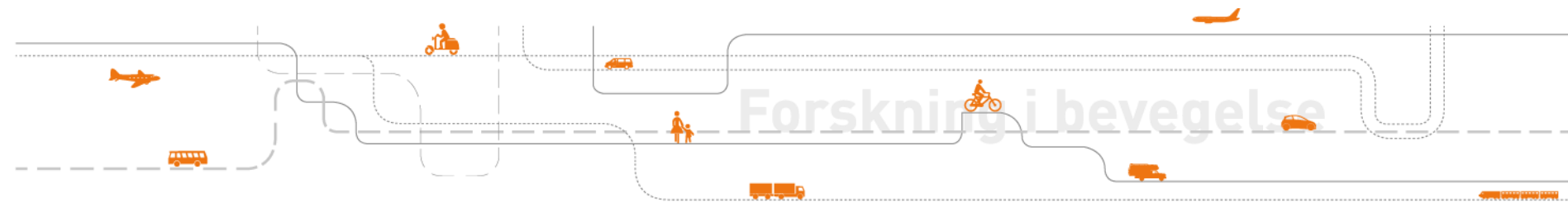


Everyday mobility and potential use of Electric Vehicles

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Outline

- What we often believe about daily travel
- How we map daily travel
- Definition of a trip
- Car ownership in Norwegian households and how much we actually travel
- Travel distance with a car
- The complexity of daily car trips
- Cottage (leisure) culture and Electric Vehicles
- The potential to substitute daily car trips with EVs – some conclusions

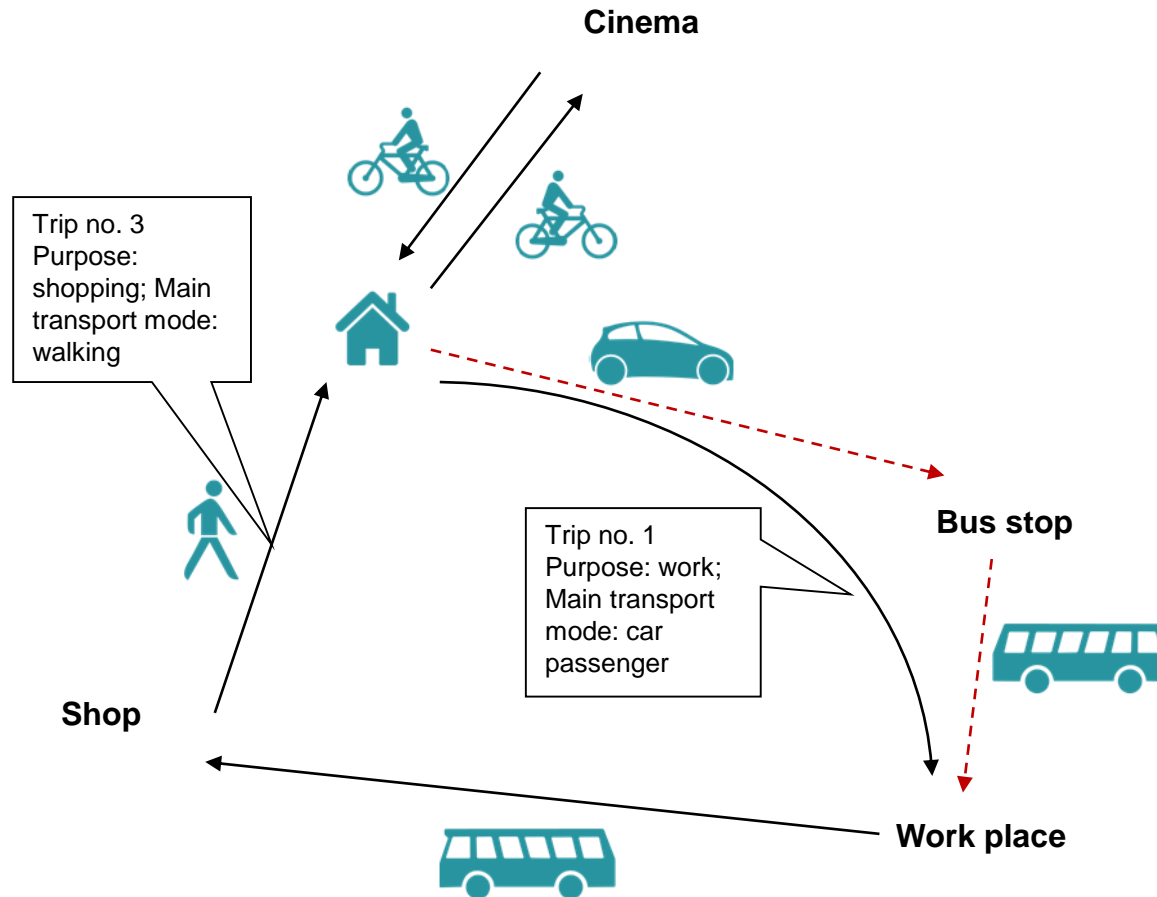
What do we believe about daily travel?

- To gain knowledge on the potential for use of EVs in society, we have to know how we actually travel in daily life – not simply assume
- We/people often believe:
 - *That we travel longer (than we actually do)*
 - *That daily travelling is complex and includes many tasks and the use of different transport modes*
- The analysis presented here is based on the terms that EVs have a range of 120 km in the summer and 80 km in the winter

How do we receive information about daily travel?

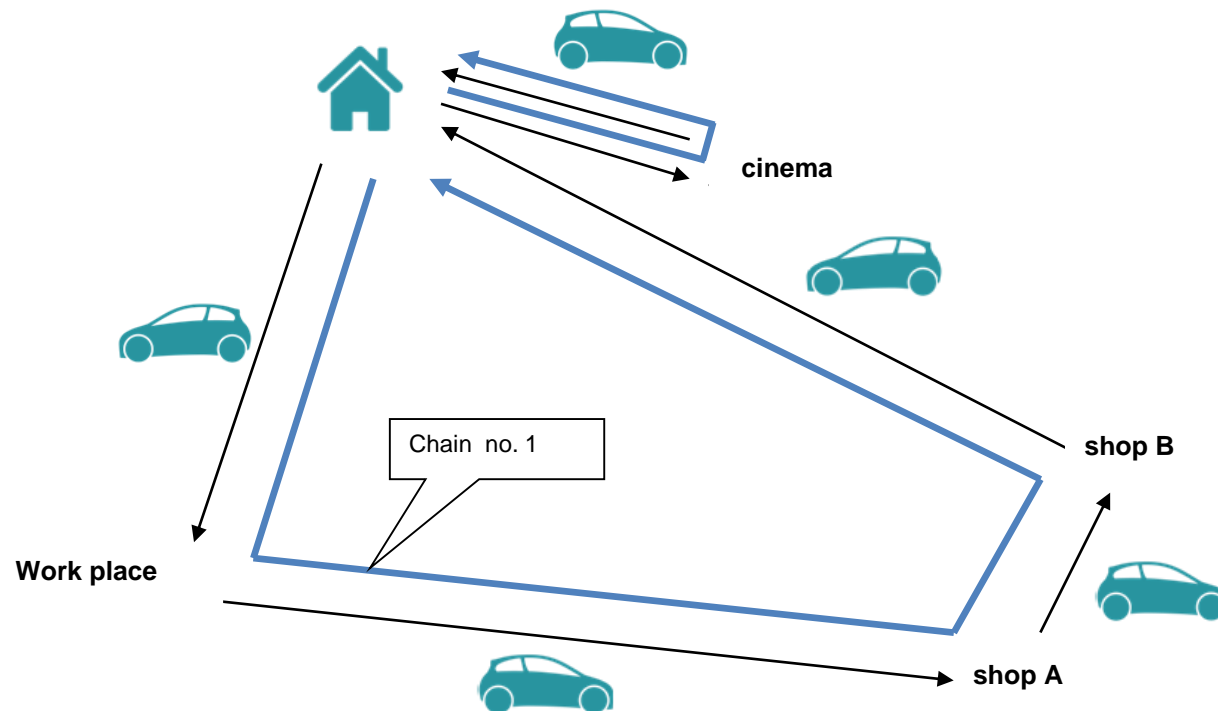
- A national travel behaviour survey (NTS) is done every fourth year in Norway
- A random sample of the population (13 years+) is interviewed by phone about daily travel and longer trips over 100 km. In addition information about the respondent and the household is collected
- The first NTS was done in 1985 – the latest in 2013/14. The results in this presentation are based on data from NTS 2009

The definition of a trip – we see five trips in the figure



What is a trip-chain?

- Here defined as: a number of trips starting and ending at home



Travel activity and access to cars in Norway

- On average people in Norway (13 years +) make 3.3 trips a day – about 1200 trips per year
- Of these - 52 % as car driver – and 11 % as car passenger
- *Number of cars in the household:*

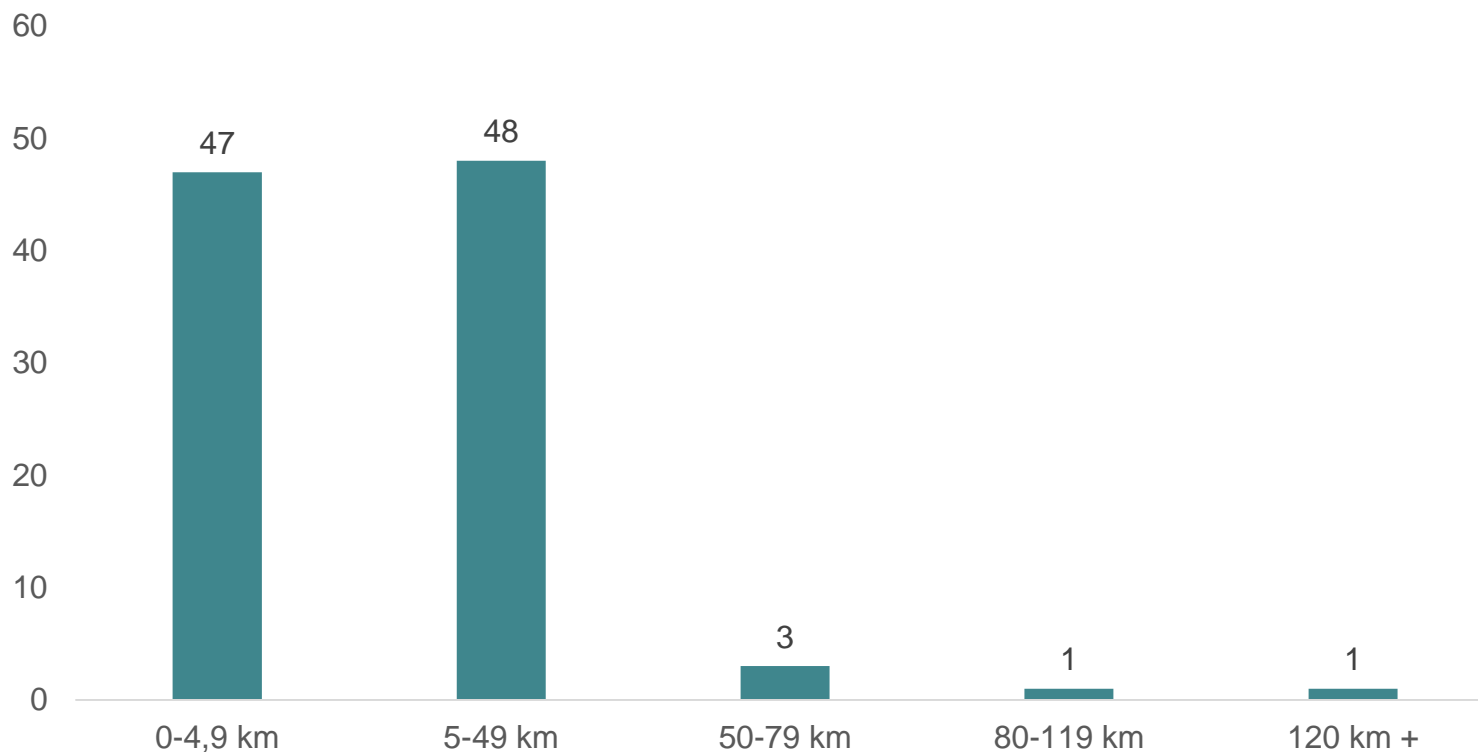
No car	15 %
One car	43 %
Two or more cars	42 %
- *Those who live in multi-car households:*
 - Men
 - Couples with children
 - Working full time
 - In the age group 35-55 years

Differences in travel purpose for those with one and those with several cars in the household. Percent

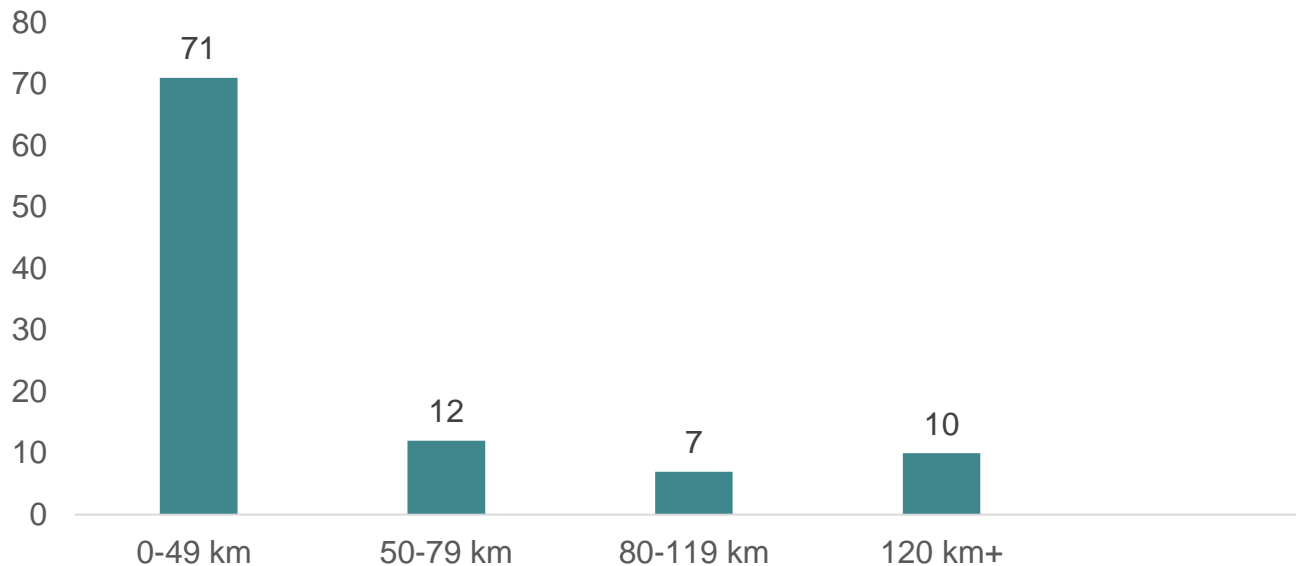
Purpose	One car	Two or more cars
Work	17	24
Business	2	5
Shopping	34	28
Accompany children/other	17	17
Leisure	11	11
Visit	13	10
Other	6	5
I alt	100	100

Travel length of car (driver) trips

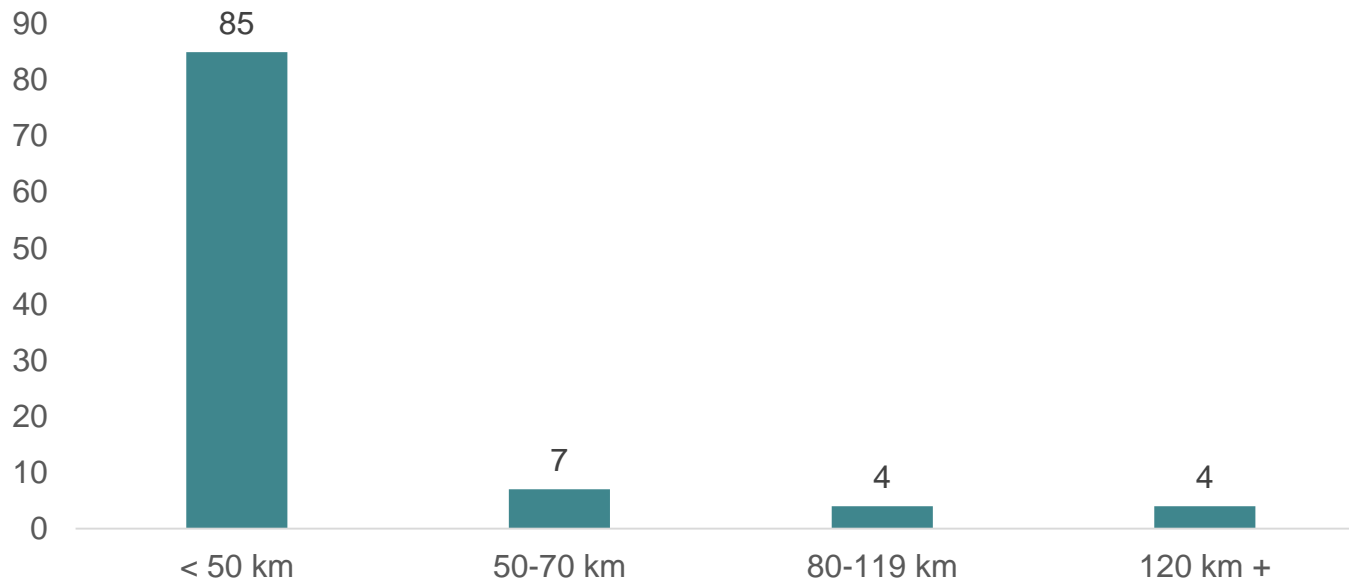
On average 13.6 km, but many car trips are short



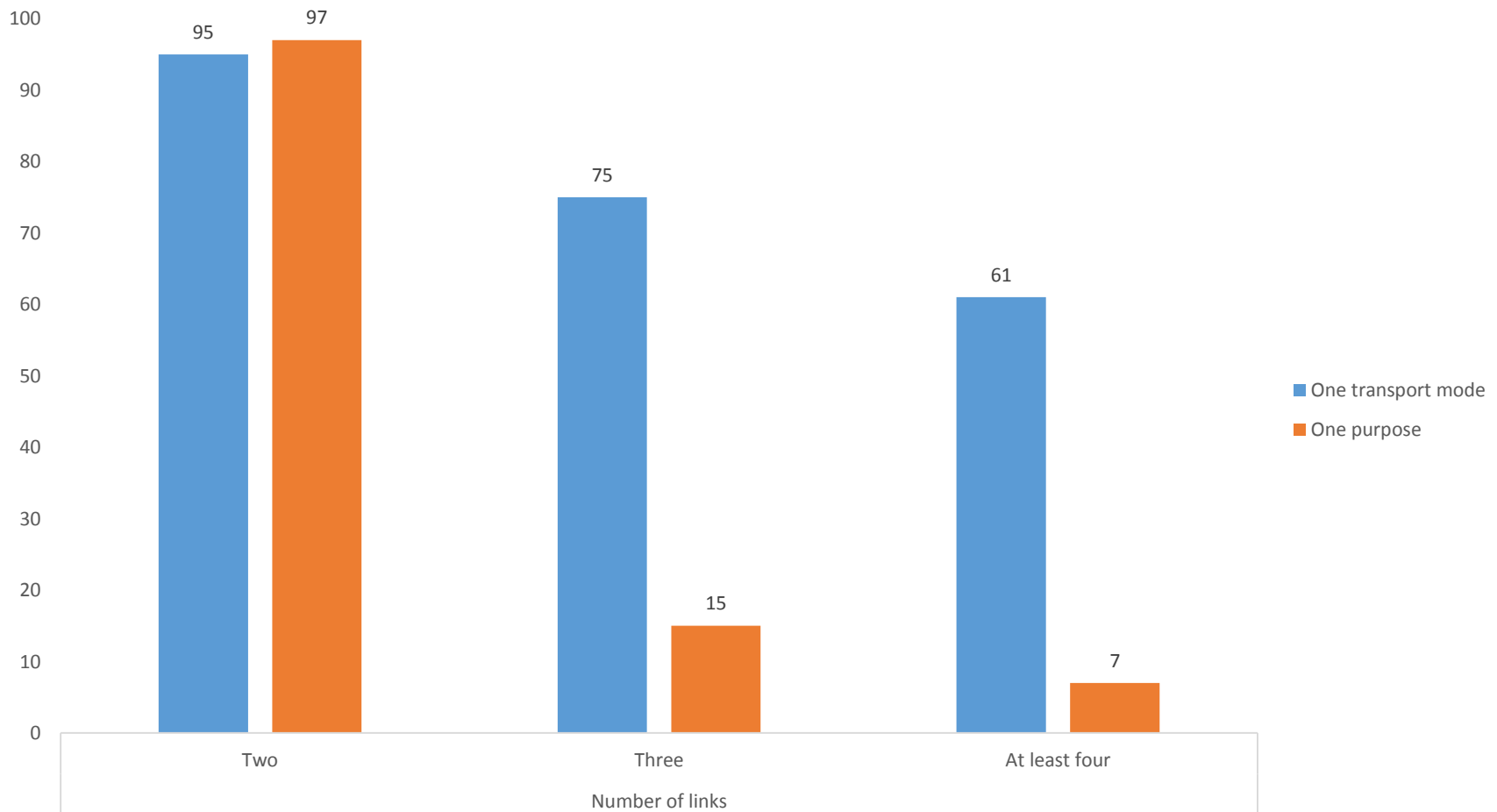
The total travel length with car (as a driver) per day (on average 48.9 km) – which implies that 90 % (in summer) and 83 % (in winter) do not need to recharge during the day



The length of car based trip-chains (average = 28 km)



The complexity of the chains (60 % of the chains have only two links)



Percentage and days in a year when the travel distance exceeds the range of the EV

▪ Percentage of trips over the limit	4 %
▪ Number of days with trips over the limit	16 days
▪ Percentage of chains over the limit	6 %
▪ Number of days with chains over the limit	23 days
▪ Percentage of trips/chains over the limit	12 %
▪ Number of days in total over the limit	43 days

Travel pattern – percentage with 1-5 hours breaks (stop) at different places during a day (night excepted)

Day	Daily travel length with car	Stop at home	Stop at work	Stop other places
	All travel lengths	22	7	43
All days	0-79 km	21	6	41
	80-119 km	29	7	50
	120 km+	24	10	58
Monday-Thursday	0-79 km	23	7	40
	80-119 km	32	10	50
	120 km +	27	13	63
Saturday and Sunday	0-79 km	17	3	46
	80-119 km	22	2	57
	120 km +	14	2	51

Travel pattern- percentage with breaks > 5 hours at different places during a day (night excepted)

	Daily travel distance with car	Stop at home	Stop at work	Stop other places
	All distances	5	24	8
All days	Day	5	25	7
	80-119 km	3	30	13
	120 km+	2	14	12
Monday-Thursday	0-79 km	6	32	8
	80-119 km	4	38	9
	120 km +	3	20	10
Saturday and Sunday	0-79 km	4	5	6
	80-119 km	2	5	12
	120 km +	1	0	17

Recharging on the way

- Many of those with total travel distance over the limit (80 km /120 km) have the possibility to recharge during the day
- Between 24 % and 29 % have a stop at home (1-5 hours), which makes it possible to recharge partly or fully
- Between 20 % and 40 % have breaks longer than five hours on weekdays
- On the days that exceed the range limit, home or the work place are important places for recharging.
- A large percentage have shopping as their purpose. Recharge at shopping centres provides the possibility of partly charging.

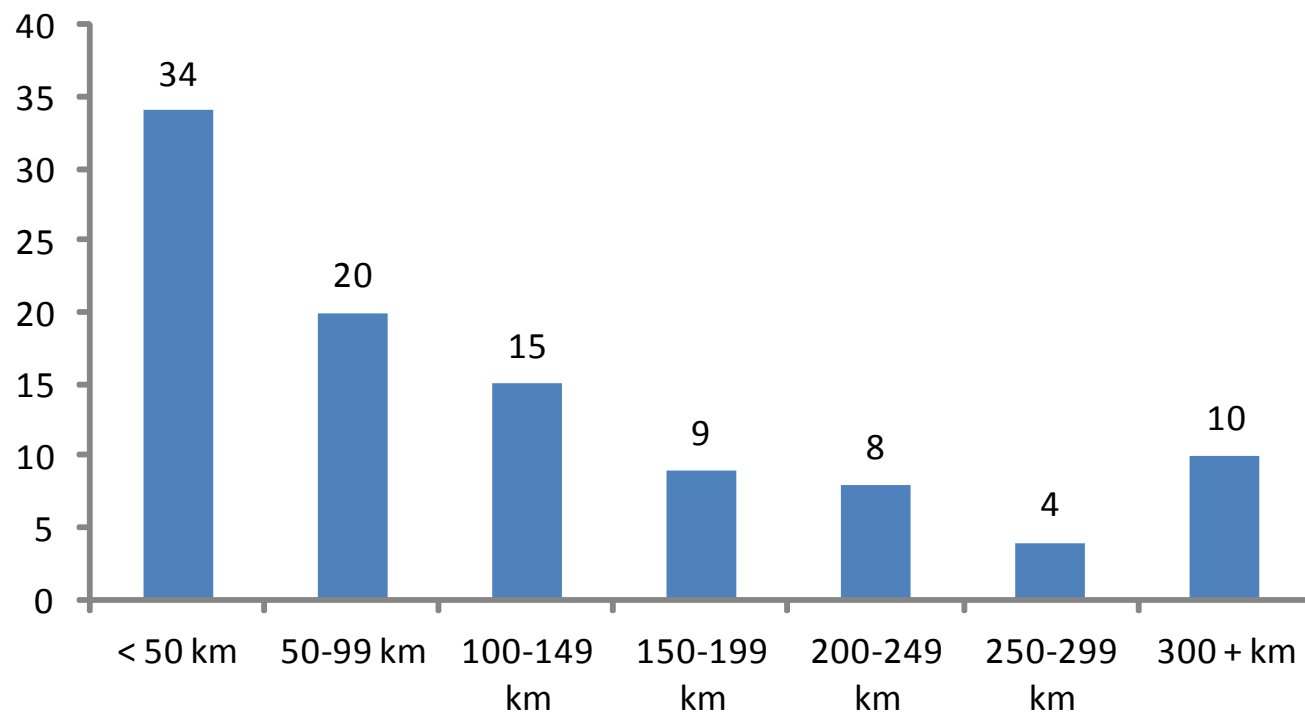
Use of the cottage as argument against purchase of EV

- A commonly used argument against electric vehicles in Norway is that Norwegians have a special leisure culture related to ownership and use of cottages in the mountains and/or at the seaside
- These cottages are thought of as being outside the reach of an EV. This conventional wisdom, however, is not based on hard facts. In this presentation data from the NTS 2005 is used
- In Norway approximately 40 % have access to a cottage/holiday home

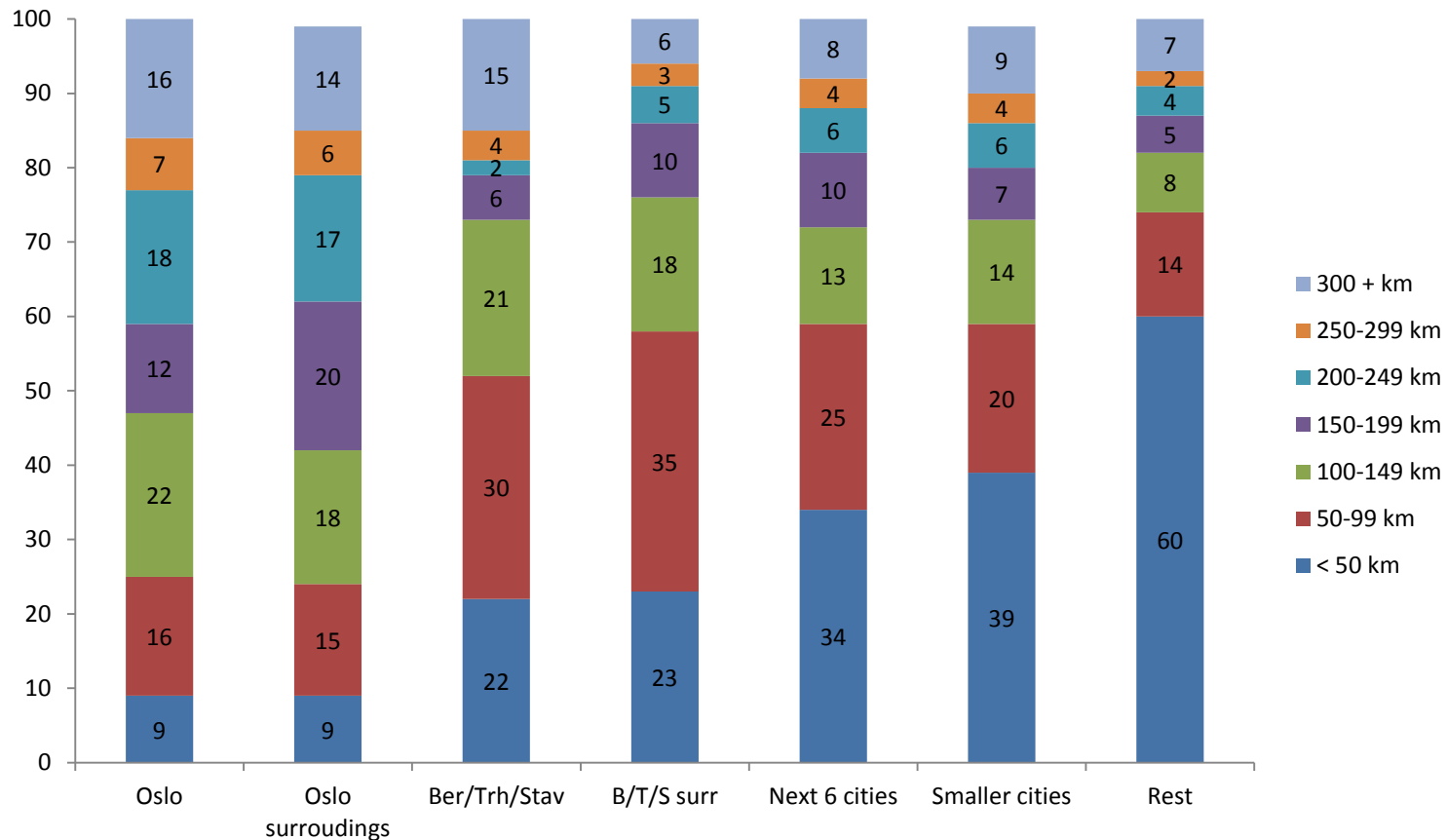
The most frequent users are

- Persons in the age group 55-66 years
 - Couples without children
 - Administrative leaders and craftsmen
 - People living in Finnmark (in the north) and Vest-Agder (in the south)
-
- In average people use their cottages:
 - 1.2 times per month
 - in total 14.4 times a year
 - 29 trips between home and the cottage a year

Distance to the cottage/holiday house



Distance to the cottage/holiday house by place of residence



A dilemma

- In the Oslo-region approximately 20 % of the cottage owners have < 100 km to their leisure home
- In the next three largest urban areas approx. 50-60 % have their cottage < 100 km
- In other parts of the country the percentage is even higher.
- For most of the EVs 100 km is within their range in the summer, but in the winter most of the EVs would need recharging.

This shows a dilemma:

Those who buy an EV in the larger urban areas where the climate and environmental gains are most significant, simultaneously have to travel the longest distances to their cottages– which can make it difficult to manage with an EV only.

A substitution of a traditional car with an EV regarding transport to a leisure home is mainly a problem for those living in the Oslo-area, and primarily in the winter. Recharging on the way can solve this problem.

Conclusions

- More than 40 % of the population have more than two cars in the household – which gives the potential to change one with an EV
- A large percentage of both trips and trip-chains are within the range of an EV. 88 % do not need to recharge during the day (presupposed charging at home during the night)
- For those who need to recharge many have breaks/stops both at home and at work, with possibilities for recharging
- 40 % of the population have access to a leisure home (not all with electricity) which is visited 14 times a year. People in the Oslo-region have the longest distance – and will be in need of recharging on the way, especially in the winter if they are going to use an EV.

Thank you for your attention!

- Further details can be found in:
 - TØI report 1352/2014