


# Socio-spatial distribution of new EV purchases in a high adoption context

BRISTOL OSLO POZNAŃ UTRECHT

ITEM INCLUSIVE TRANSITION TO ELECTRIC MOBILITY

<https://www.itemresearch.org/>

ABOUT ITEM FUNDING NEWS AND EVENTS RESULTS



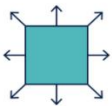
Inclusive Transition to Electric Mobility: Oslo

## Will electric mobility be inclusive, equitable, and fair?

The transition towards electric urban mobility is in full swing across Europe, championed by governments, accelerated by the environmental decarbonisation agenda, and embraced by industry as an economic opportunity. City-level ambitions are high, with a strong focus on speed of change and efficiency in light of restricted resources. Less is known about the social justice dimensions of these changes and how they will influence electric mobility ambitions across urban communities.

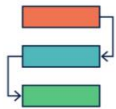
ITEM reviews three social justice aspects of the transition to electric mobility using a multi-perspective and mixed methods approach to compare four medium-sized cities across Europe at different stages of electric mobility adoption.

### Three Pillars of Justice



#### Distributive Justice

How do decisions, policies, actions or changes influence who benefits from access, and opportunities and who faces risks, costs, and impacts?



#### Procedural Justice


How inclusive and participatory is decision-making and governance in terms of identifying problems and solutions, making or implementing policy?



#### Recognition Justice

Are the various needs, values, abilities, knowledge and practices of different groups involved in or affected by policy change acknowledge and respected?

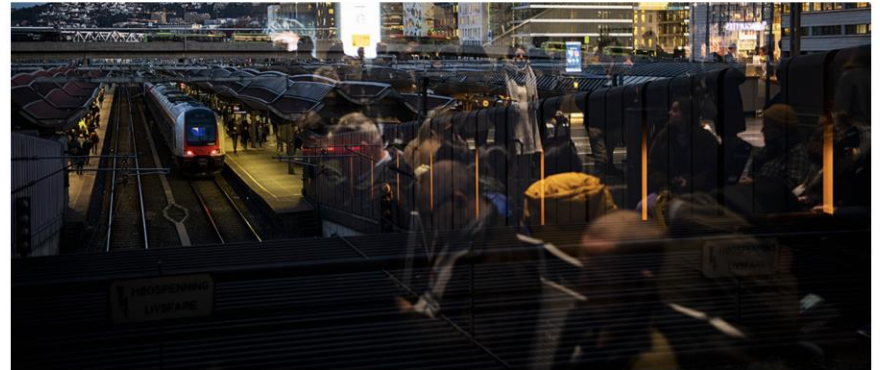
### Cities covered by the ITEM project

 <b>BRISTOL</b>	 <b>OSLO</b>	 <b>POZNAŃ</b>	 <b>UTRECHT</b>
ITEM   Bristol United Kingdom	ITEM   Oslo Norway	ITEM   Poznań Poland	ITEM   Utrecht The Netherlands

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Centre for Development and the Environment

Include - Research centre for socially inclusive energy transitions



## What is Include?

Include is a research centre on socially inclusive energy transition. Include has seven research partners and about 20 user partners in the public, private and voluntary sectors in Norway and the UK.

Include's publications and contributions in media →



Project # 16: Spatial and social distribution of EV and PV adoption

# Background and objective

- Fossil-fuel → electric mobility: highly recognised & critical in green transitions
- Individual and societal benefits, but also costs, barriers and inequalities



- Objective of this study
  - Mapping and assesment of distributional justice: What charaterises areas, socially and spatially, with high access to Evs and those with low access?
  - Reflections around policy and planning measures that could make the current electric mobility transition more inclusive

# The Norwegian EV scheme

- Reduced initial purchase costs

<b>Golf</b>  €38,000	<b>ID.3 422 km range</b>  €38,000
 BMW X7 BENSIN • DIESEL €148,000	 BMW iX €78,000

# The Norwegian EV scheme

- Reduced initial purchase costs
- Reduced annual costs
- Reduced road toll and ferry fees
- Bus lane privileges
- Parking privileges

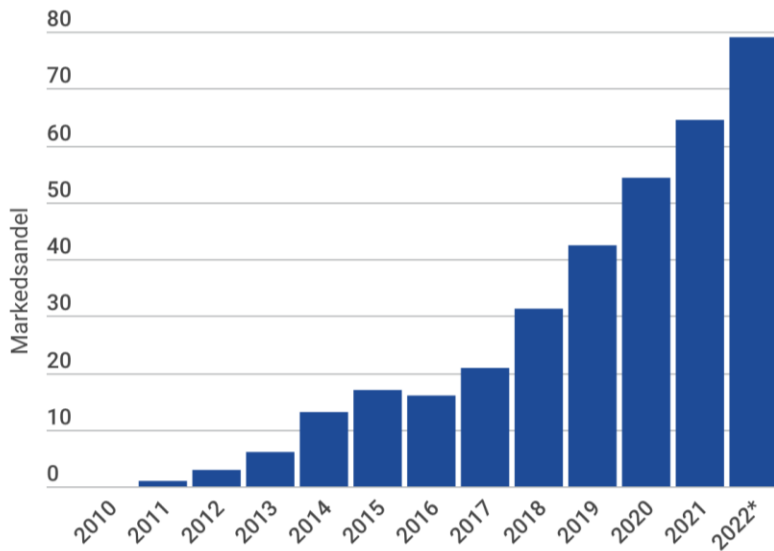


# The Norwegian EV scheme

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EV market share (new vehicles)



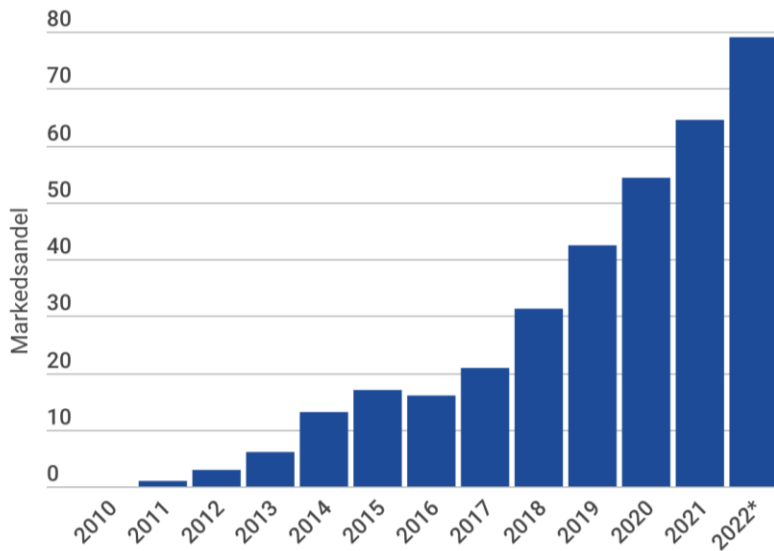


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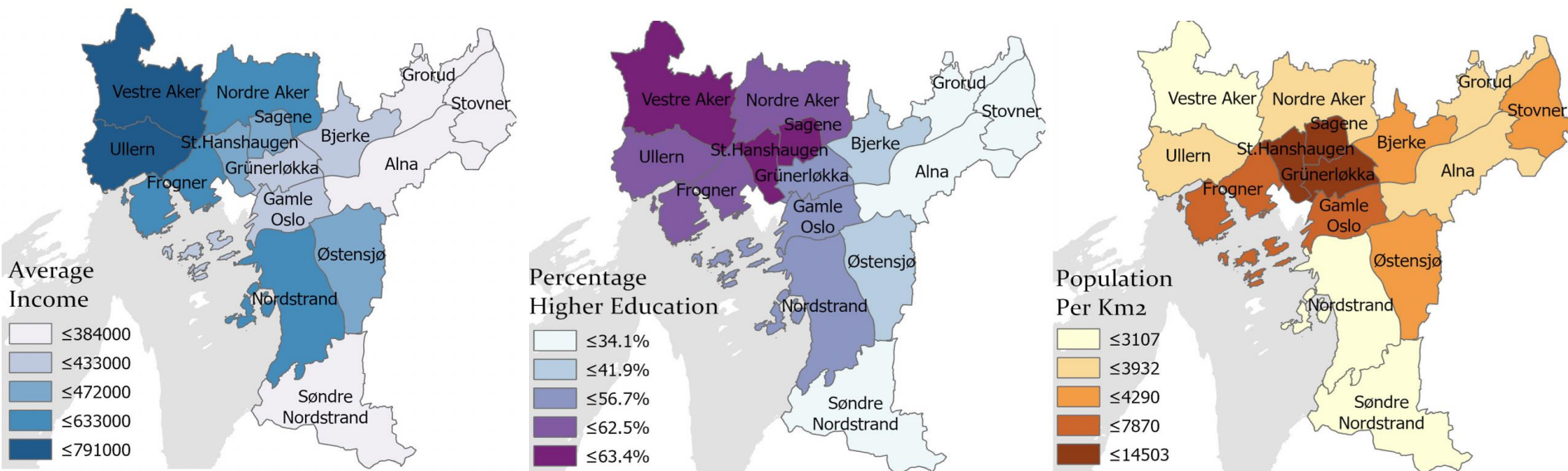
<b>Golf</b>	<b>ID.3</b> 422 km range
	
€38,000	€38,000
	
BMW X7 BENSIN • DIESEL	BMW iX
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EV market share (new vehicles)



# Data and methods

- Geographic Information Systems
- Non-spatial and spatial regression models
- Locational data on greater Oslo EV purchases 2015-2021 (private, not lease)
- Urban form and population statistics at the census tract level



# Results

## Non-spatial regression

	EV/1000inh	nonEV/1000inh.	EV-share	
(Intersept)	32.38** (12.05)	96.93*** (13.50)	0.28*** (0.04)	
% medium educ.	-12.13 (14.81)	-74.00*** (16.59)	0.14** (0.05)	ref. = % low educ.
% high educ.	-40.81*** (11.89)	-125.34*** (13.33)	0.21*** (0.04)	
% income quartile 2	-19.84 (20.10)	19.15 (22.52)	-0.28*** (0.07)	ref. = % lowest quartile
% income quartile 3	5.30 (15.21)	83.02*** (17.04)	-0.11* (0.05)	
% income quartile 4	128.30*** (12.95)	119.91*** (14.51)	0.10* (0.05)	
% non-western	31.54*** (9.27)	-57.45*** (10.39)	0.28*** (0.03)	ref. = native or western
% single family house	5.98 (4.04)	-16.01*** (4.53)	0.07*** (0.01)	ref. = % multi-family housing
% terraced	-0.75 (3.63)	-5.24 (4.07)	0.01 (0.01)	
Population density	-0.11*** (0.01)	-0.17*** (0.02)	0.00*** (0.00)	
Geographic variation				
R <sup>2</sup>	0.41	0.38	0.27	
Adj.R <sup>2</sup>	0.41	0.38	0.26	
Num.obs.	1261	1261	1261	

\*\*\* 99.9% konfidens; \*\* 99% konfidens; \*95% konfidens



# Results

## Non-spatial regression

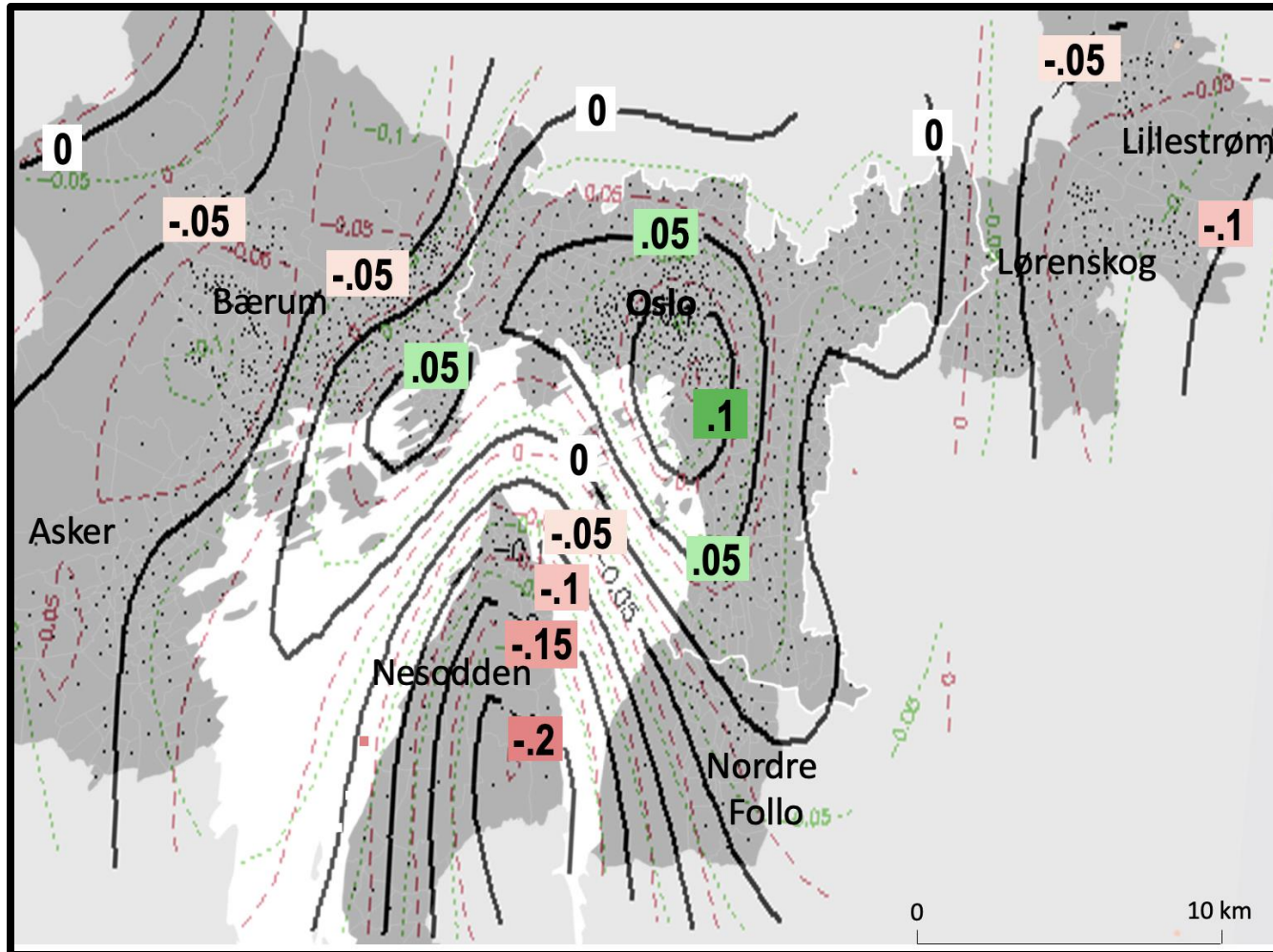
## Spatial regression

	EV/1000inh	nonEV/1000inh.	EV-share	EV/1000inh	nonEV/1000inh.	EV-share
(Intersept)	32.38** (12.05)	96.93*** (13.50)	0.28*** (0.04)	31.64* (12.42)	103.91*** (13.84)	0.23*** (0.04)
% medium educ.	-12.13 (14.81)	-74.00*** (16.59)	0.14** (0.05)	-21.85 (15.30)	-67.46*** (17.14)	0.10 (0.05)
% high educ.	-40.81*** (11.89)	-125.34*** (13.33)	0.21*** (0.04)	-67.50*** (14.98)	-97.85*** (16.30)	0.04 (0.05)
% income quartile 2	-19.84 (20.10)	19.15 (22.52)	-0.28*** (0.07)	-0.25 (20.76)	-5.53 (23.12)	-0.06 (0.07)
% income quartile 3	5.30 (15.21)	83.02*** (17.04)	-0.11* (0.05)	32.06 (16.64)	65.66*** (18.45)	0.06 (0.05)
% income quartile 4	128.30*** (12.95)	119.91*** (14.51)	0.10* (0.05)	126.84*** (14.66)	104.03*** (16.02)	0.17*** (0.05)
% non-western	31.54*** (9.27)	-57.45*** (10.39)	0.28*** (0.03)	17.09 (10.69)	-52.53*** (11.72)	0.23*** (0.03)
% single family house	5.98 (4.04)	-16.01*** (4.53)	0.07*** (0.01)	17.54*** (4.48)	-23.86*** (4.91)	0.14*** (0.01)
% terraced	-0.75 (3.63)	-5.24 (4.07)	0.01 (0.01)	4.73 (3.64)	-9.59* (4.06)	0.05*** (0.01)
Population density	-0.11*** (0.01)	-0.17*** (0.02)	0.00*** (0.00)	-0.13*** (0.02)	-0.15*** (0.02)	-0.00 (0.00)
Geographic variation			explained variance	24.77*** (27.94)	16.71*** (21.63)	26.62*** (28.65)
R <sup>2</sup>	0.41	0.38	0.27	0.45	0.41	0.43
Adj.R <sup>2</sup>	0.41	0.38	0.26			
Num.obs.	1261	1261	1261	1261	1261	1261

\*\*\* 99.9% konfidens; \*\* 99% konfidens; \*95% konfidens

# Results

Spatial smoother plot for EV market share (geographic variation)



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# Conclusion

- Climate urgency demands technological solutions, such as EVs, but also a deeper societal embedding of such solutions, to provide a successful and just transition
- Besides the optimising of underlying technologies, it is important to study the societal dimensions of, and changes brought about by, electric mobility transitions
- Current EV adoption, even in the maturing Oslo context, faces socio-spatial unevenness:
  - New car sales, EV sales and EV-market-share higher in high income areas
  - EV share higher in areas with high population density and high education
  - EV sales and market share higher in areas with more non-western ethnicities
  - EV sales and shares lower in multifamily housing areas
  - Strong unique geographic variation in addition
- Understanding such uneven adoption requires deep insights into
  - Heterogeneous (electric) mobility needs, motivations and barriers of users/non-users
  - Intention-adoption discrepancies
  - Awareness of unintended rebound effects
  - Societal acceptance for difficult measures
- Holistic visions on future urban mobilities: for example post carbon vs post-car