

ON THE DIFFERENT (URBAN, LONG-DISTANCE AND TOURISTIC) SIMULTANEOUS PATHWAYS TO MARKET FOR ELECTRIC PROPULSION

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TOC

- The „average car“ does not exist (anymore)
- Is the German goal (1 mio. EV in 2020) achievable?
- Market penetration model
- Importance of forecasting the micro/small car segment
- Conclusions

The average car does not exist (anymore)

- Car market in OECD countries: saturated > diversification
- More car size/type segments
- Higher spread of relative power
[rated kW per tonne curb weight]
- Higher spread of sales prices [factor 5]
- Past:
large engines in large cars, small engines in small cars
- Present: Many car models with huge variety of engines

Example Germany: 1 million EV on the road in 2020?

- Phase 2010–2015: Only few suppliers with limited production capacities. Strongly supply-limited market; vehicles for demonstration projects not operating 2020
- How long will it take for the first 1 million EV to be produced worldwide?
- Phase 2016–2020: More electric vehicles being available in higher production numbers
- 1 million electric cars have to be sold 2018 – 2020
- Electric car market share in 2020 would have to be 19%

Market penetration simulation results

Switzerland 100'000 EV in 2020
(= analogous to German goal)

Example Swiss car market, 100'000 EV on the road in 2020

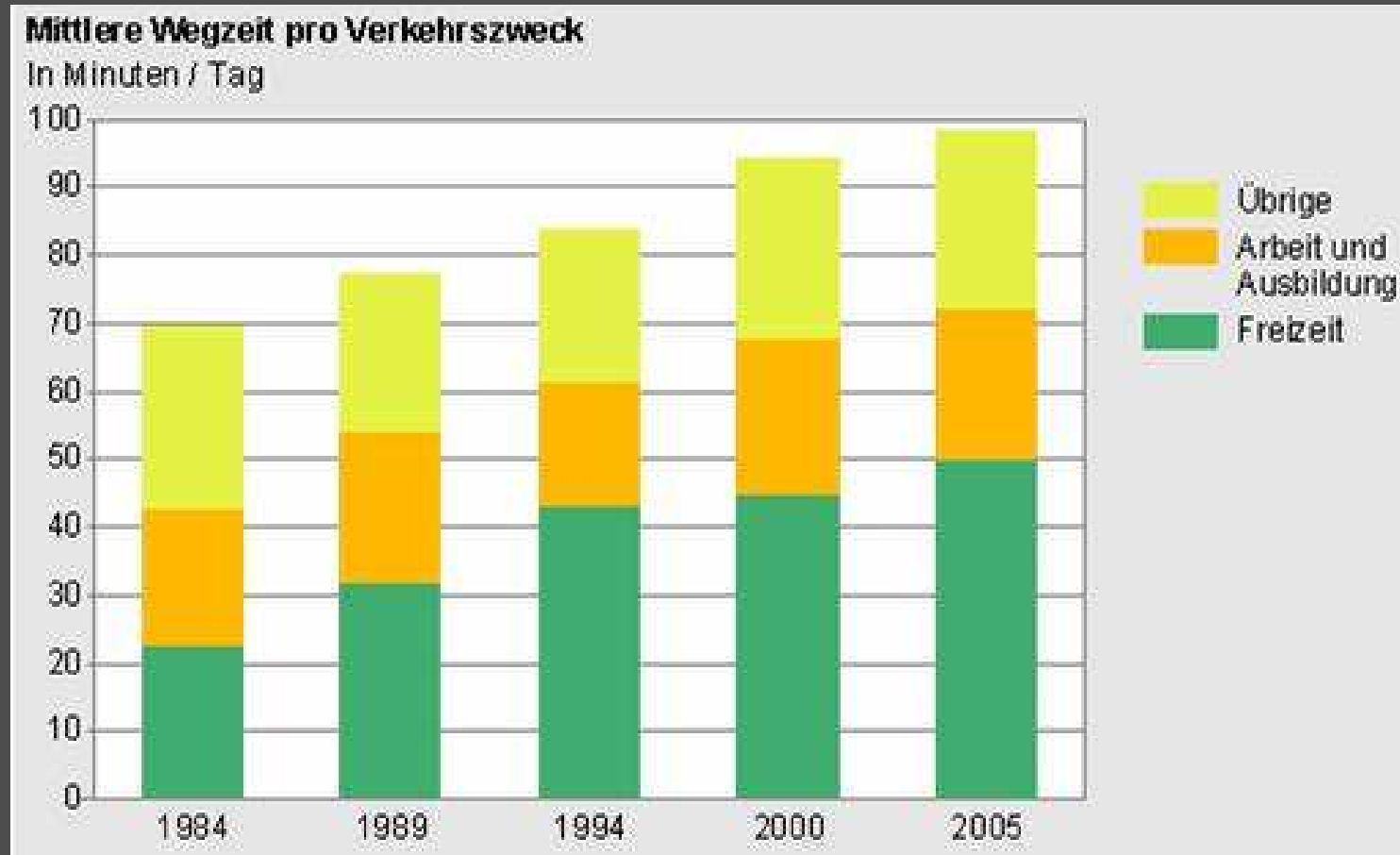
year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	tot. newreg 2010-20	on road in 2010
total fleet	4.1	4.2	4.2	4.3	4.4	4.4	4.5	4.6	4.6	4.7	4.8		
# new reg.	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3		
EV city	39	81	168	346	702	1'422	2'879	5'817	11'453	22'463	43'864	89'232	72'309
EV full	0	1	3	11	45	141	392	1'026	2'863	7'488	18'798	30'768	27'691
EV total	39	82	171	357	747	1'563	3'271	6'843	14'316	29'951	62'662	120'000	100'000
%newreg	0.01%	0.03%	0.06%	0.1%	0.2%	0.5%	1%	2%	4%	9%	19%		

Discussion

- Electric market share **annual** growth of **109%** needed
 - But: Electric cars in 2020 will still be outperformed by improved conventional ICE cars in terms of costs, range, driveability.
- 19% over-all electric market share in 2020 appears **high**
- But: 19% of *which* market?
Is it composed like today's market?
Or will there be a higher share of micro/small-sized cars, where electric propulsion **is** highly competitive?

Trends in mobility behavior

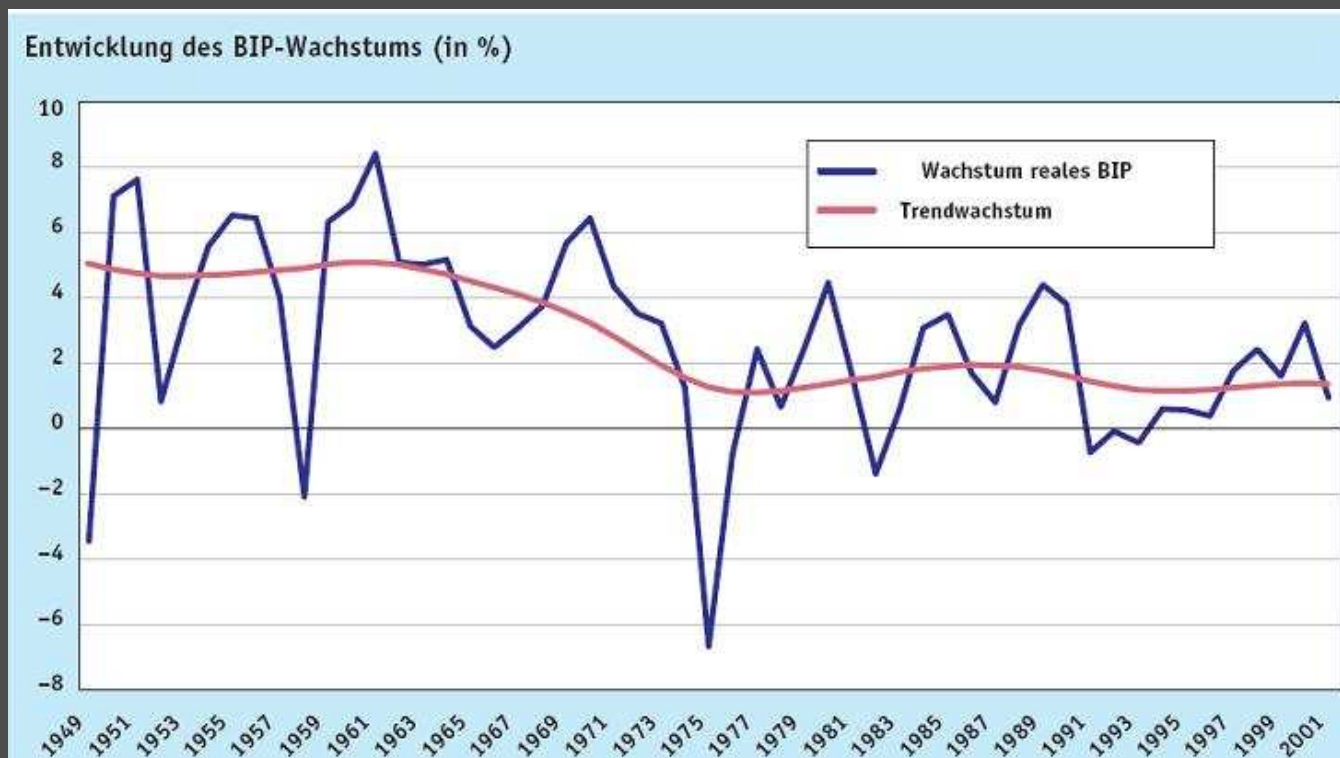
- More time spent on the road.
Increase fully due to recreational activities.



Economic trends

- Lower average annual GDP increase

2000–2010	2010–2020	2020–2030
1.4	1.0	0.5



Other trends relevant for increase of micro/small car segment

- EU 130 g strategy: OEMs bring new micro/small car models to market in an effort to enlarge the market (selling more small cars in order to meet the 130g target)

- Sociodemographics:
 - > Increasing rate of multi-car households
 - > Increasing rate of single-person households
 - > Increasing rate of retired persons

- Increase of energy prices

- Behavior: Trend „walking > bike > e-bike > e-car“?

Disaggregated car market modeling: Inputs

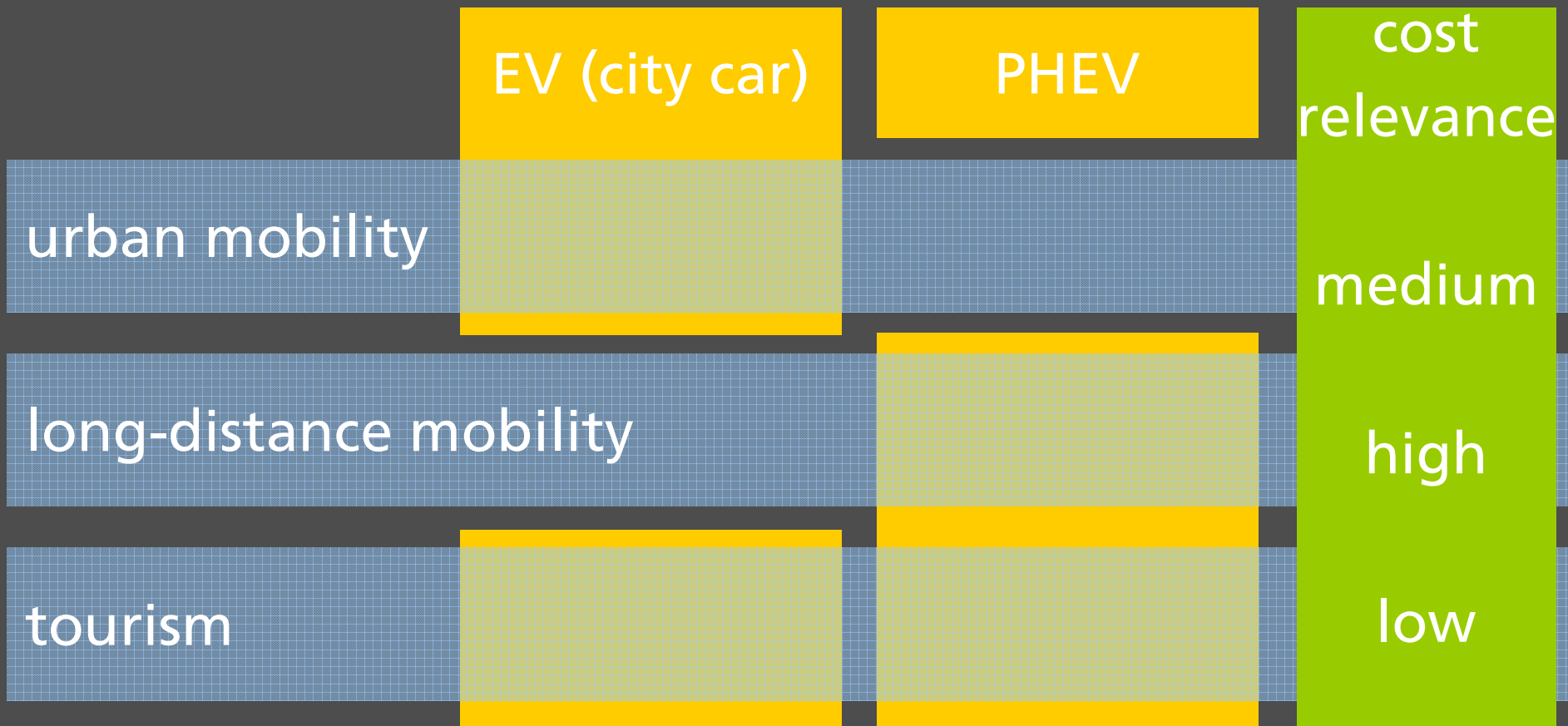
year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
#persons/hh	2.95	2.93	2.92	2.90	2.89	2.88	2.86	2.85	2.84	2.83	2.81
1 car hh	66%	65%	65%	64%	63%	63%	62%	61%	60%	59%	59%
2 car hh	27%	28%	28%	29%	29%	30%	30%	31%	32%	32%	33%
3+ car hh	7%	7%	7%	7%	7%	8%	8%	8%	8%	8%	8%
# car /hh	1.4287	1.4373	1.446	1.4549	1.464	1.4733	1.4828	1.4924	1.5023	1.5123	1.5226
# of cars per 1000 inhabitants	485	490	496	501	507	512	518	524	529	535	541
% of cars in multi-car households	54%	54%	55%	56%	57%	58%	58%	59%	60%	61%	61%
km/cap (*1000)	12.407					12.347					12.403
km/car (*1000)	23.61					22.437					21.311

Results from disaggregated modeling

- Increase of % of cars going into multi-car households (54% > 61%)
- Decrease of average km per car (−9.7% from 2010 to 2020)
- Increase of share of recreational trips (44% > 59%)
- ➔ micro/small car segment will grow from 18% to 28% (making an overall electric market share of 19% achievable)

- Annual growth of market share of electric propulsion *per market segment* ca. **50%** (instead of 109%)
Rest due to growth of market segment.

Three parallel pathways of e-cars to market



Conclusions

- Three pathways: city cars;
premium segment (e.g. tourism);
[PHEV >] full size EV
- EV market penetration: account for different market segments (car size / customer)
- Disaggregated market model
- German „1 million EV in 2020“ goal might be achievable
- Forecast of micro car segment essential for predictions on EV market penetration.
Drivers: multi-car households, sociodemographics, mobility behavior