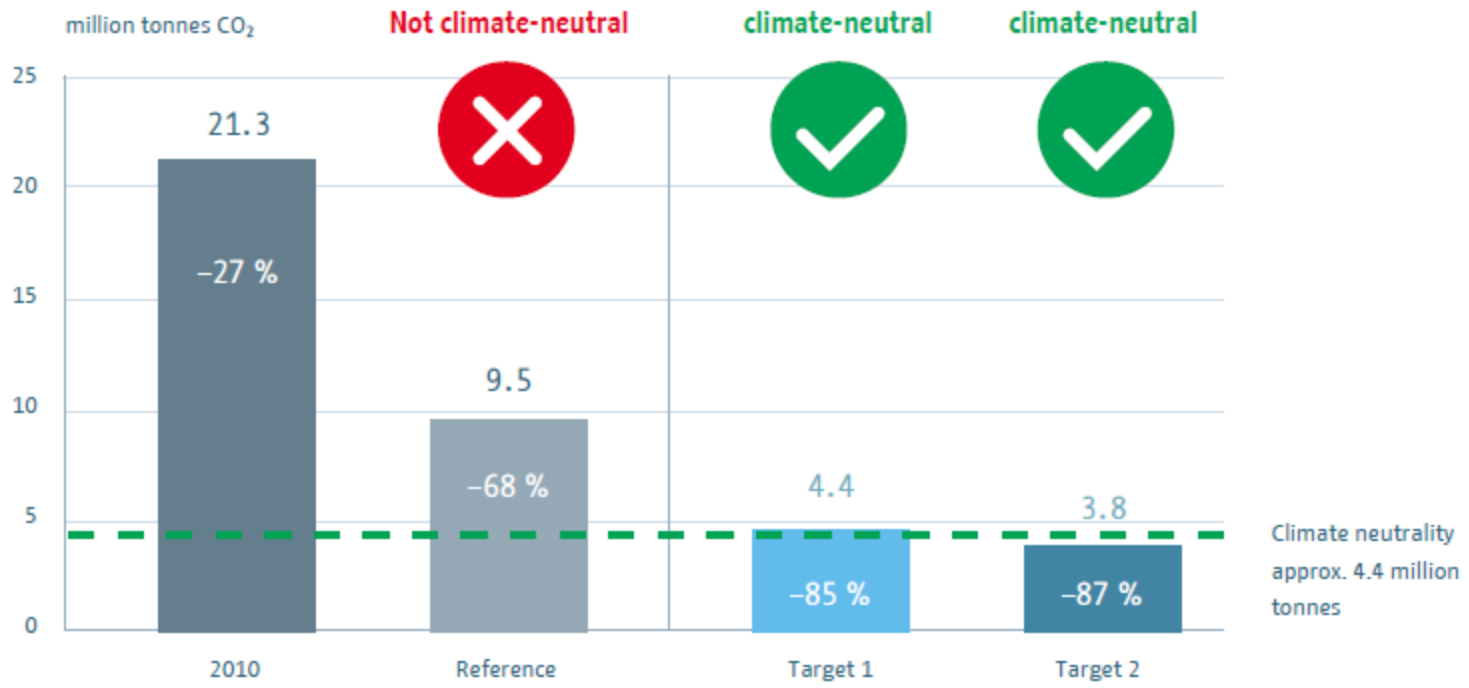
Urban development & buildings
- High redensification
- Focus: city-wide
- Open space quality campaign
- Thorough refurbishment
- Less living space per capita

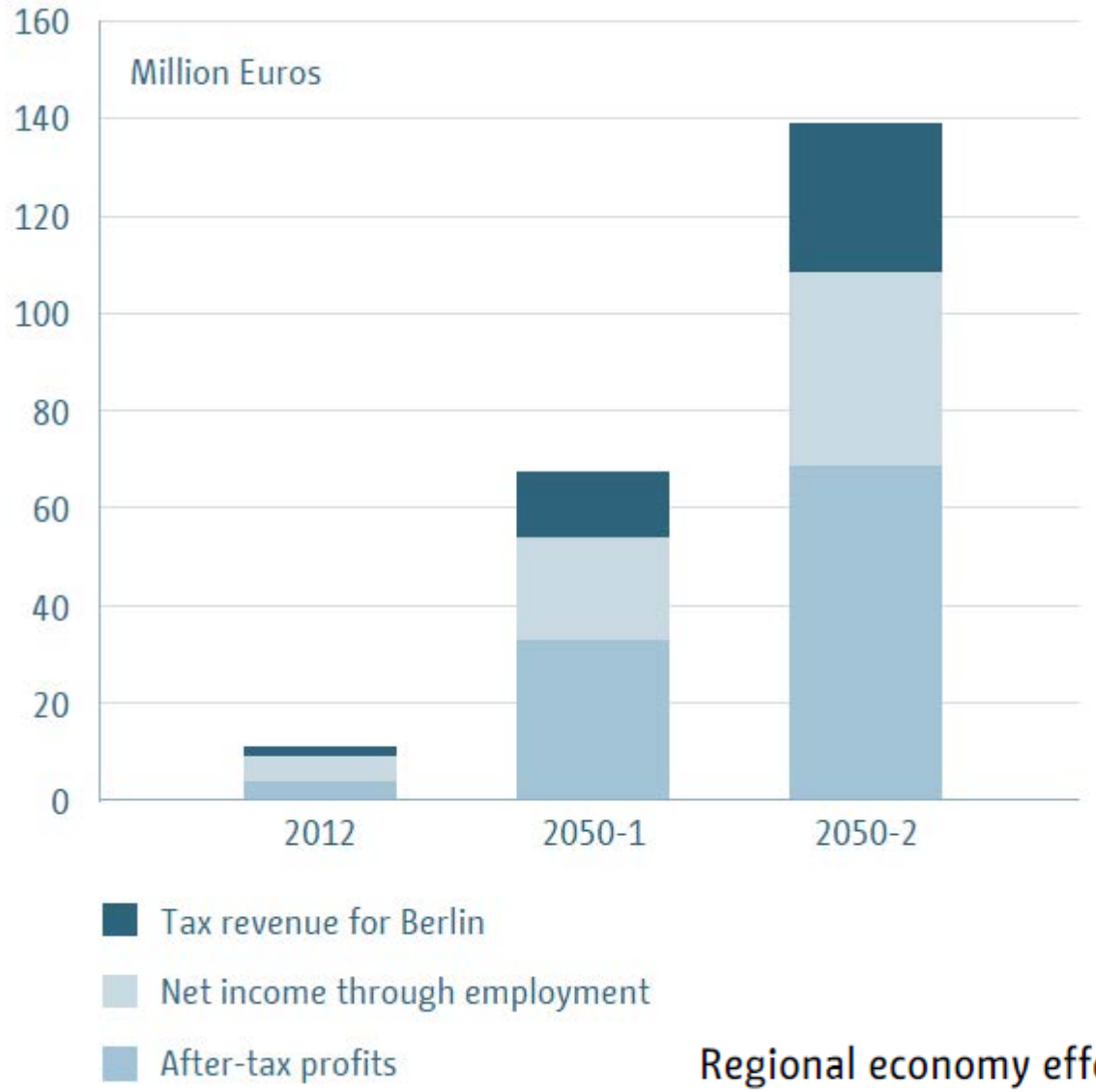
Economy
- SMEs dominate
- Strong corporate networks

Private households
- Technological and behavioural efficiency (no rebound)
- Larger household sizes
- Eco-consumption widespread in society

Traffic
- Private car less important, no fossil fuels
- Strong increase in multi-modality (sharing concepts very common)
- Air travel: fossil share lower, less restrictions

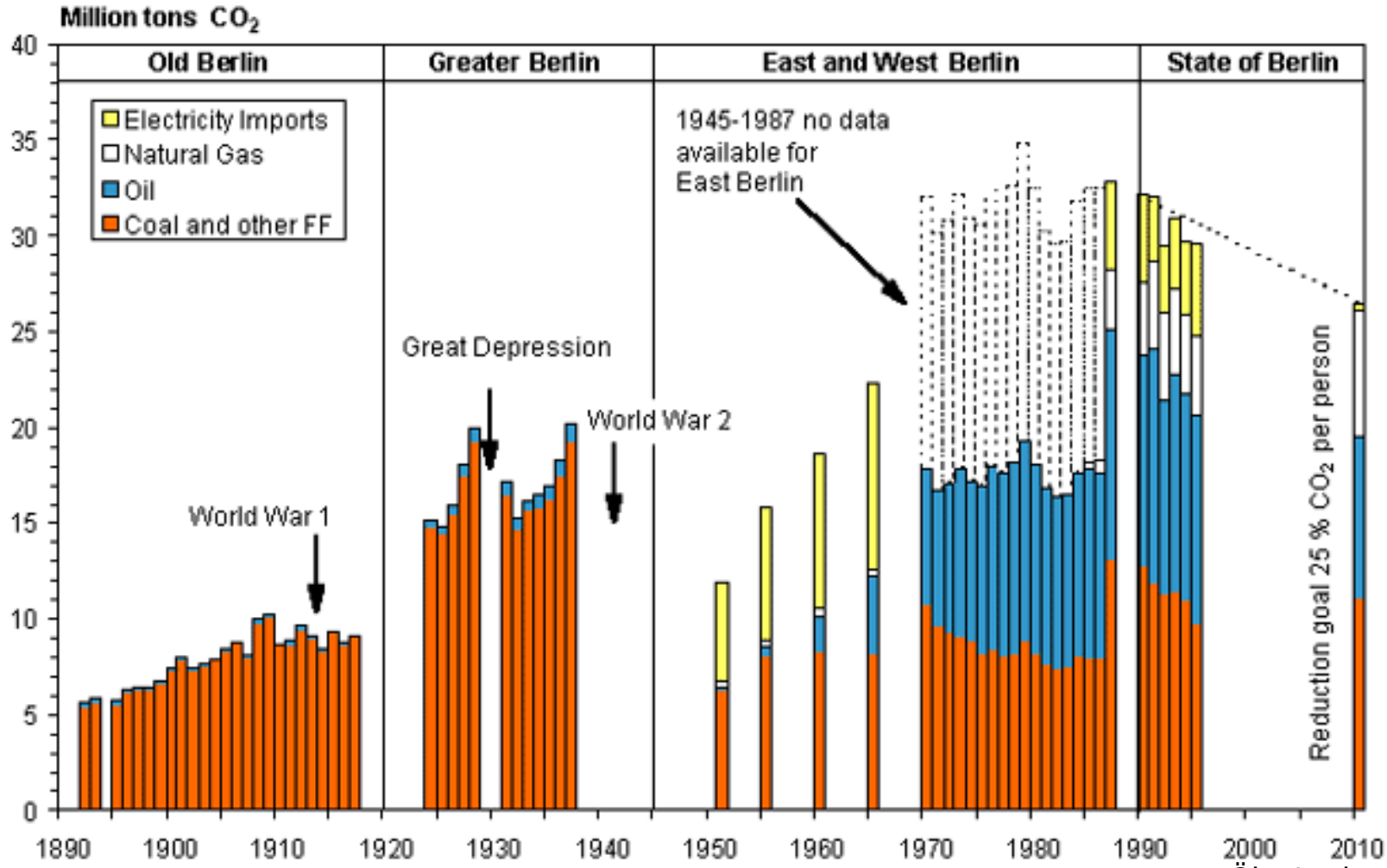
CO_2 emissions from final energy consumption according to consumption-based accounting in 2010, in the reference scenario and in the two target scenarios (reduction in % compared to 1990).





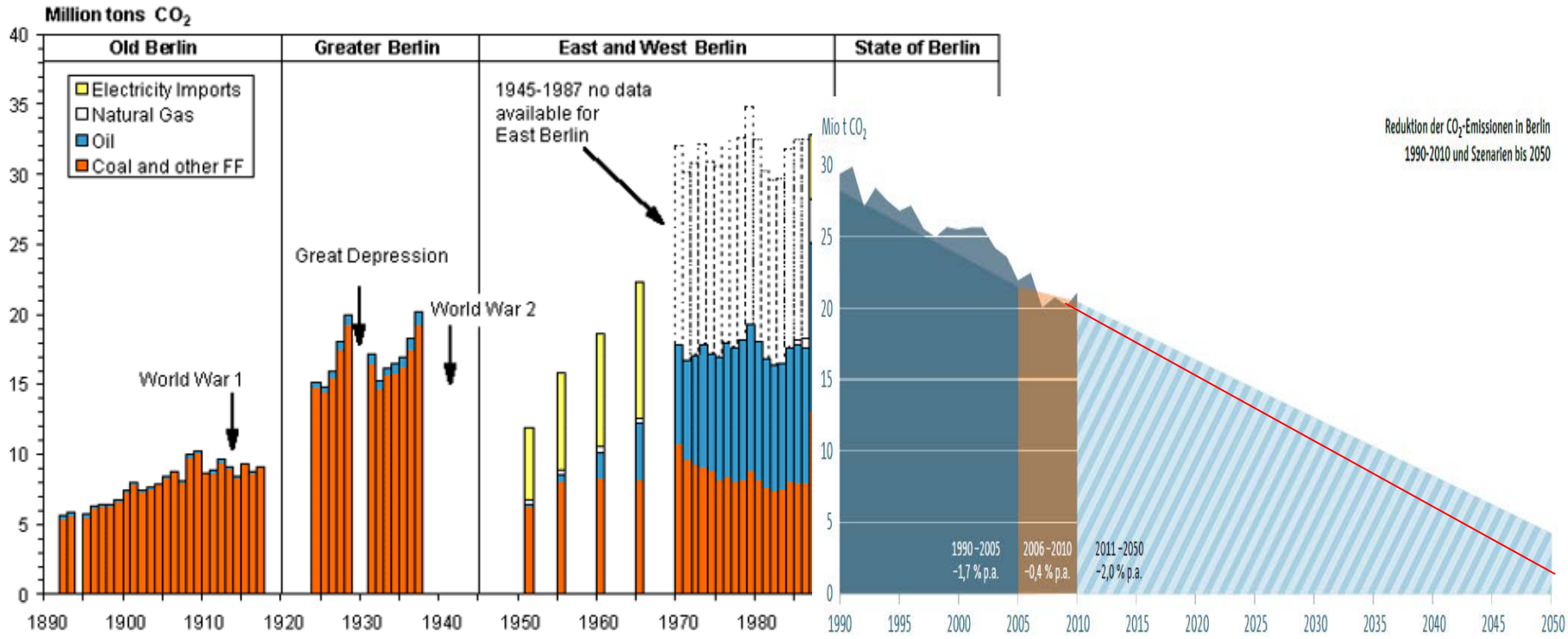
Regional economy effects of renewable energy in Berlin in 2012 (left) and 2050 (both target scenarios, right)

Emissions history Berlin



Öko-Institut 1994

Emissions history Berlin und climate neutrality goal



60 years

60 years

KliB in a nutshell

KLIMANEUTRAL LEBEN IN BERLIN

- **Climate friendly lifestyles**: 100 private households in Berlin try to voluntarily reduce their carbon footprints by about 40% within one year (2018).
- **Areas covered**: Heating, electricity, mobility (air travel, ground travel, food, other consumption, public consumption.
- **Core feedback instrument**: Carbon tracker (cf. UBA CO_2 calculator) based on products & services lifecycle assessments as a weekly monitoring tool. Display of results on website or mobile end devices.
- **Real-lab setting**: Organized as a socio-technical experiment (time, space) with interventions and monitoring. Real life conditions (no giveaways).
- **Core questions**: Possible? For whom? Why? Obstacles? Supporting factors?
- **Stakeholder Network**: Berlin enterprises and NGOs support households with their low-carbon products and services.
- **Policy Framing**: Context-aware project, addressing both the consumer and the citizen.
- **Continuity and upscaling**: Lessons learned; continuity for Berlin and upscaling for Germany are tasks of the project.

KliB Stakeholder network

Interventions

- Voluntary **reduction goals** in tracker
- **CO_2 saving tips** from KliB-Team
- **Product and service offers** from stakeholders
- **Consulting services** from partners (BUND, Verbraucherzentrale)
- KliB **Forum**: Communication among participants (peer-to-peer)
- **Community building** (peer-to-peer)
- KliB **Events & Discussions** with partners
- Focus groups on **climate policy preferences**
- **Mass media**

Ihr Profil

Website

Fritz, KLIB-Team

Fritz Reusswig, Soziologe am PIK, KliB-Projektleiter

Zufällige Haushalts-Steckbriefe

VERTRETER/IN	Carolin
PERSONEN	3
AUTO(S)	0
CO_2 BEI START	6602
CO_2 BEI HEUTE	5386

Wir sind eine kleine Familie im Friedrichshain. Wir lieben unseren Wochenmarkt und unseren Jahresurlaub auf Sardinien.

CO_2 Tracker starten

Fritz, KLIB-Team, dies ist ihr persönlicher *CO2-Tracker*. Bei Fragen schauen Sie ins Forum oder wenden Sie sich direkt an klib@pik-potsdam.de

KliB-Forum öffnen

Hier können Sie sich mit anderen Teilnehmenden und dem Projekt-Team des PIK austauschen. Das Forum ist nicht öffentlich, also nur für die KliB-Teilnehmenden zugänglich.

KliB bei Facebook

Hier geht es zu unserer *Facebook-Gruppe*. Sie haben dort die Möglichkeit, sich zum Reallabor auszutauschen.

12. Oktober 2018 - Klimapolitik, Nachrichten, News

Gerichtsurteile zum Hambacher Forst – KliB spricht mit dem BUND

"Was kann ich noch tun?" – KLIB-Haushalte melden sich zu Wort

In diesem neuen Format wollen wir in den verbleibenden Monaten des Reallabors Haushalte mit ihren Erfahrungen, Anregungen etc. zu Wort kommen lassen. Den Anfang macht Laura (Nickname im Projekt: Laburnam). Sie spricht eine Frage an, die uns gerade nach den Sommerferien schon von mehreren anderen Haushalten t… oder per Email gestellt wurde: Was kann ich noch tun?

Weiterlesen

14. September 2018 - Allgemein, KliB Haushalte, News, Tipps: Ernährung

"Superfood" – Exoten mit langer Anreise

Für viele Menschen gehören Mango, Goji-Beeren, Avocado und Chia Samen zum Alltag, doch wie wirkt sich unser Hunger auf exotische Nahrungsmittel auf die CO2 Emissionen aus?

Weiterlesen

12. Oktober 2018 - Allgemein, Klimapolitik, Nachrichten, News

Schlüsselsektor „Verkehr": Auf dem Weg zur fossilfreien Mobilität

Das Thema „Auto" ist in den letzten Tagen wieder in aller Munde. Die EU berät über neue Grenzwerte für den CO2 Ausstoß im Straßenverkehr und in Berlin wurden erstmals Diesel-Fahrverbote wegen zu hohem Stickstoffdioxid Ausstoß angeordnet. Klar ist: Um die Umwelt zu schützen, müssen in diesem Sektor schnellere und mutigere Schritte erfolgen!

KLIMANEUTRAL LEBEN IN BERLIN

Hallo Fritz, KLIB-Team, dies ist Ihre persönliche Ansicht der KliB-Website

Kategorien

- Frage & Antwort
- KliB Haushalte
- Klimapolitik
- Nachrichten
- Veranstaltungen

Newsletter

Melden Sie sich hier für unseren Newsletter an:

E-Mail

News

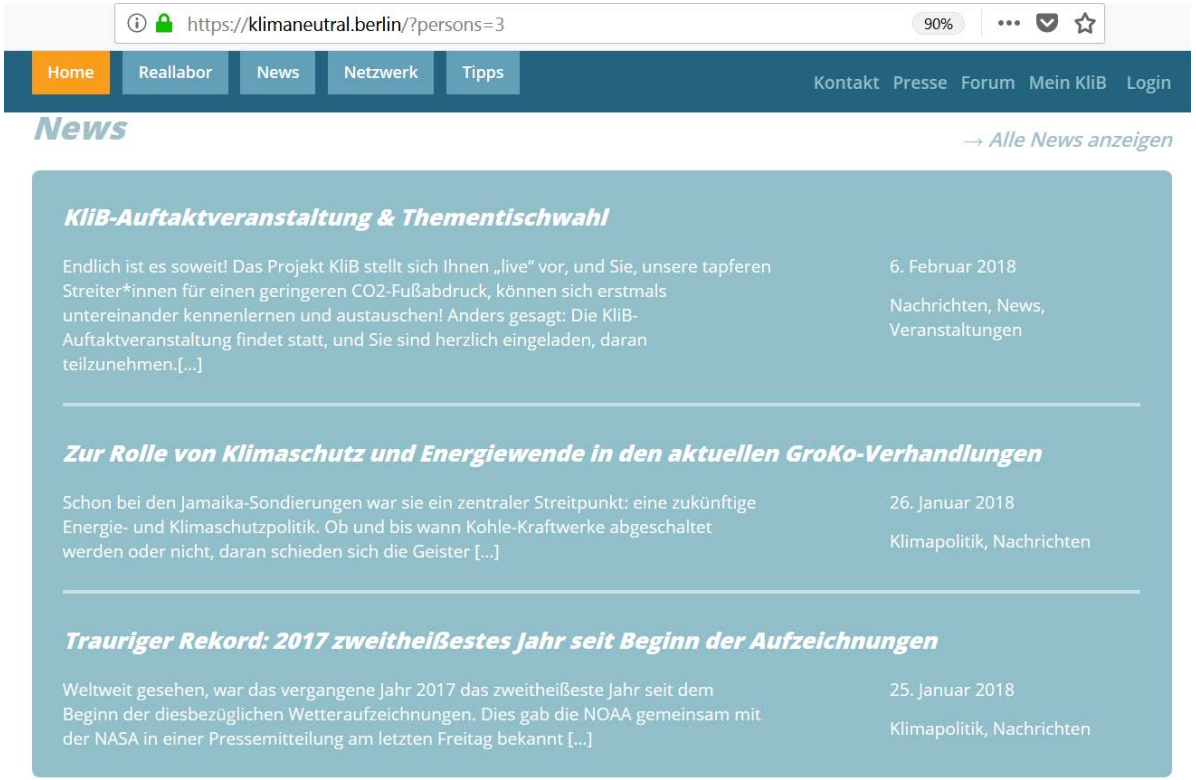
24. Februar 2018 - Klimapolitik, Nachrichten

Was ist eigentlich Bulk-Shopping?

Der Begriff des „Bulk-Shoppings" begegnet uns gegenwärtig an vielen Orten. Dabei besteht das Neue an diesem „Trend-Begriff" im Wesentlichen nur aus seiner englischen Sprachhülle und liegt nicht so sehr in der damit bezeichneten Tätigkeit selbst. [...]

Weiterlesen

KLIB-Newsletter as one form of intervention



Up to now: 8 newsletters (2 per month) with 4-8 contributions for all the housholds
Two special newsletters for „KLIB-frinds"

Bundesministerium für Umwelt, Naturschutz, Bau und Reaktorsicherheit
NATIONALE KLIMASCHUTZ INITIATIVE
ptj Projektträger Jülich Forschungszentrum Jülich

Current State, Day 255

- 152 active households, continuous weekly tracking: 61 households
- Drop-off rate: about 25 households
- Average Carbon Footprint: 6,8 tons p.c. (-17.6% against 2017 baseline, -41.4% against German average (11.6 t))

Community building


Klimapolitik
Thementisch
ERNÄHRUNG
Thementisch
Energie
Origami
Spiele
Eisbär-
höhle

KliB household distribution across Berlin districts

1. self-selection bias
2. urban bias

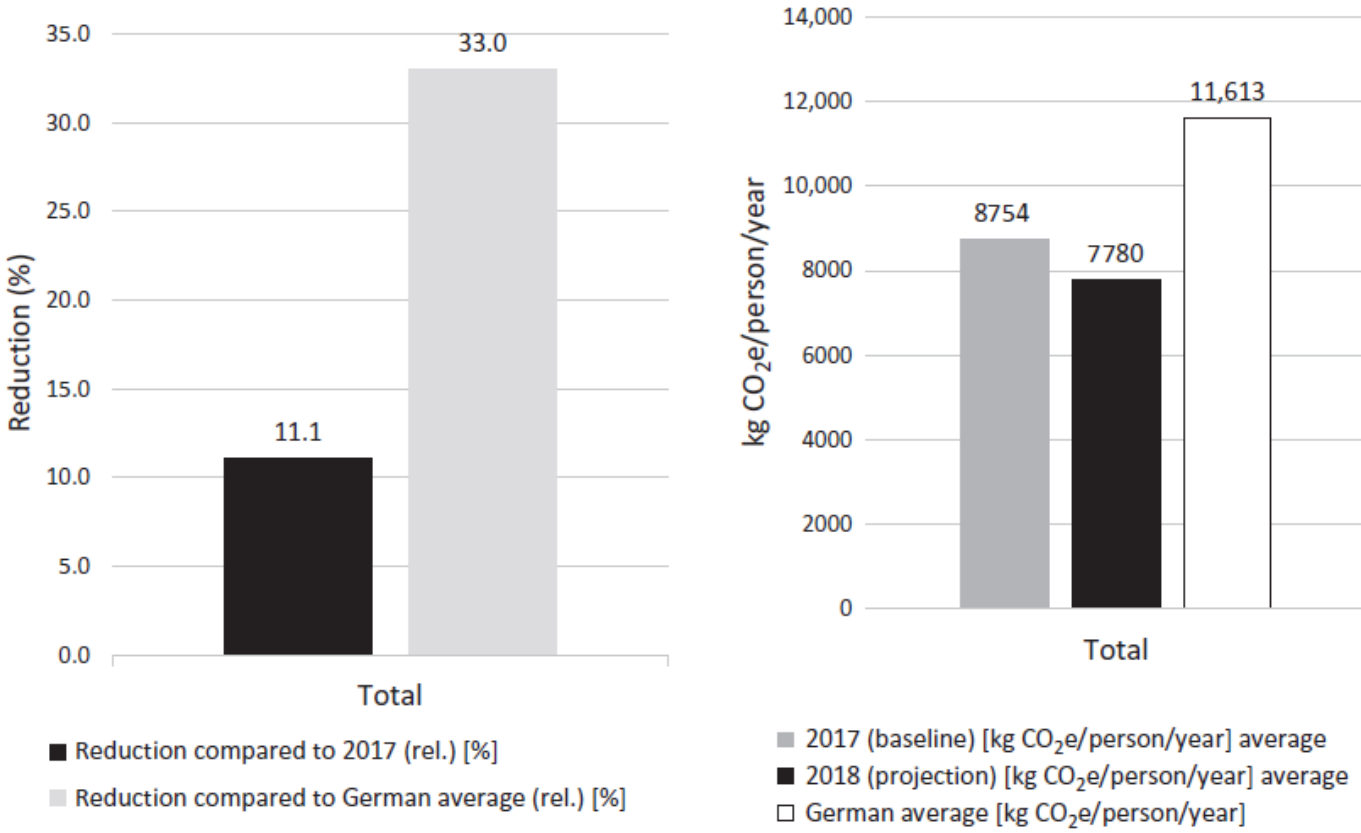


FIG. 1

Baseline (2017) and real-lab overall performance (2018) results of KLIB households in comparison with German average both in total (kg/cap) (*left*) and in relative numbers (percent) (*right*).

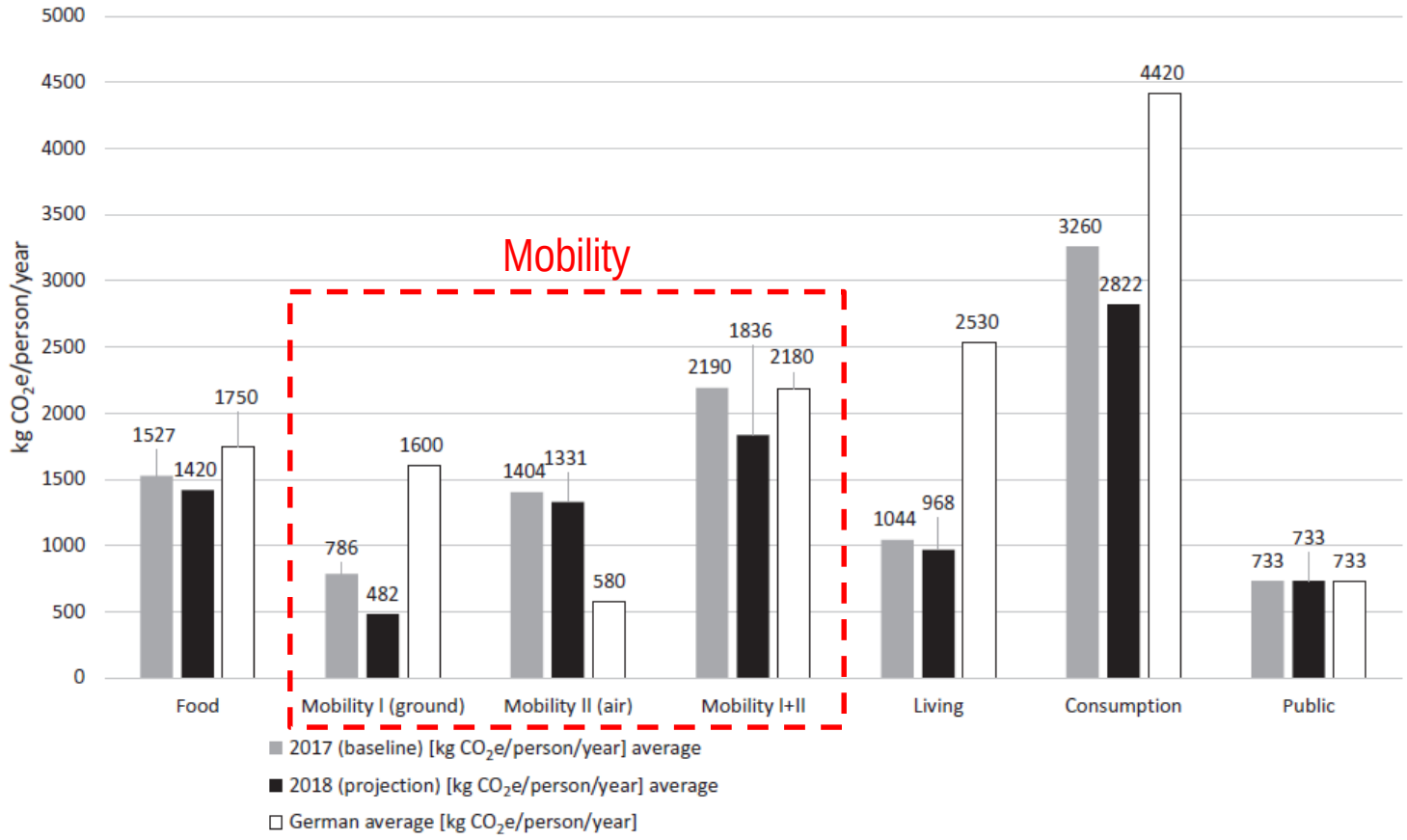


FIG. 2

Baseline (2017) and real-lab sectoral performance (2018) results of KLIB households in comparison with German average both in total (kg per capita).

Demonstrating ways for everyday low-carbon mobility

KLIMANEUTRAL LEBEN IN BERLIN

an analysis of the mobility patterns of urban household types with regard to emission reductions in a real-world experiment

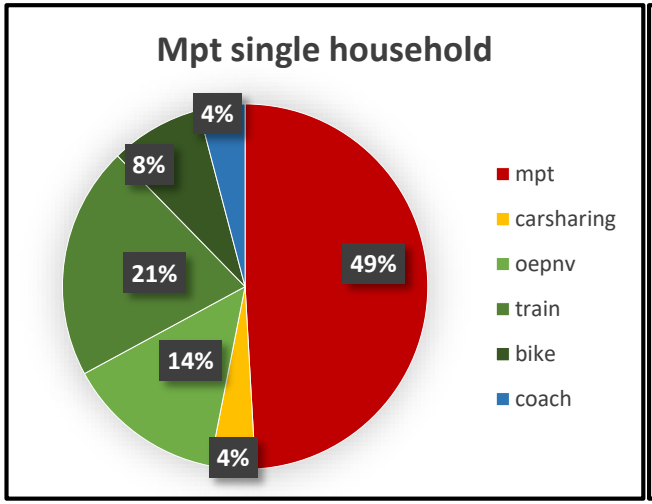
Max Juri Bäuerle, Student, Humboldt University Berlin,
max.juri.b@googlemail.com

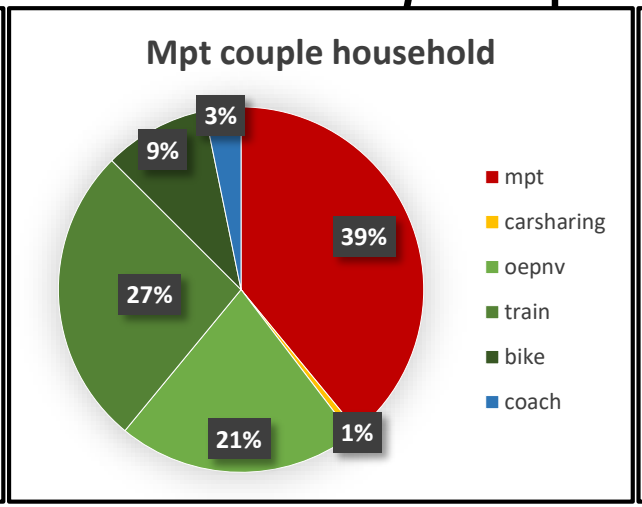
Preliminary results

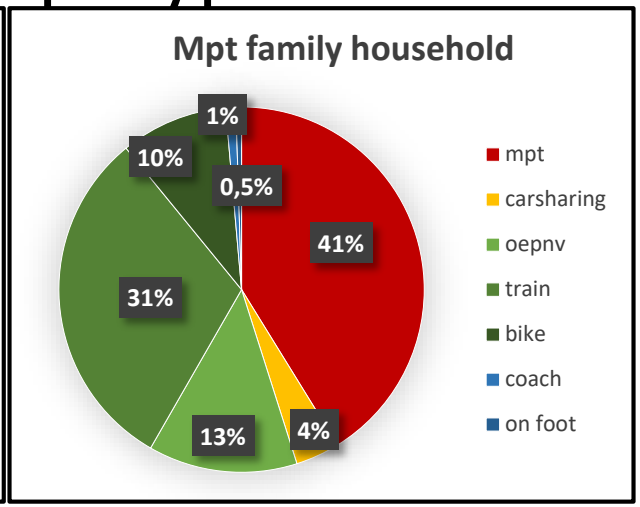
KLIMANEUTRAL LEBEN IN BERLIN

- **Household types:**

Modal split | Mpt types



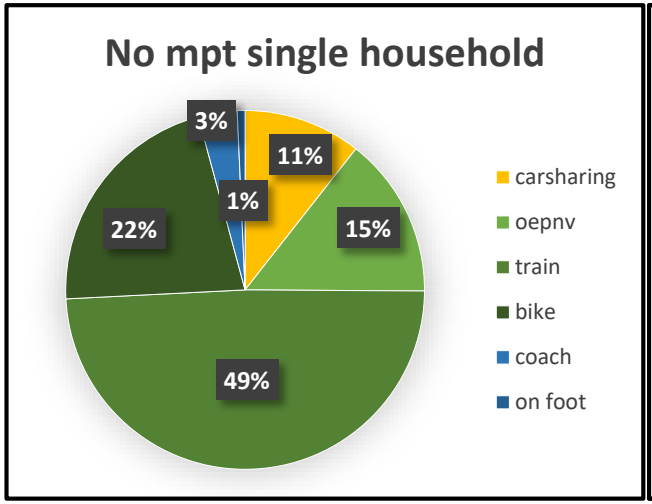


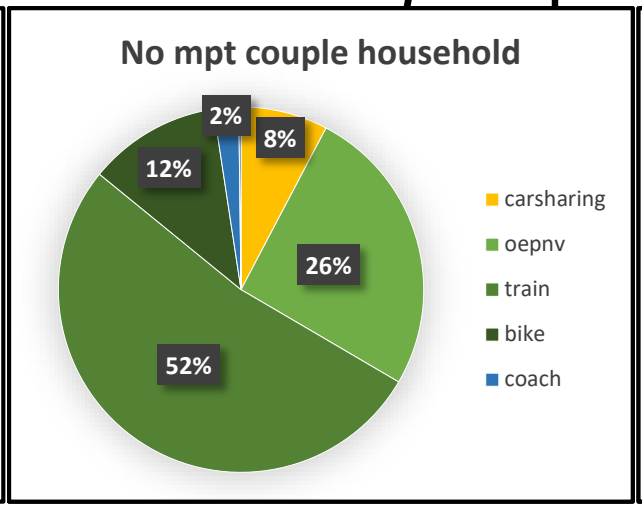


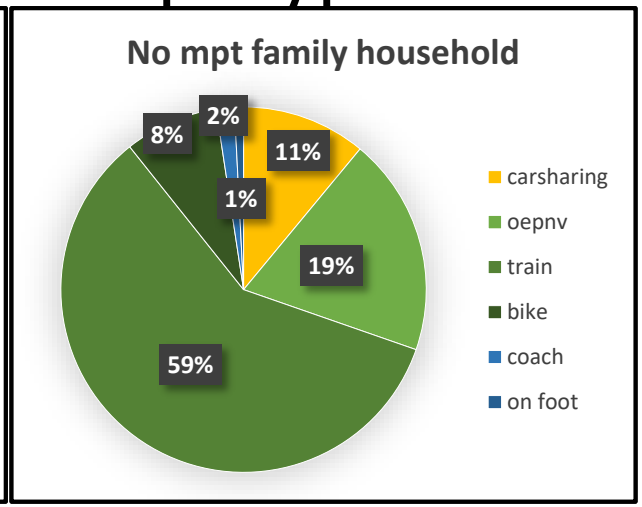
Preliminary results

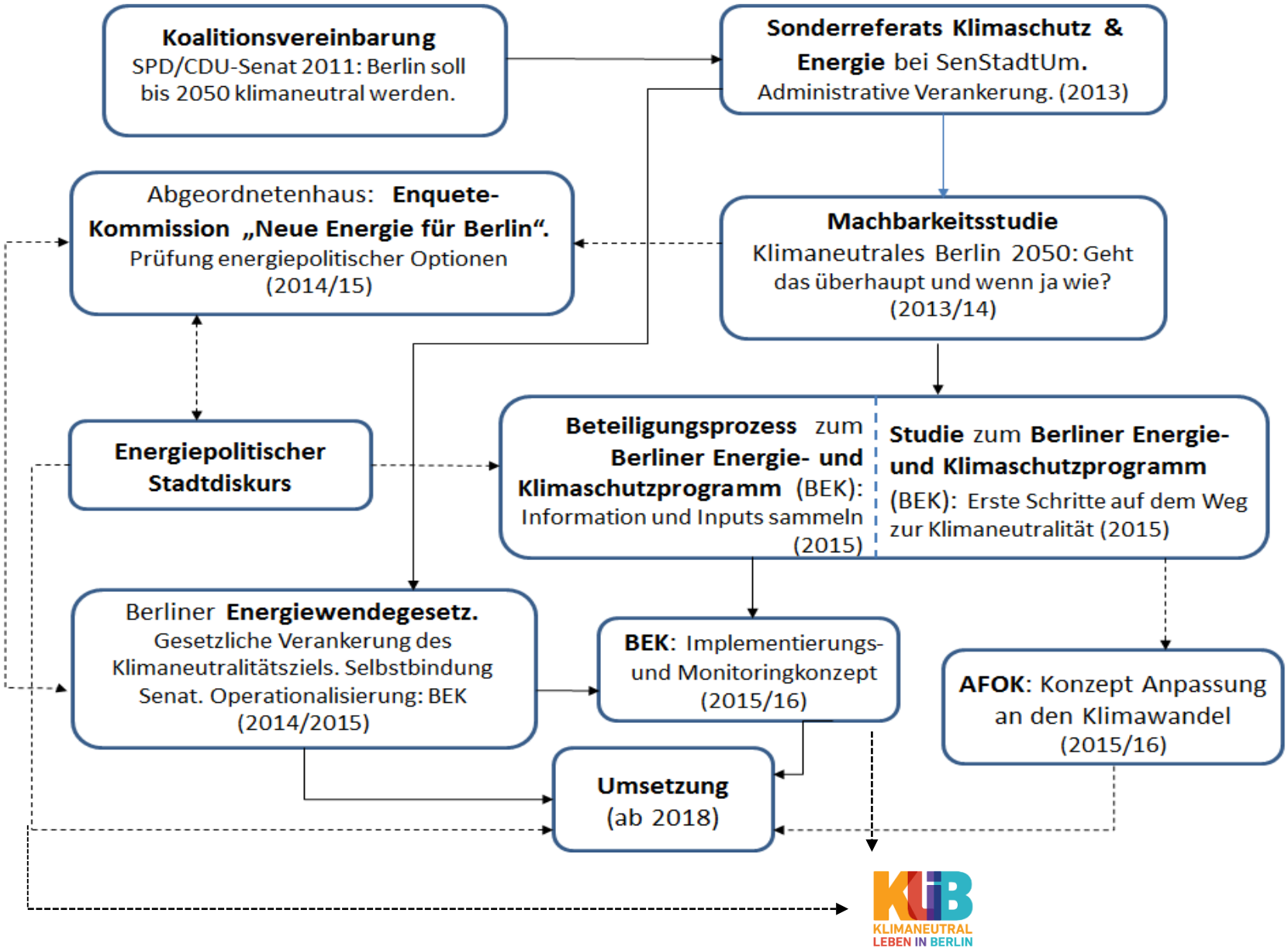
- **Household types:**

Modal split | **No** mpt types

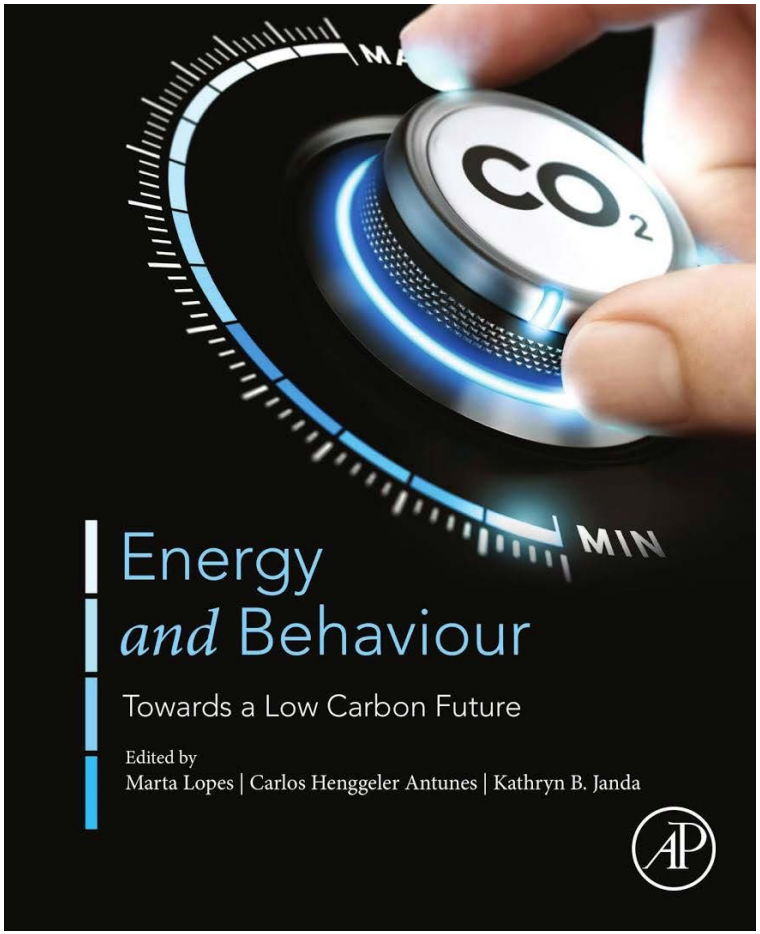







Koalitionsvereinbarung
SPD/CDU-Senat 2011: Berlin soll bis 2050 klimaneutral werden.
Sonderreferats Klimaschutz & Energie bei SenStadtUm.
Administrative Verankerung. (2013)
Abgeordnetenhaus: Enquete-Kommission „Neue Energie für Berlin“.
Prüfung energiepolitischer Optionen (2014/15)
Machbarkeitsstudie
Klimaneutrales Berlin 2050: Geht das überhaupt und wenn ja wie? (2013/14)
Energiepolitischer Stadtdiskurs
Beteiligungsprozess zum Berliner Energie- und Klimaschutzprogramm (BEK): Information und Inputs sammeln (2015)
Studie zum Berliner Energie- und Klimaschutzprogramm (BEK): Erste Schritte auf dem Weg zur Klimaneutralität (2015)
Berliner Energiewendegesetz.
Gesetzliche Verankerung des Klimaneutralitätsziels. Selbstbindung Senat. Operationalisierung: BEK (2014/2015)
BEK: Implementierungs- und Monitoringkonzept (2015/16)
AFOK: Konzept Anpassung an den Klimawandel (2015/16)
Umsetzung (ab 2018)
KLIMANEUTRAL LEBEN IN BERLIN

Thank you!



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