



Sociological survey of HVAC operating modes FORD-NAMI

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Sociological survey design

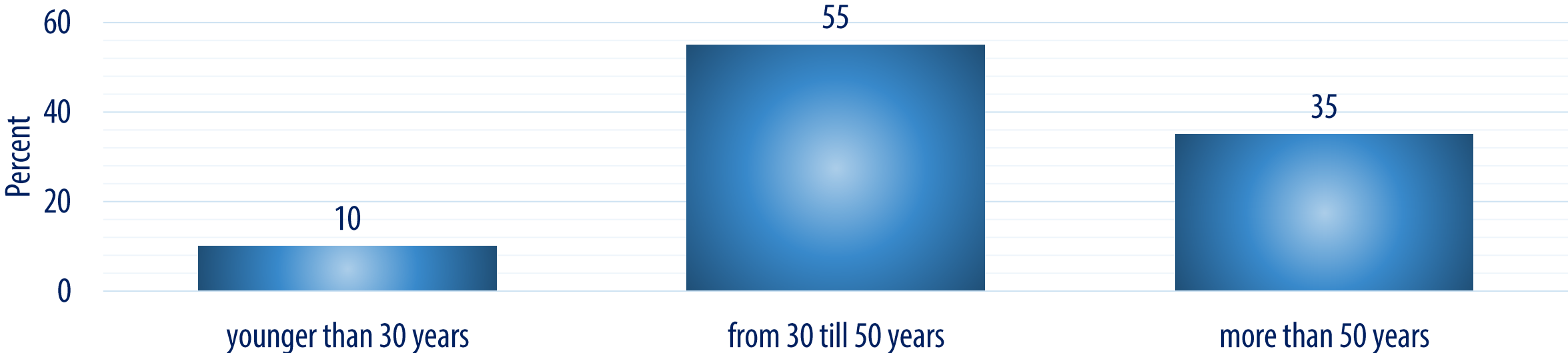
The aim of sociological survey was to investigate car Heating, Ventilation and Air Conditioning (HVAC) system operation modes settings among of private car owners

Questionnaire with 17 questions was prepared and distributed

see <https://wiki.unece.org/download/attachments/65503585/How%20do%20you%20use%20HVAC.pdf?api=v2>

20 respondents took part in the survey by Ford Motor Company employees (6 female and 14 male)

Respondents age distribution



The survey was carried out at Ford Motor Company's Allen Park Test Laboratory (1500 Enterprise Dr., Allen Park, MI 48101 USA)

Data of survey October 2018

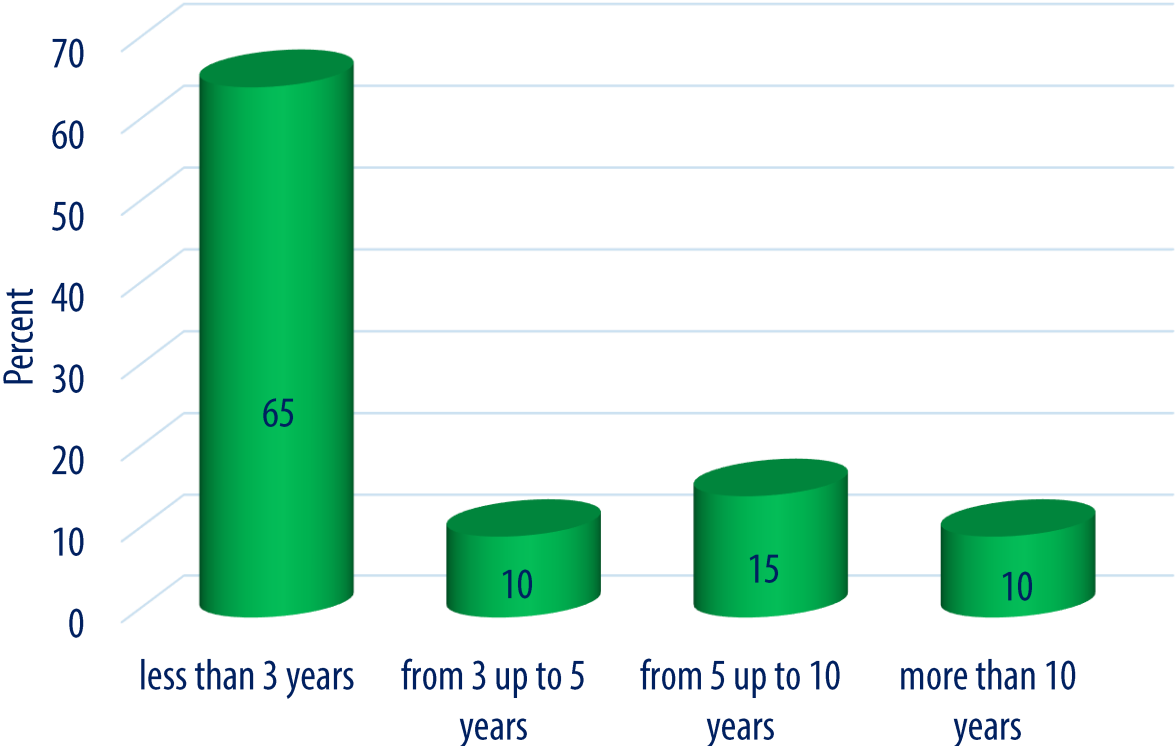


Cars age and powertrain type

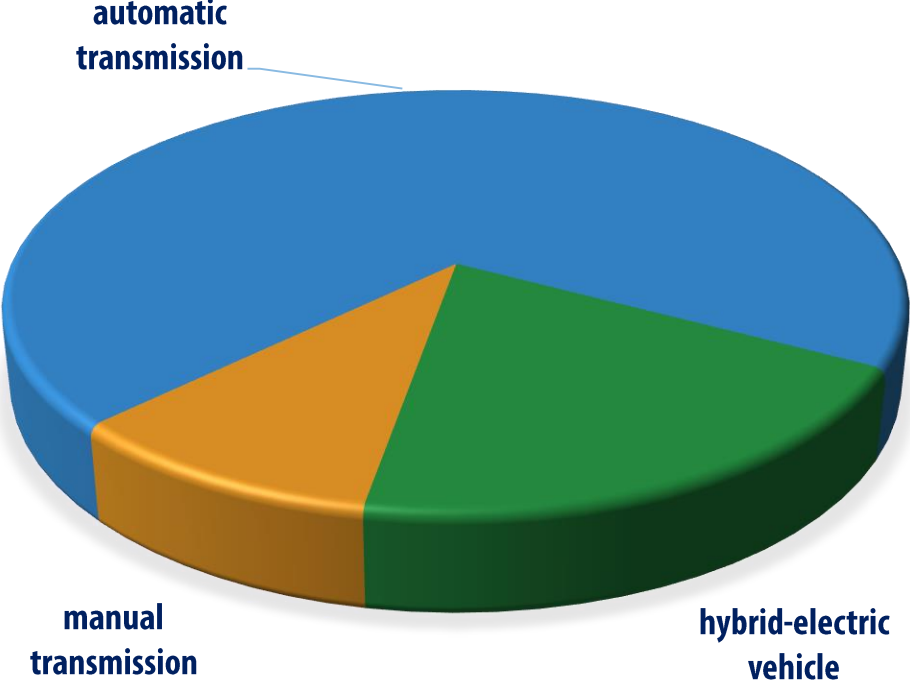
Cars by fuel type:

➤ 100% gasoline

Vehicle age

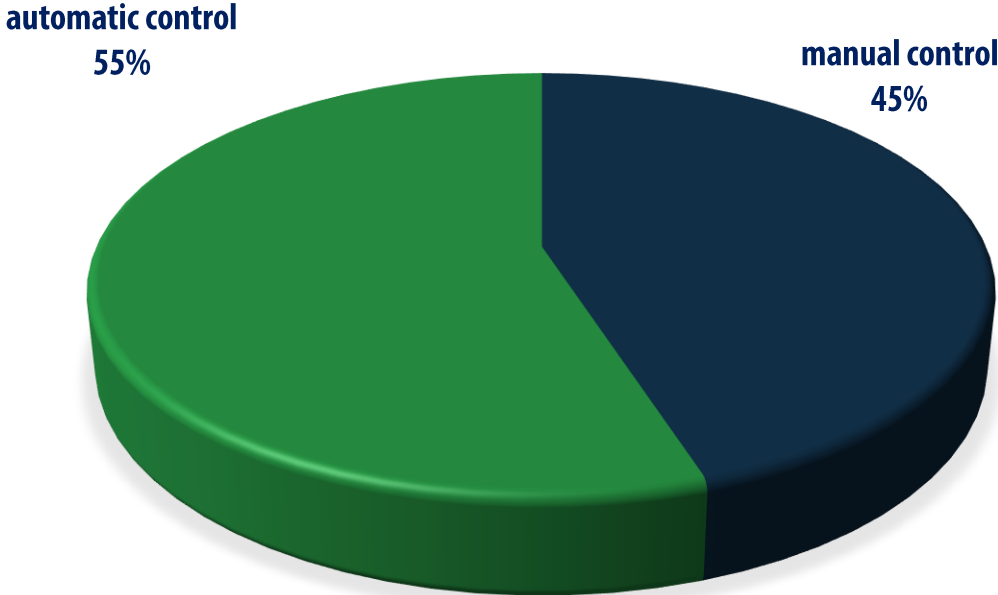


Powertrain type

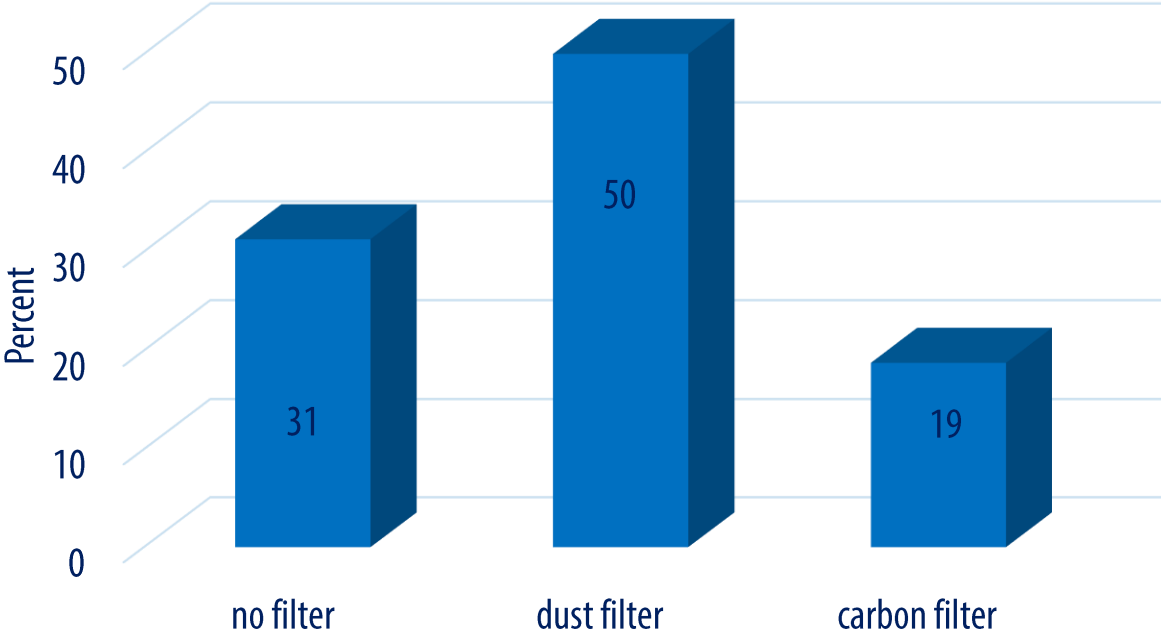


HVAC system and cabin filter type

HVAC system type

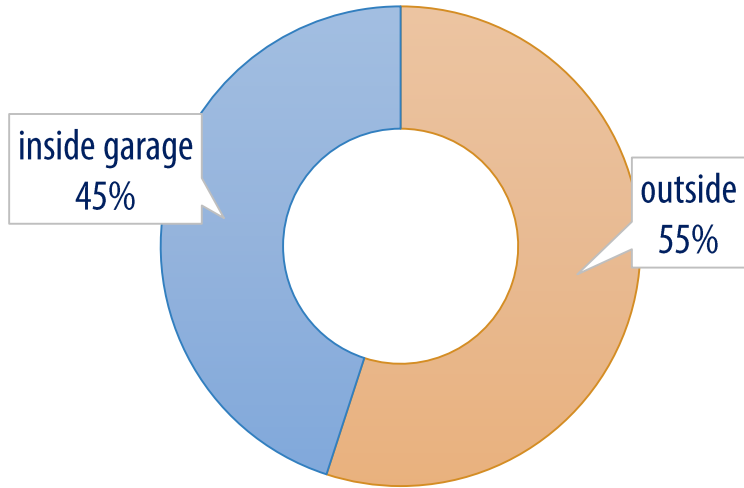


Cabin filter type

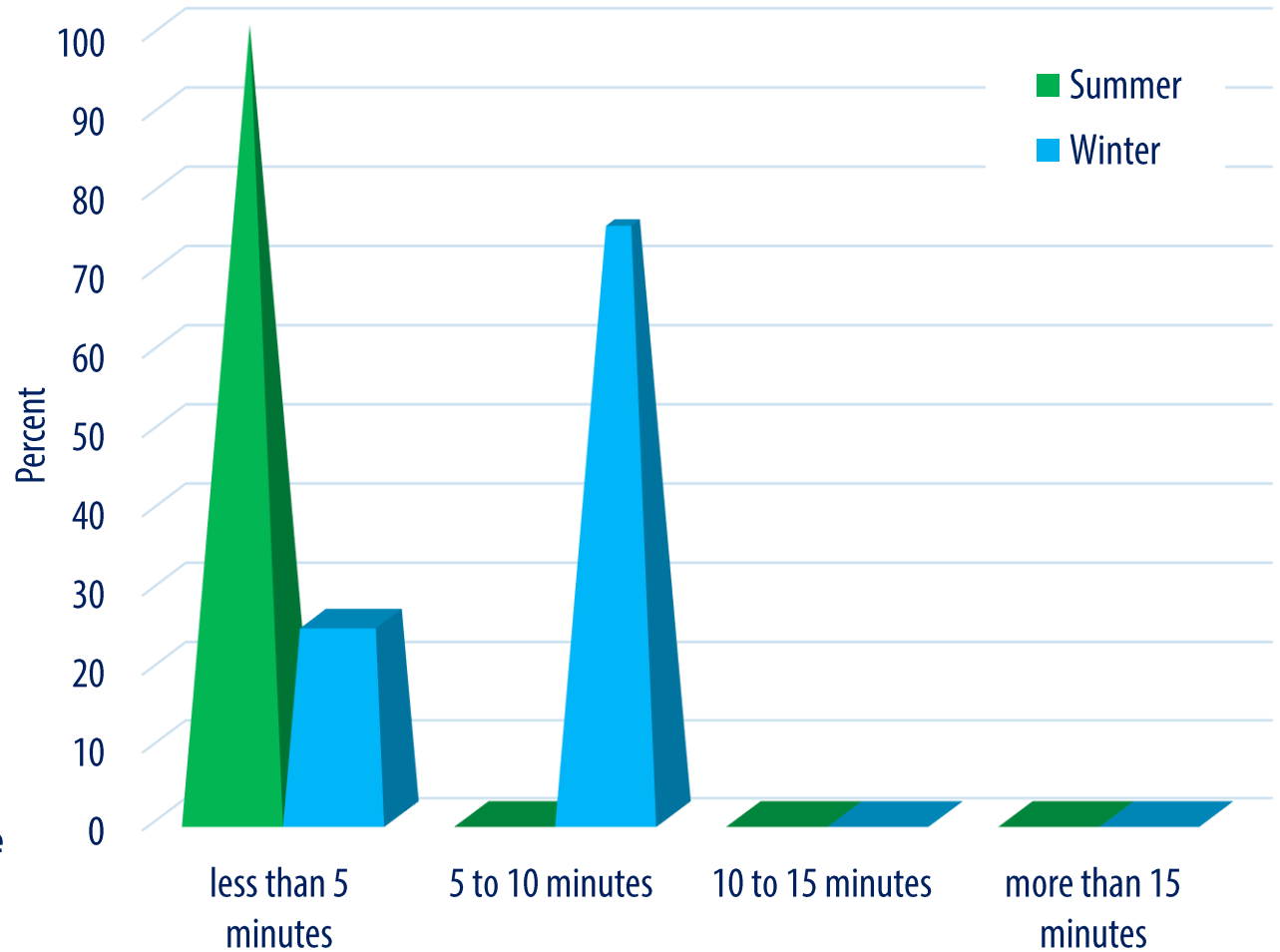


Place to store a car, pre-heating/pre-cooling the interior

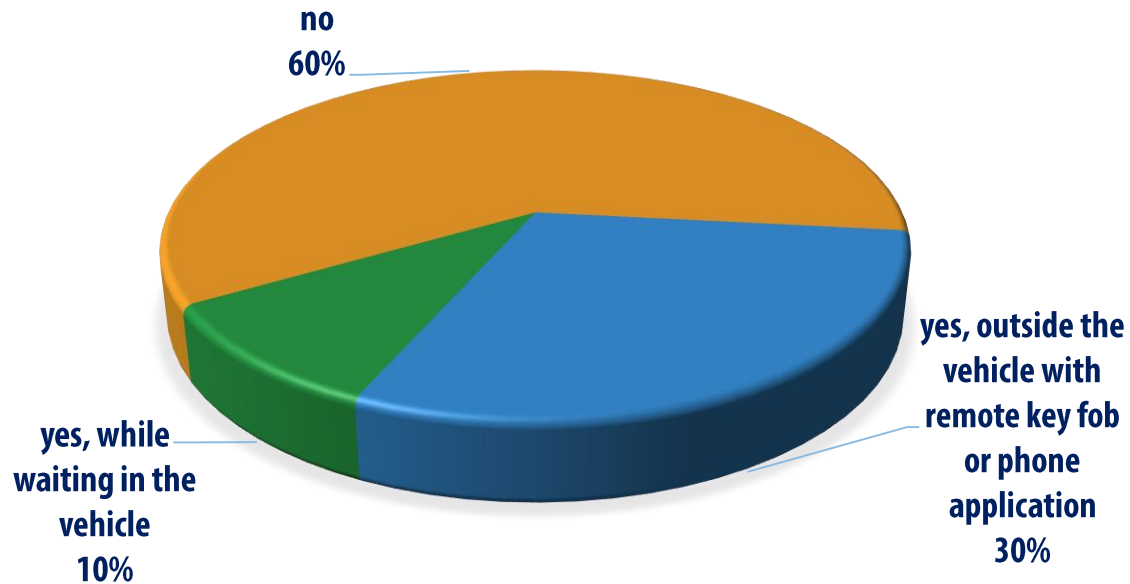
Place to store a car



Time to pre-heat or pre-cool the interior

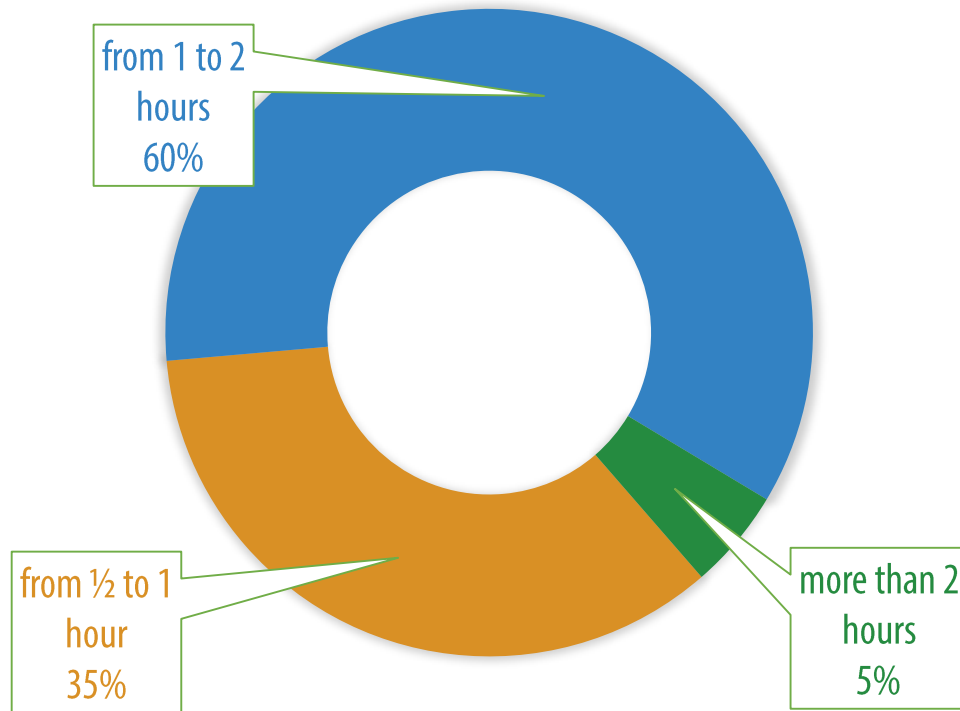


Pre-heat or pre-cool the interior prior to driving

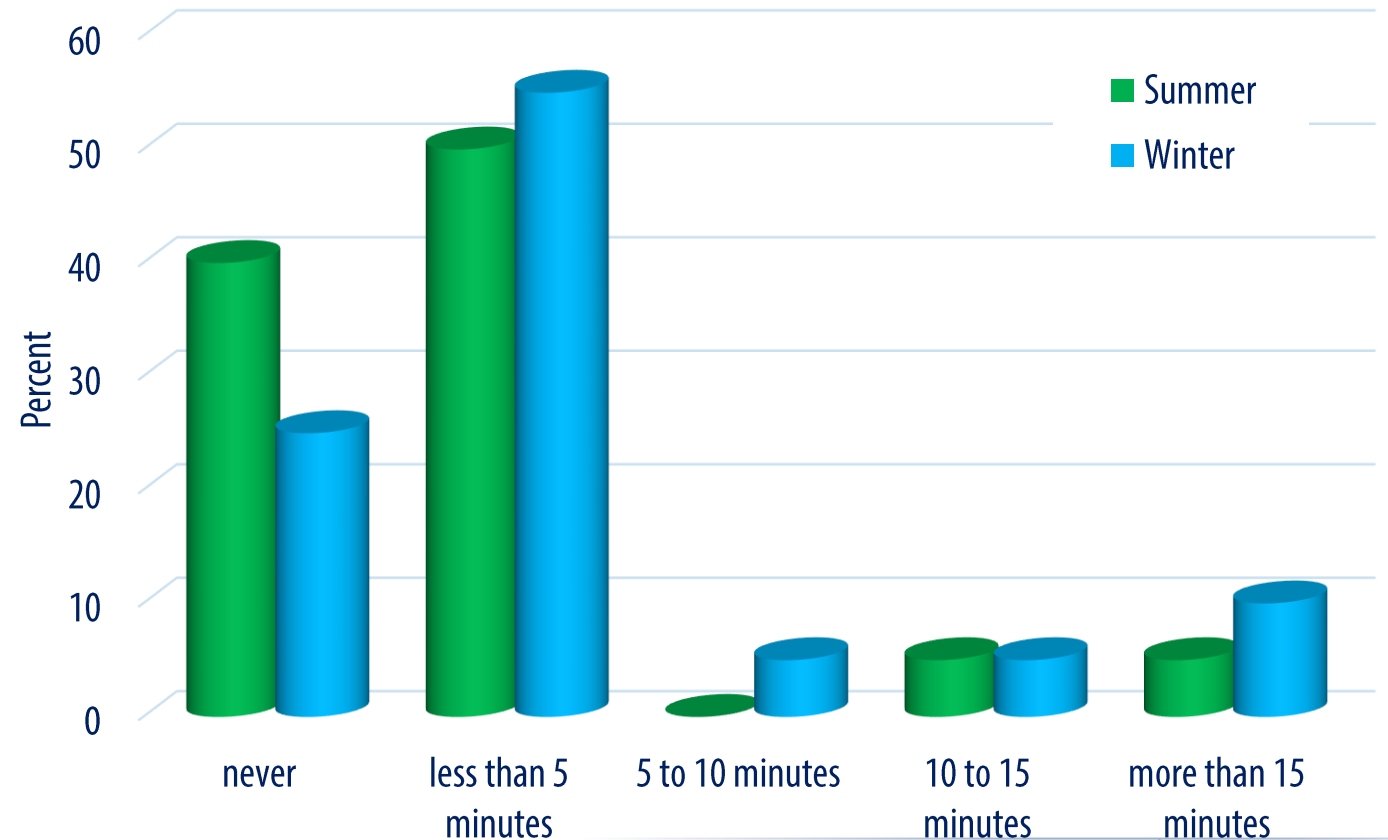


The time inside a car

Total time people usually drive inside a car daily

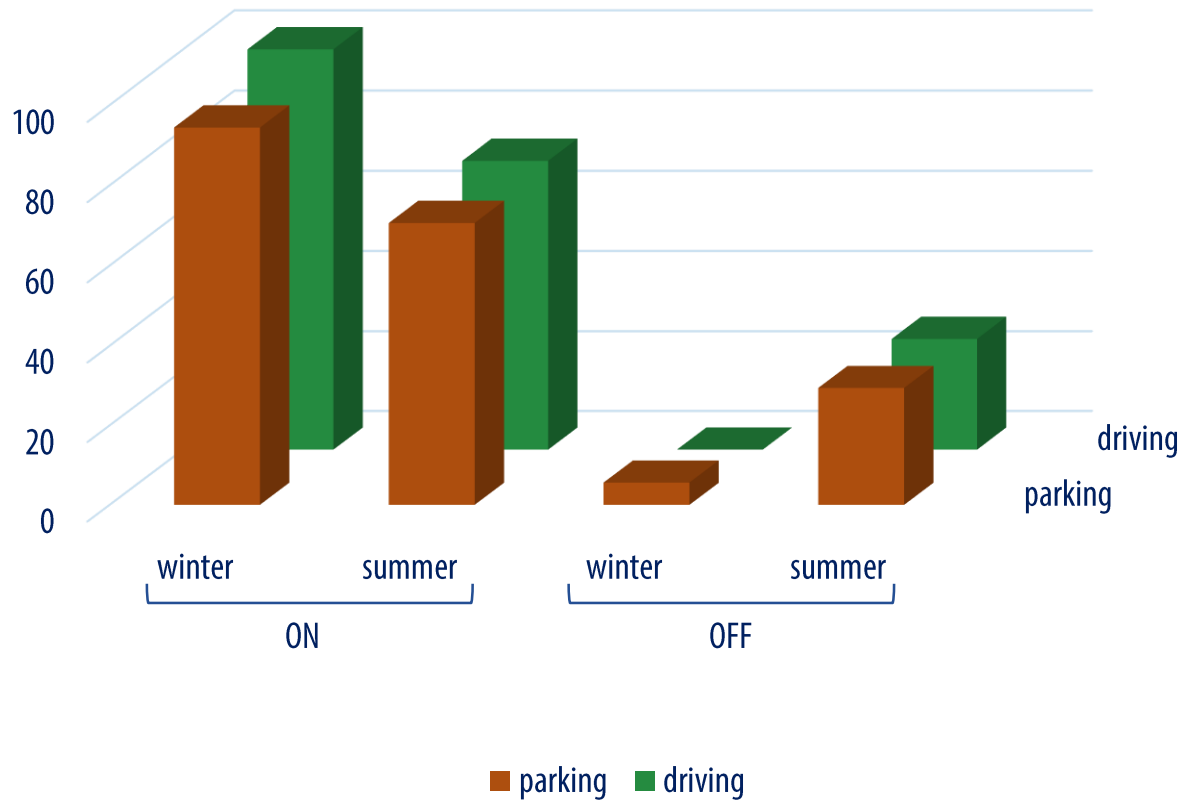


Total time people usually are inside a parked car with engine running

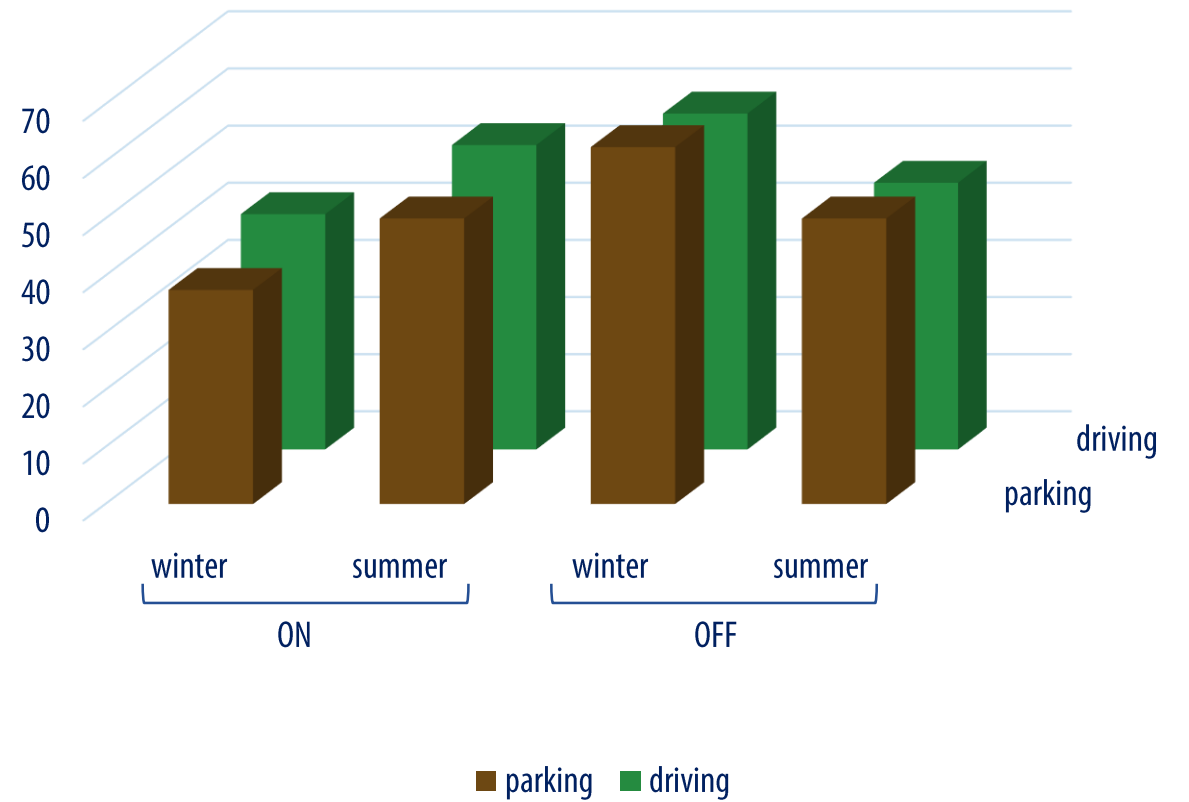


HVAC operation modes

Heating/conditioning - on/off

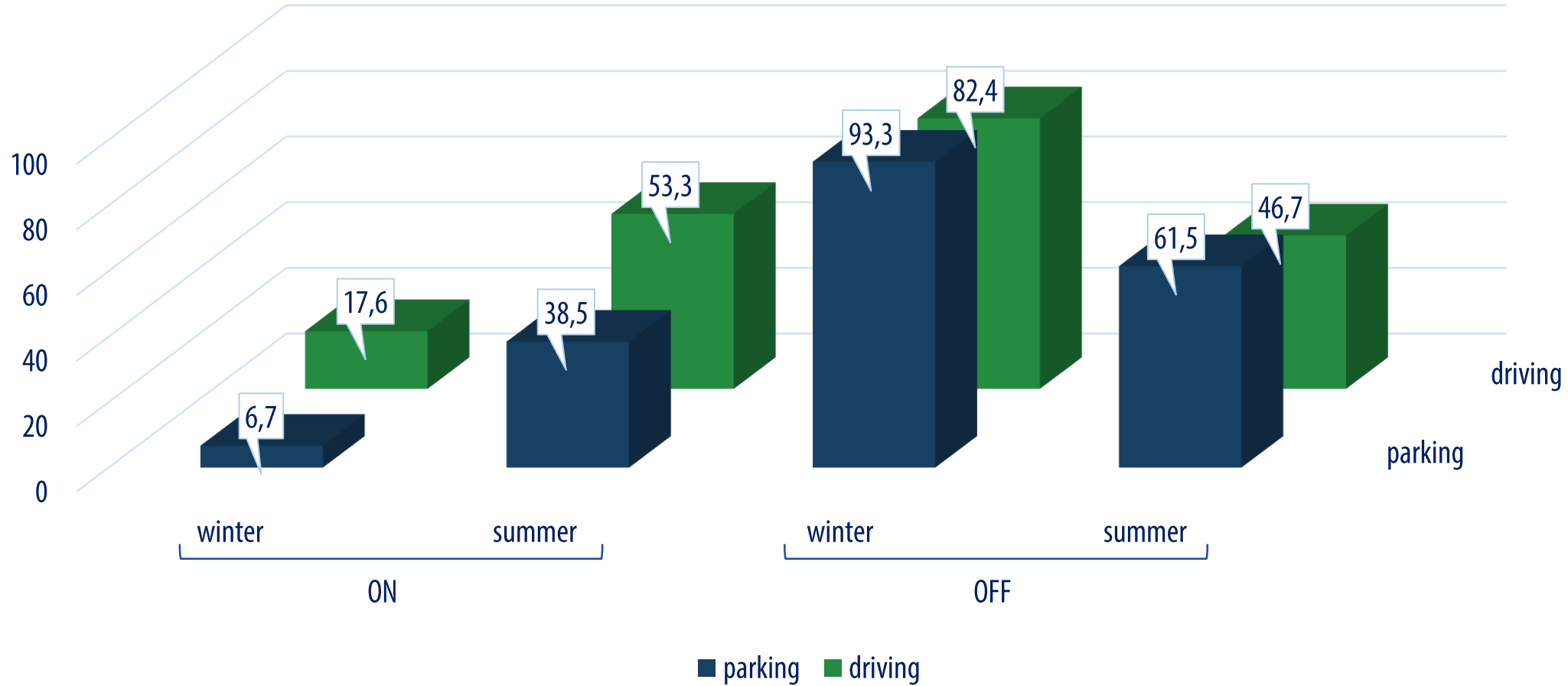


Auto Mode - on/off



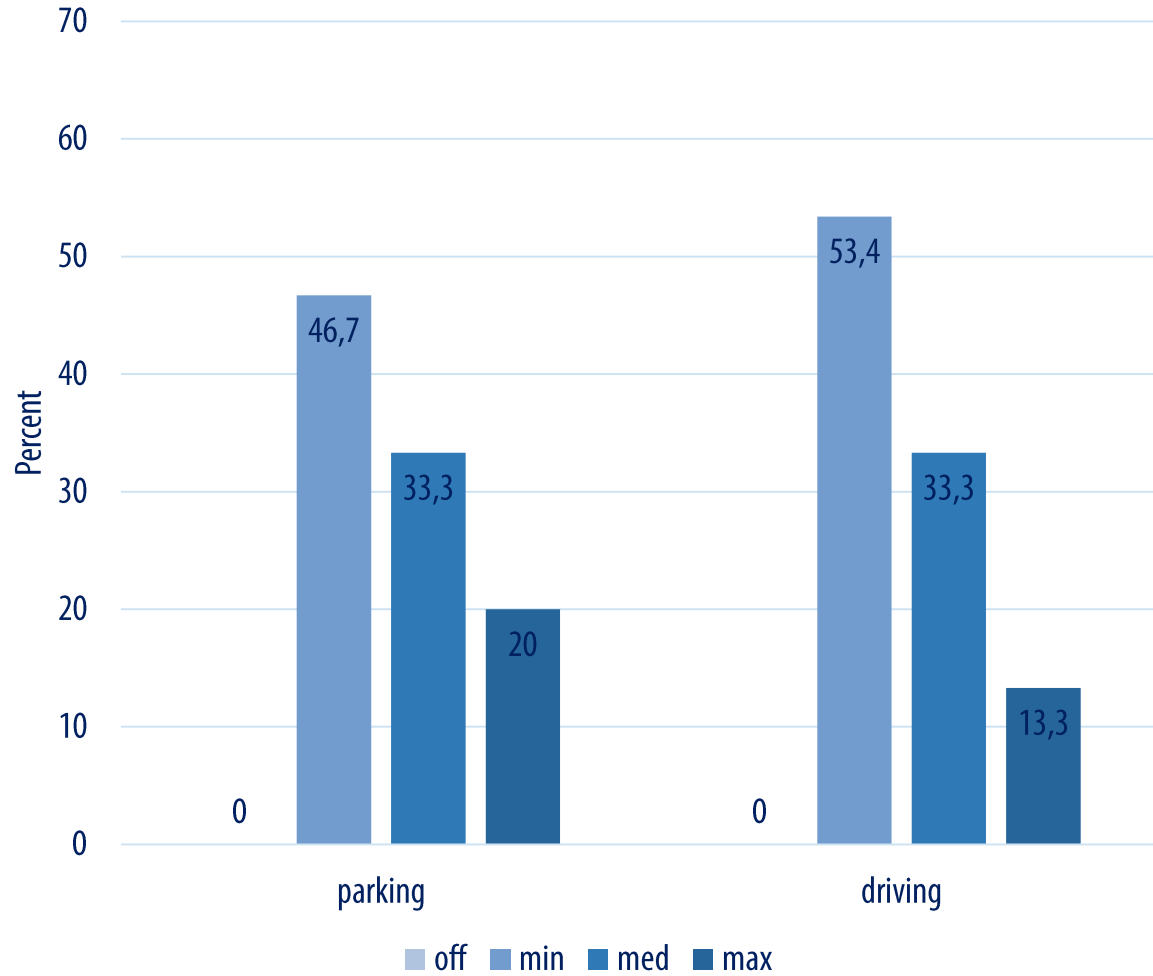
HVAC operation modes: recirculation

Recirculation - on/off

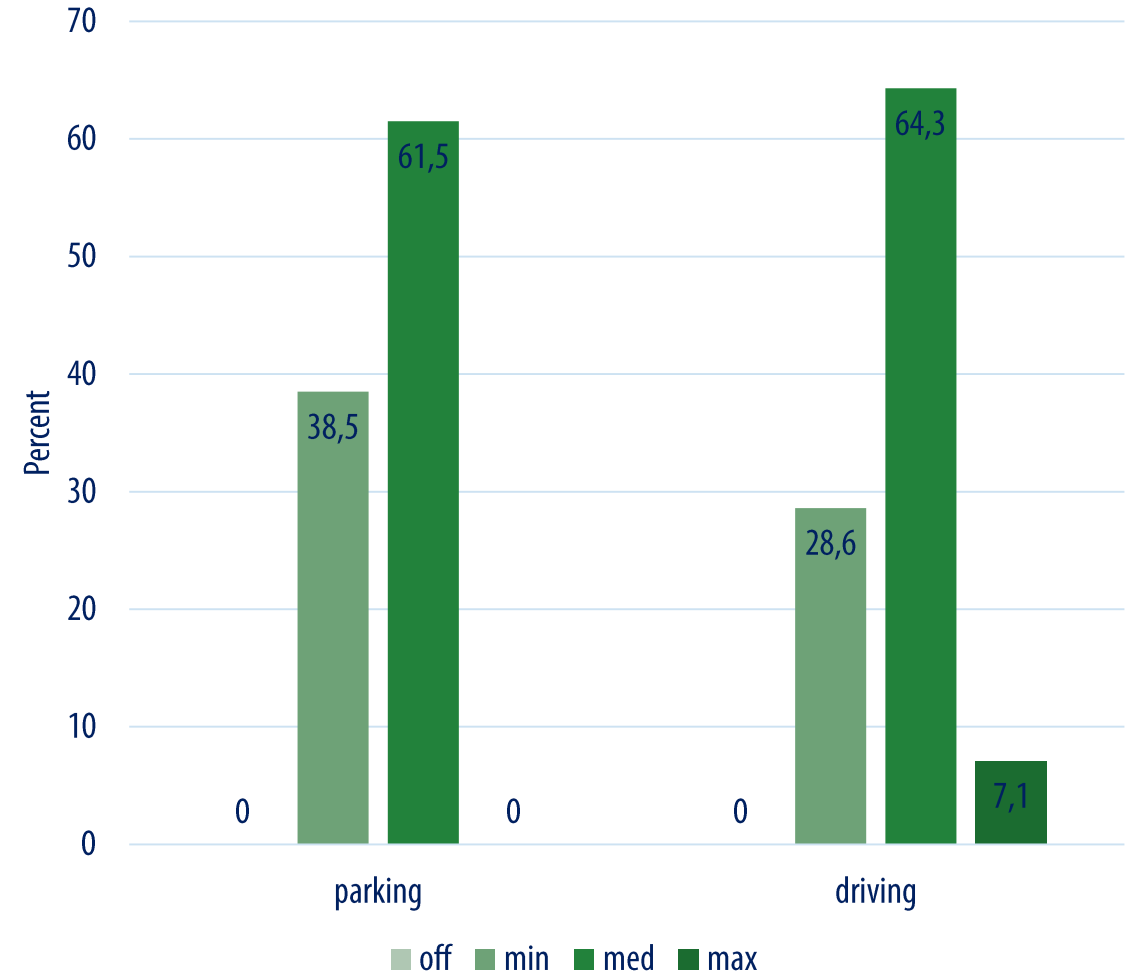


The ventilation speed

Ventilation speed (winter)

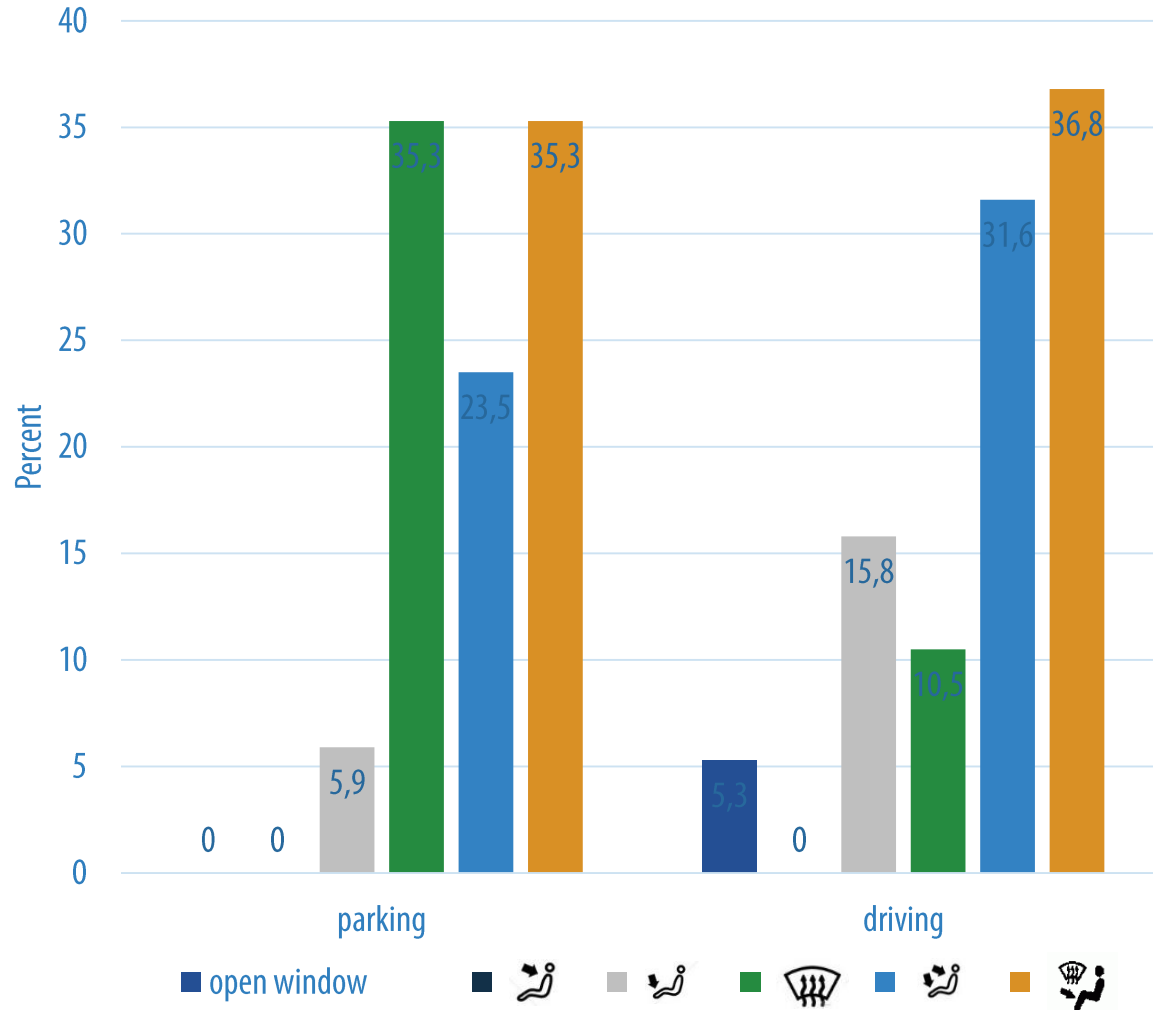


Ventilation speed (summer)

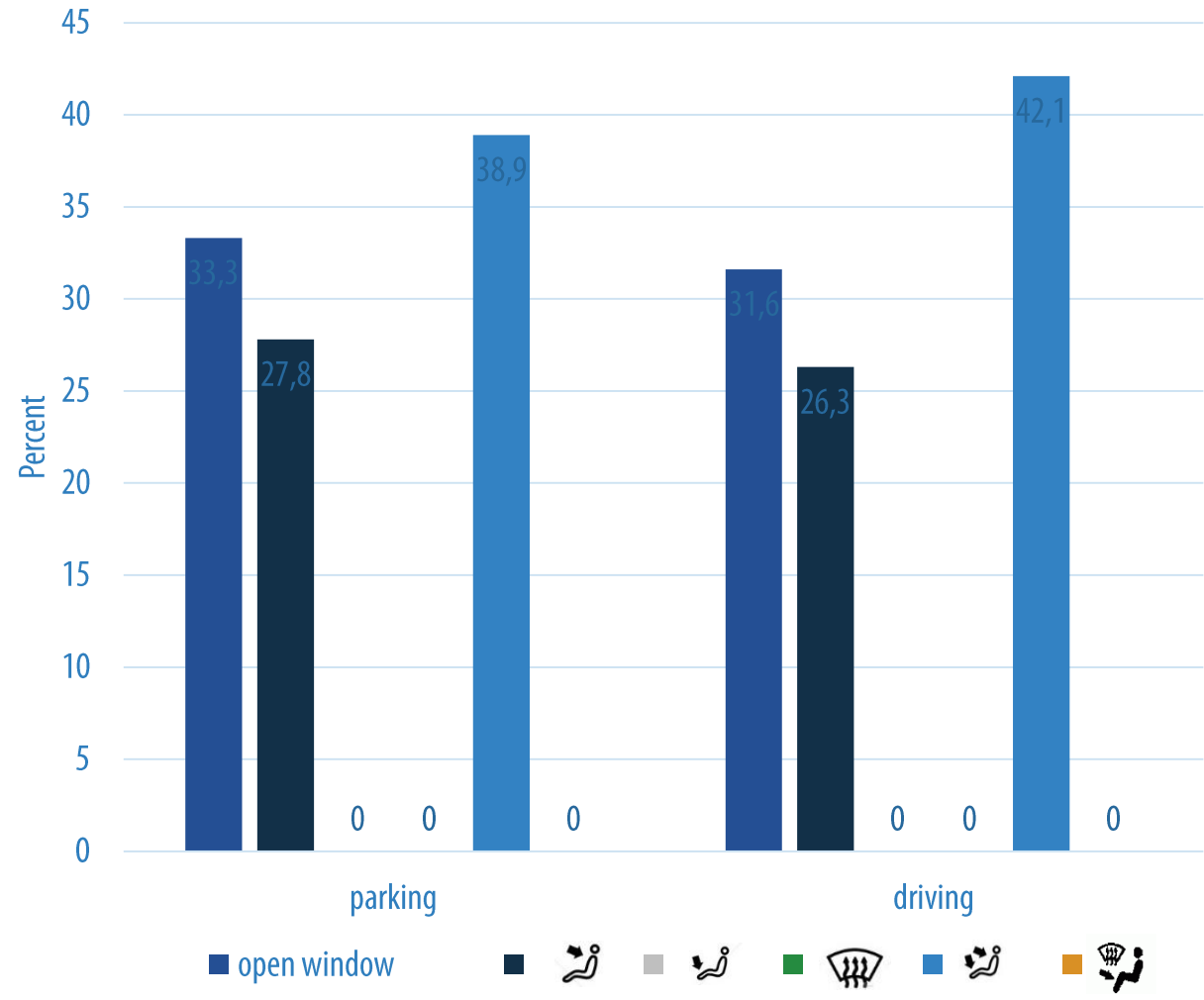


The ventilation direction

Ventilation direction (winter)

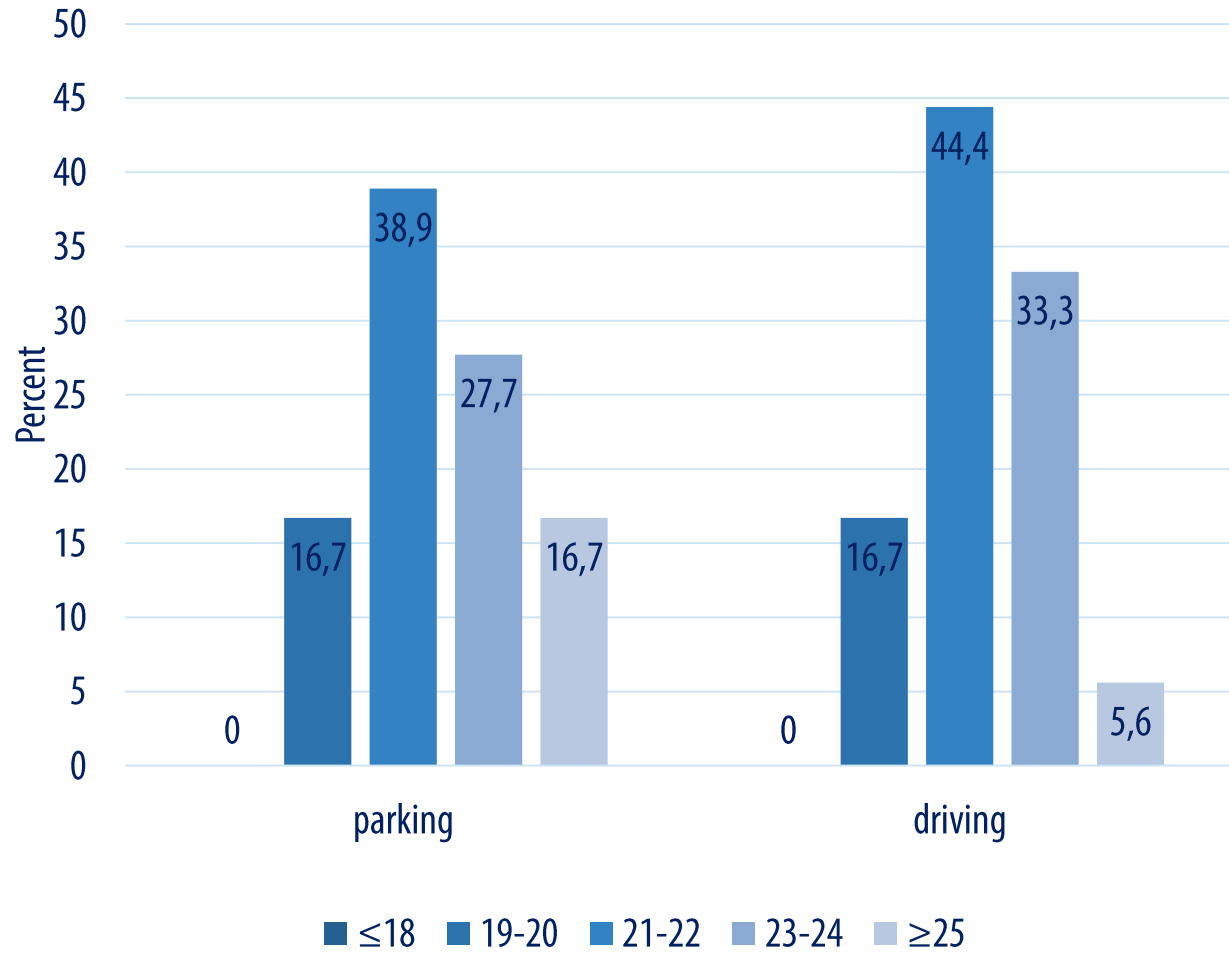


Ventilation direction (summer)

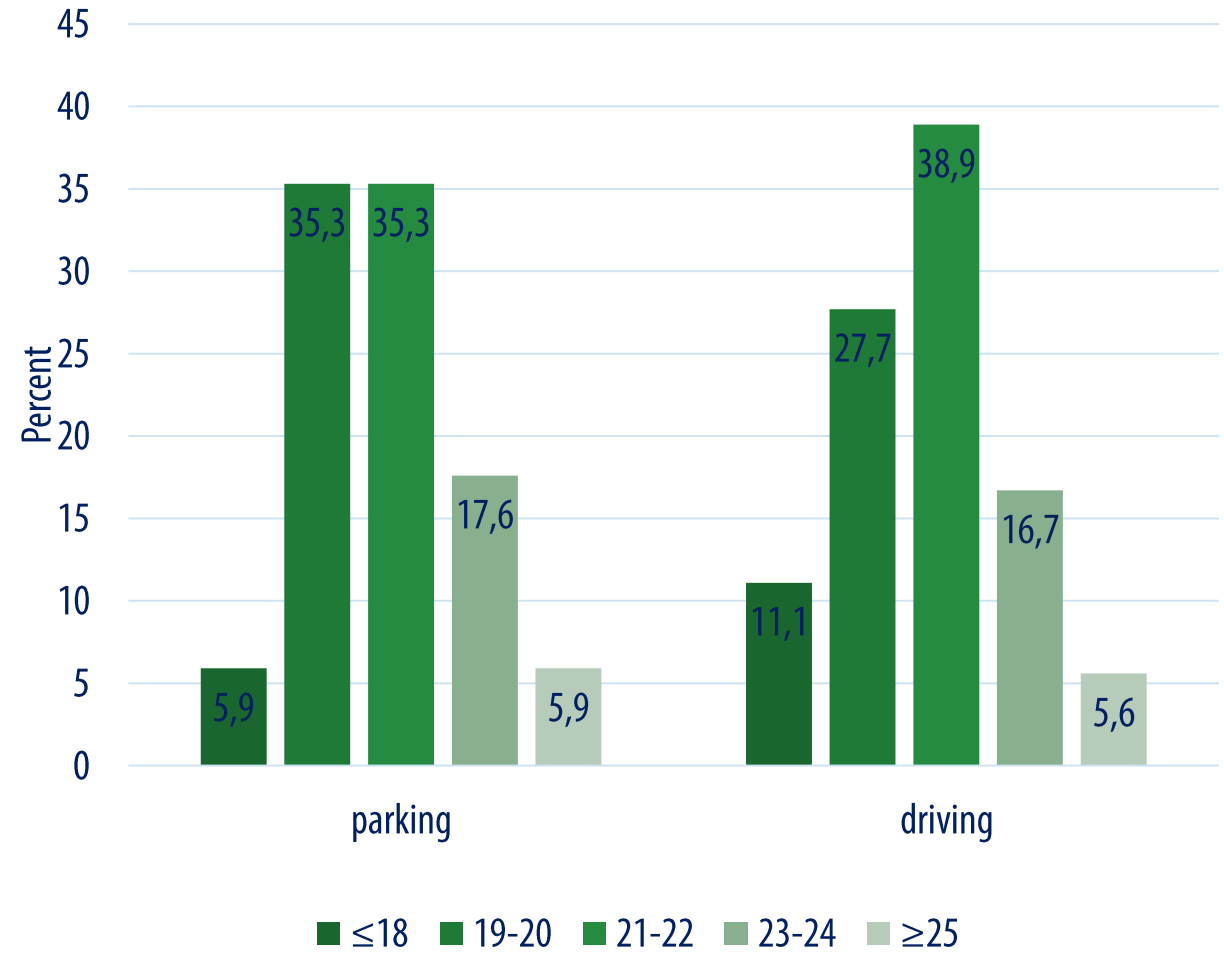


The temperature inside cars (°C)

Temperature inside a car (winter)



Temperature inside a car (summer)



Conclusions

1. Analysis of HVAC operating modes was carried out among 20 private car owners in USA.
2. All cars were equipped with gasoline engines and 65% were less than 3 years old.
3. Around half of cars have HVAC system with automatic control and only 19% equipped with carbon cabin filters.
4. All owners pre-cool the interior during less than 5 minutes in summer time and 75% of owners pre-heat the interior during 5...10 minutes in winter time.
5. Most of owners, 60% use a car from 1 to 2 hours a day and around 50% of people keep engine running if they are waiting inside a car less than 5 minutes.
6. Around 70% of owners use air conditioning in summer time and almost all owners use air heating in winter time.
7. Around 40...50% of owners switch recirculation ON in summer time and only 7...18% - in winter time.
8. Around 50% people set the ventilation speed at minimal level in winter time and around 60% at medium level in summer time.
9. Most of people set inside temperature in the car cabin in the range of 21..22°C in winter time and from 19 till 22°C in summer time.

Thank you for your attention!

