EV adoption, how fast can it go?

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EVCONSULT
experts in sustainable mobility

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- A team of 15 consultants with various academic backgrounds
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- Strategy consultancy, project management research & innovation
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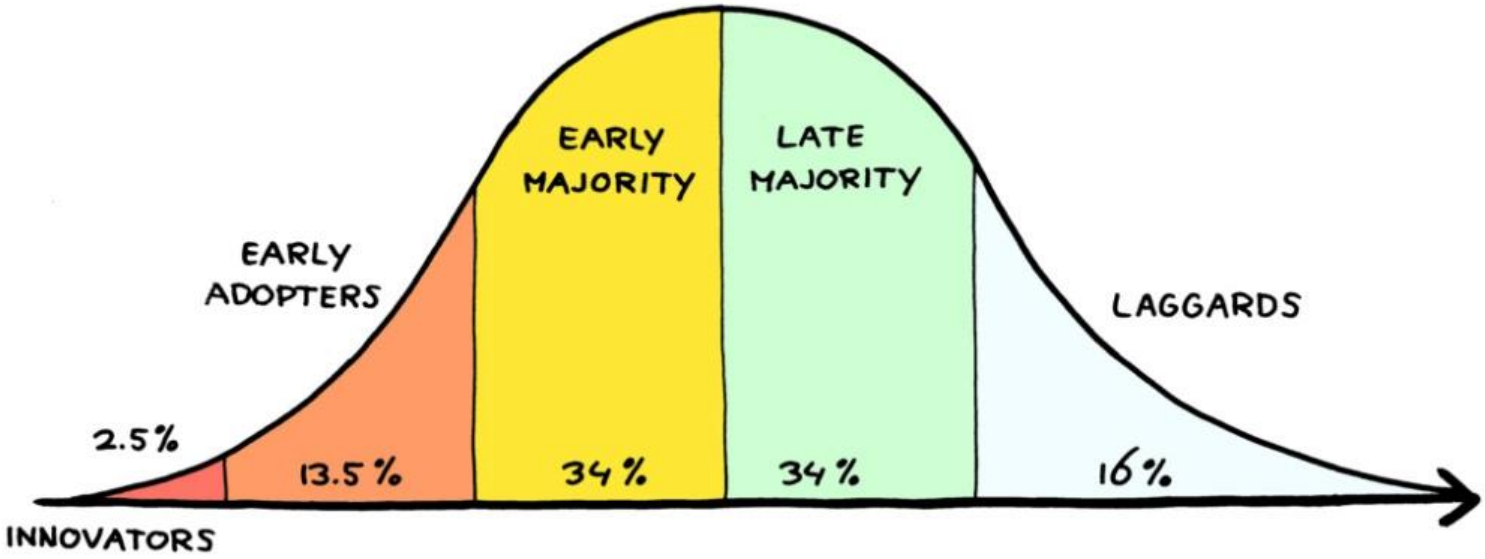
EV adoption requires financial attractiveness



SparkCity models financial attractiveness based on TCO

Fuel costs	**Maintenance costs**	**Vehicle class**	**Residual value**
Fuel efficiency	**Purchase subsidies**	**Luxury level**	**Battery capacity**
Yearly mileage	**Tax rebates**	**Vehicle power**	**Battery pack costs**
Income	**Lease or private**	**Discount rate**	**Ownership period**

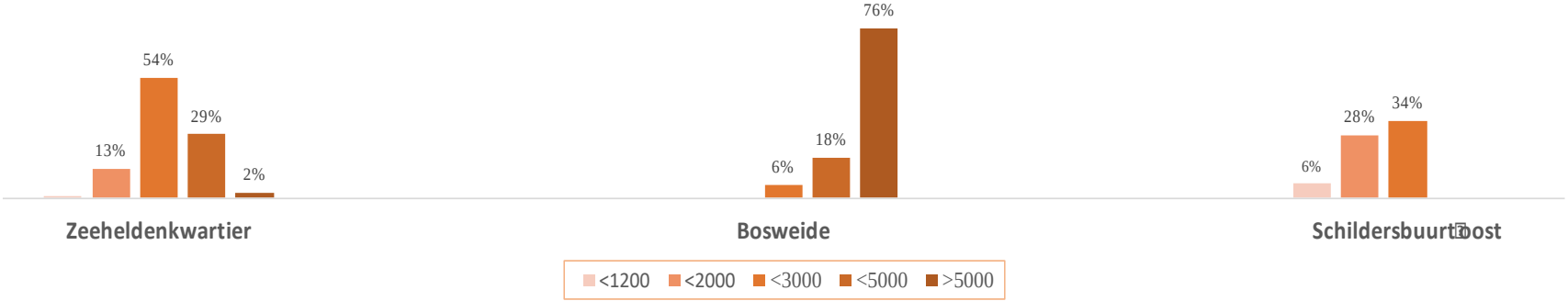
Total Cost of Ownership (TCO)

The power of agent-based simulation lies within modeling heterogeneity

Real neighborhoods have different characteristics

SparkCity switches easily between neighborhoods

Income distribution per neighborhood



Income level says a lot about buyer and driver types

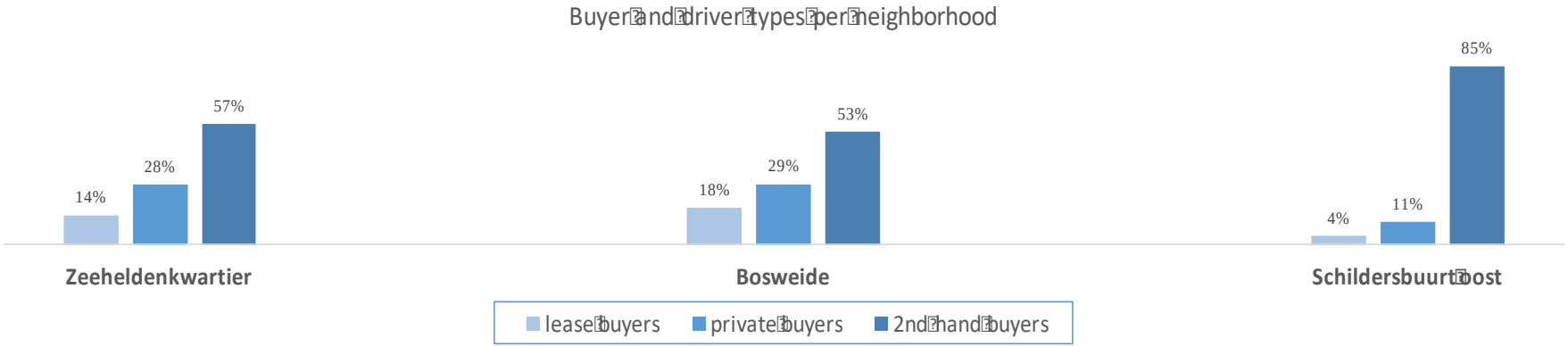
Monthly Income

Buyer type	**Lease buyer** 14%, avg 25.000 km/year 4 years ownership	**Private buyer** 29%, avg 20.000 km/year 8 years ownership	**2nd hand buyer** 57%, avg 10.000 km/year 10 years ownership
Class preference	A class	C class	E class

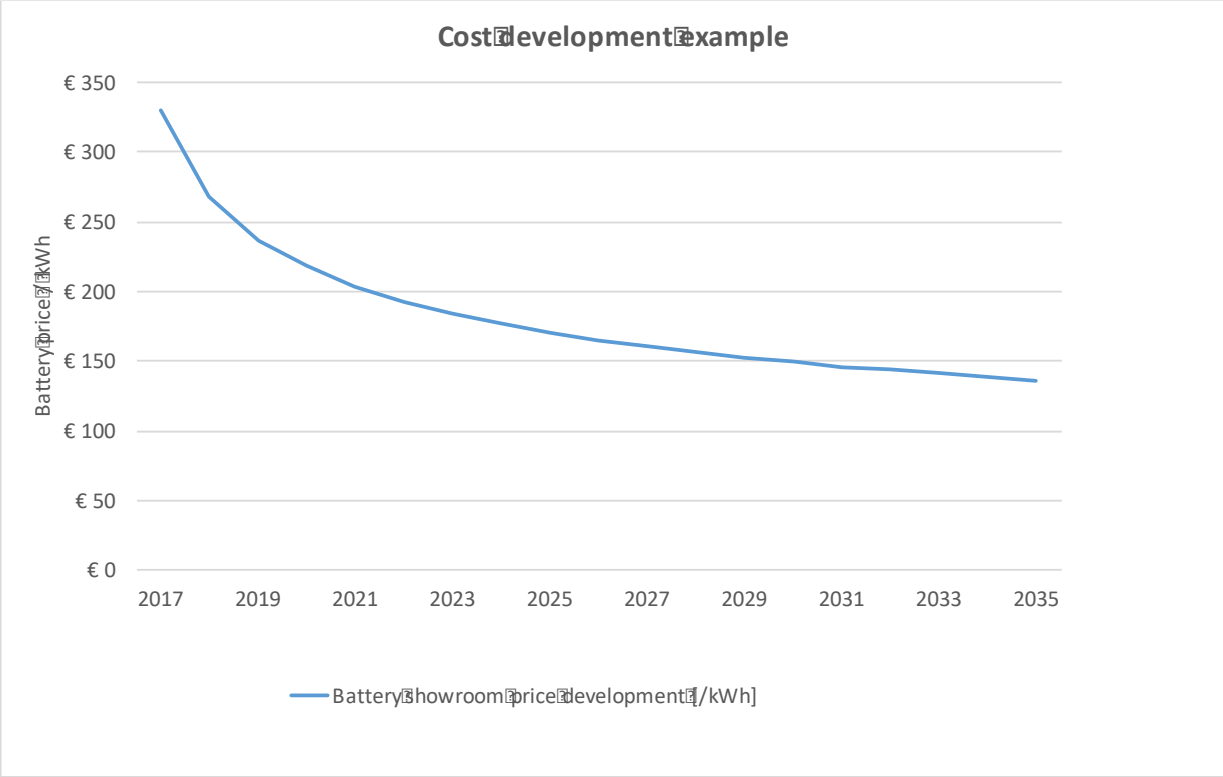
Sources: CBS, focus group discussions

Real neighborhoods have different characteristics

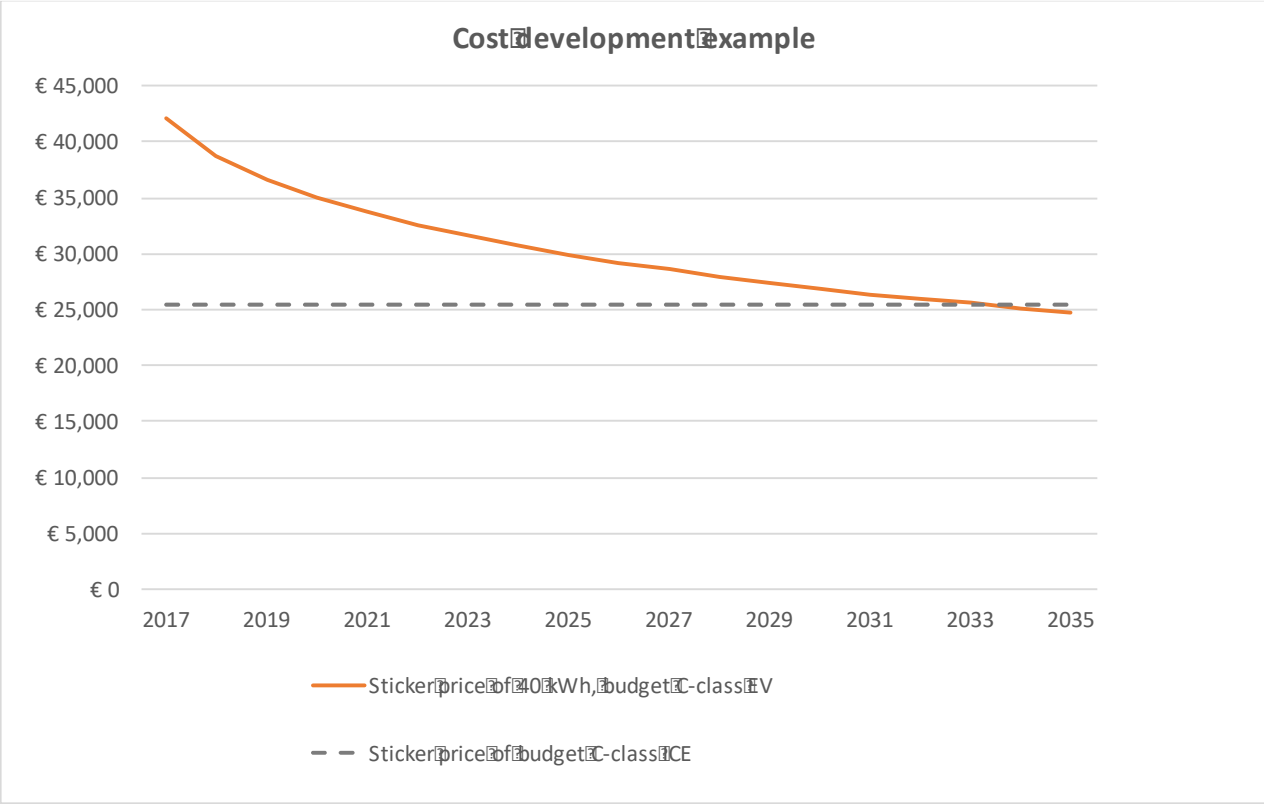
SparkCity switches easily between neighborhoods



Cost developments for battery and drivetrains are modelled



Sticker price of EVs reduces over time



TCO = sticker price + operation costs – residual value - subisides

The buying process consists of four steps

Step 1:
A resident requires a new vehicle

Step 2:
The resident determines its preferences and characteristics

Step 3:
The resident calculates the TCOs of the ICE and EV fitting its preferences

Step 4:
The resident purchases the option with the lowest TCO

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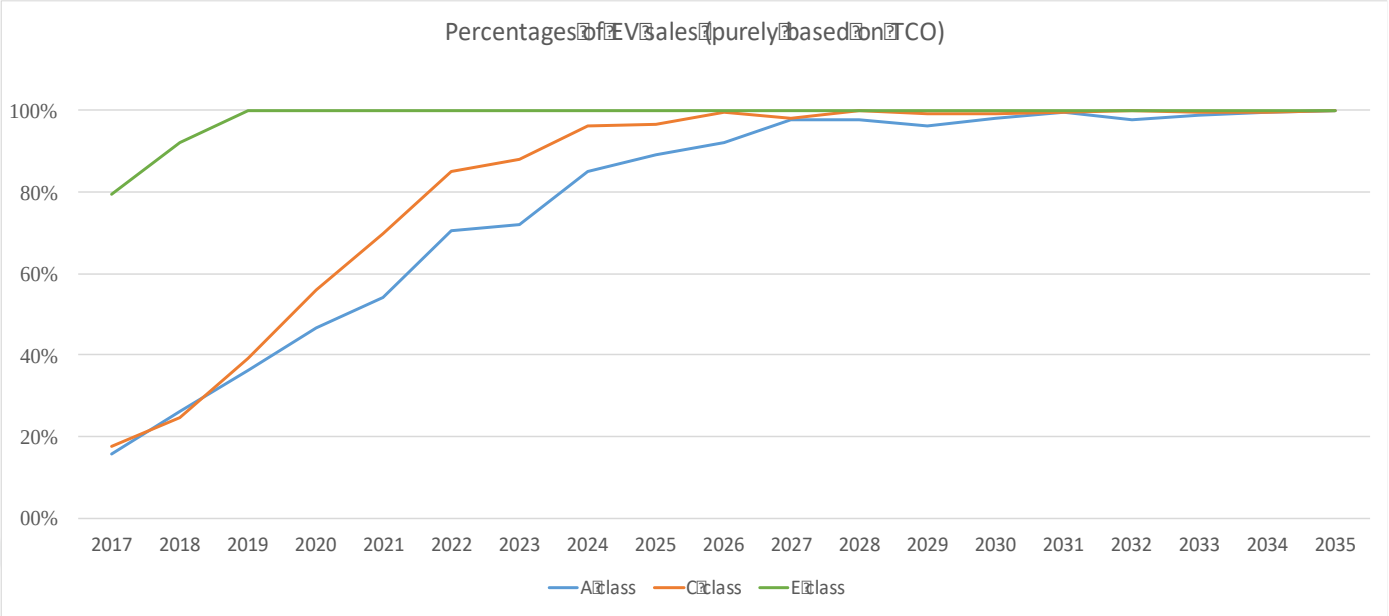
Cost-parity differs per vehicle class

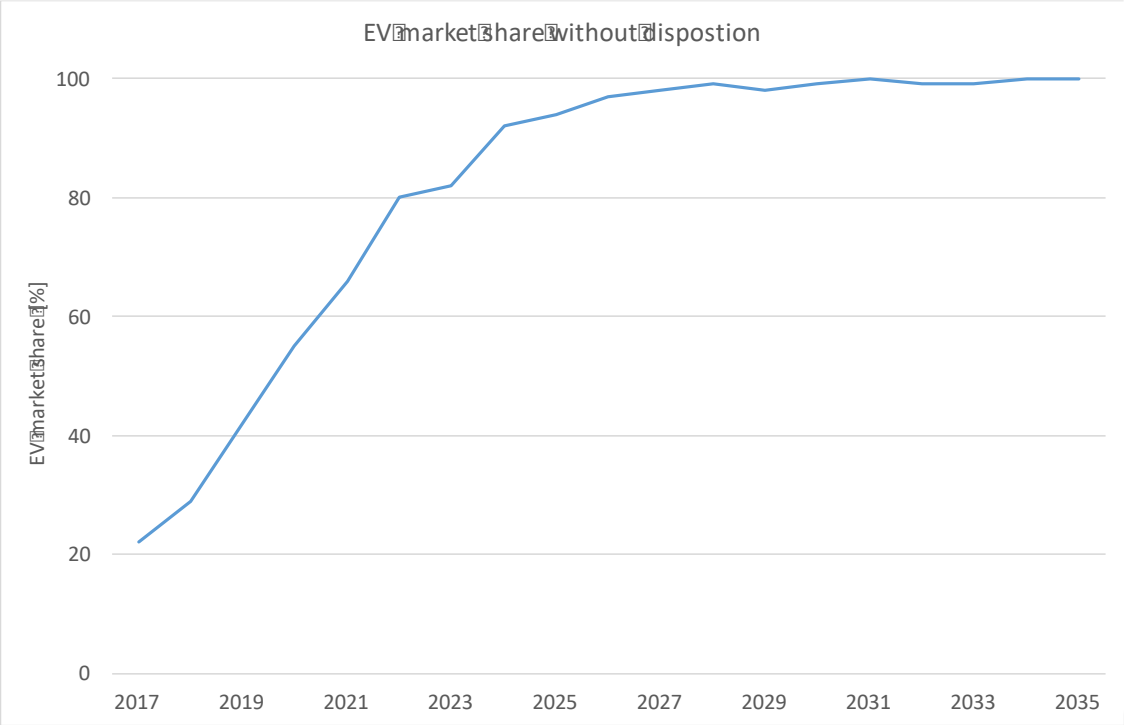
- 6000 car buyers simulated in a neighborhood resembling Dutch characteristics

Cost parity

A-class: 2027
C-class: 2024
E-class: 2019



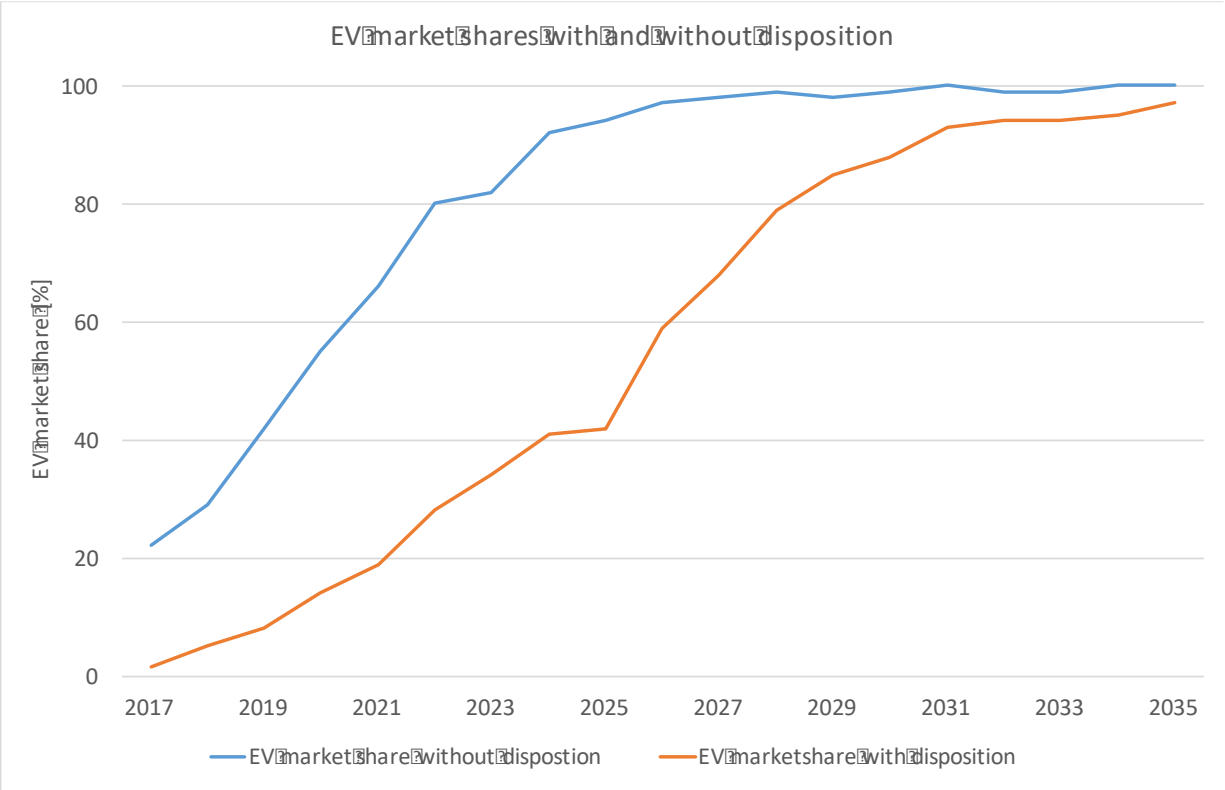
A ‘disposition’ is implemented to correct for non-financial factors



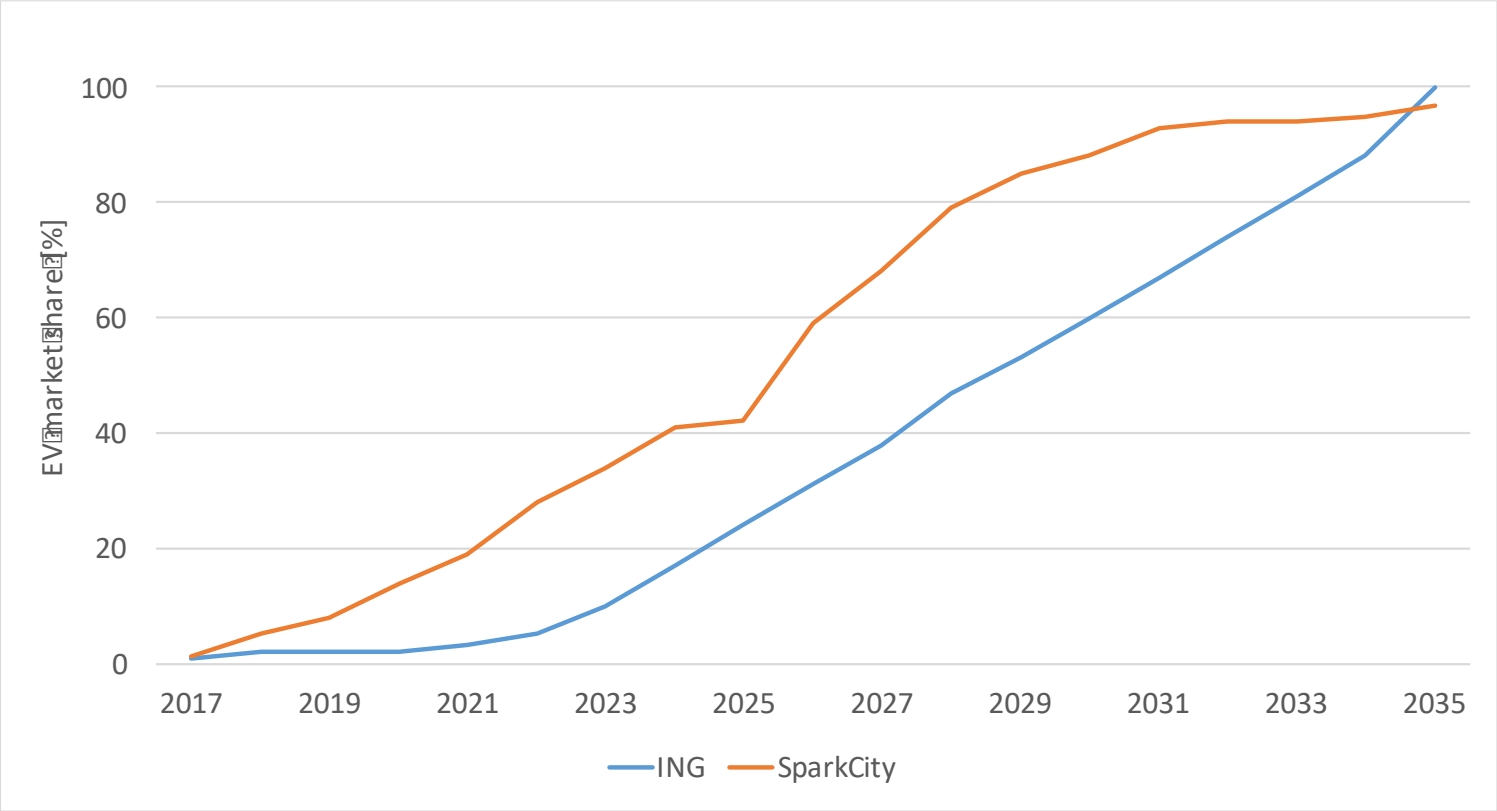
Non-financial factors:

1. Brand and drive-train preferences
2. Driving range
3. Charging infrastructure
4. Charging process
5. Limited model choices for EVs
6. Limited EV stock

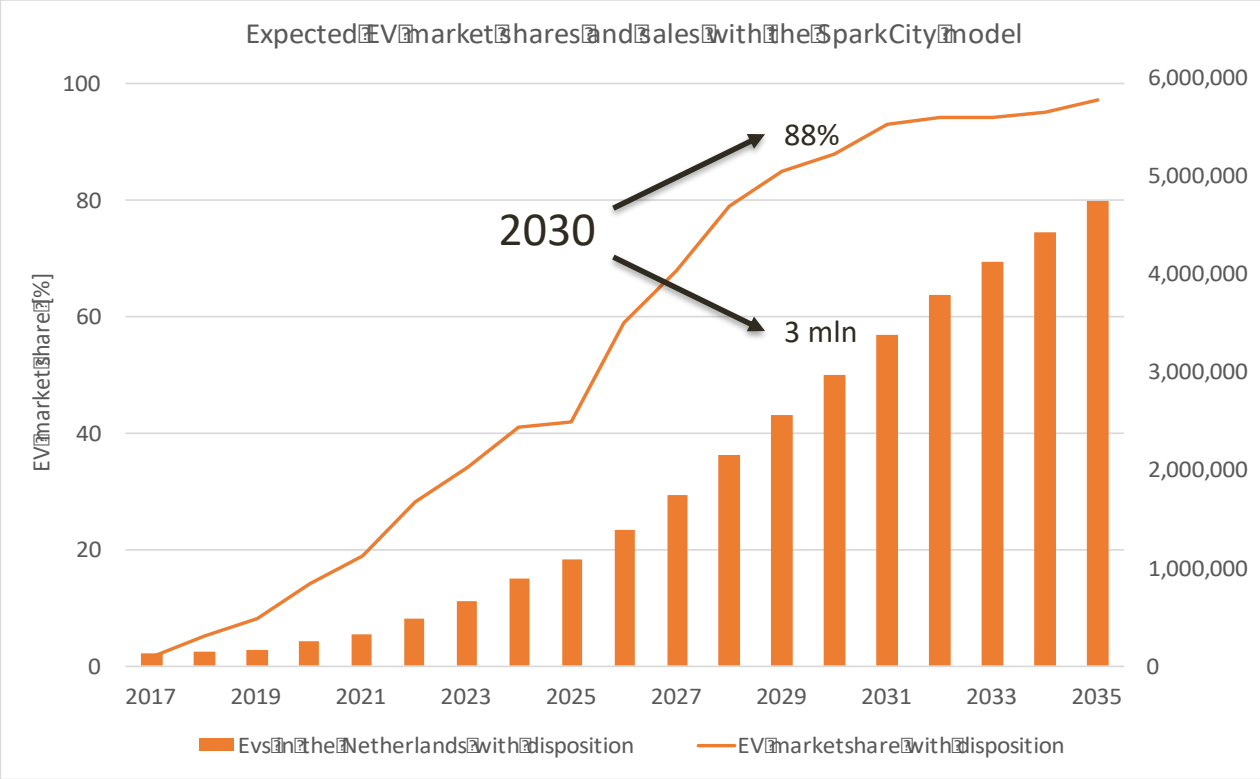
EV Market share with disposition much lower than with TCO based decisions



SparkCity vs ING prediction



88% market share by 2030



Takeaways for achieving 100% EV market share in 2030

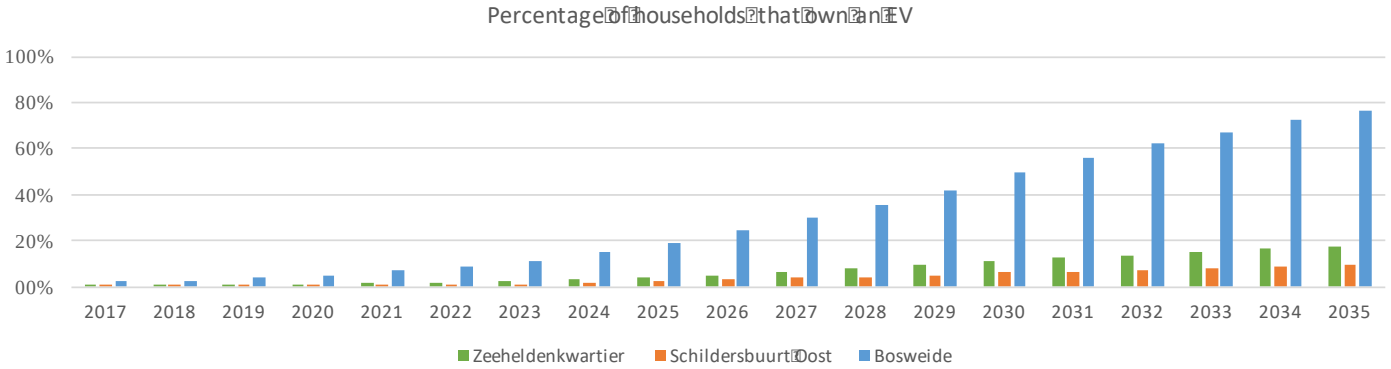
1. By 2027 all EVs have lower TCO than their ICE counterparts → policies should focus on non-financial factors such as raising awareness, placement of charging infrastructure, ICE bans and stimulating EV production

2. 80% of E-class EVs already financially more attractive → financial incentives might not be as effective for E-class vehicles

3. The smaller the vehicle class the lower the TCO differences (ICE vs EV) → financial incentives are likely to be more effective for smaller vehicle classes such as A, B and C.

4. Smaller vehicle classes are the last to reach cost-parity → financial incentives for A class may significantly speed up adoption

The adoption varies a lot per neighborhood



Next steps

- Surveys to provide more data for the disposition factor
- 2nd hand EV flow between neighborhoods
- Model EV production limits
- Multiple car ownership of households
- Integrate car sharing and its effect on car ownership

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