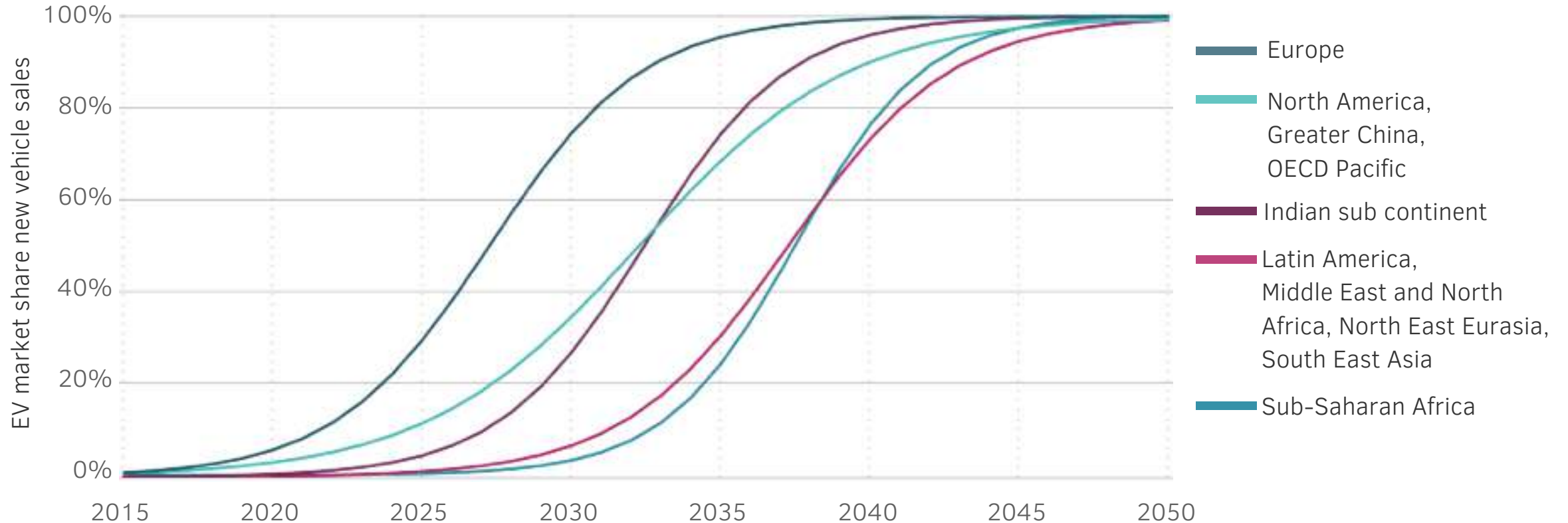
A photograph of a row of electric cars parked at a charging station. The cars are white and are connected to charging cables. The scene is overlaid with a semi-transparent blue filter. In the background, there is a stone wall and a parking sign with the letter 'P'.

The Norway way for grids:  
Electrifying the traffic system of a whole  
nation– but can the grid handle it?

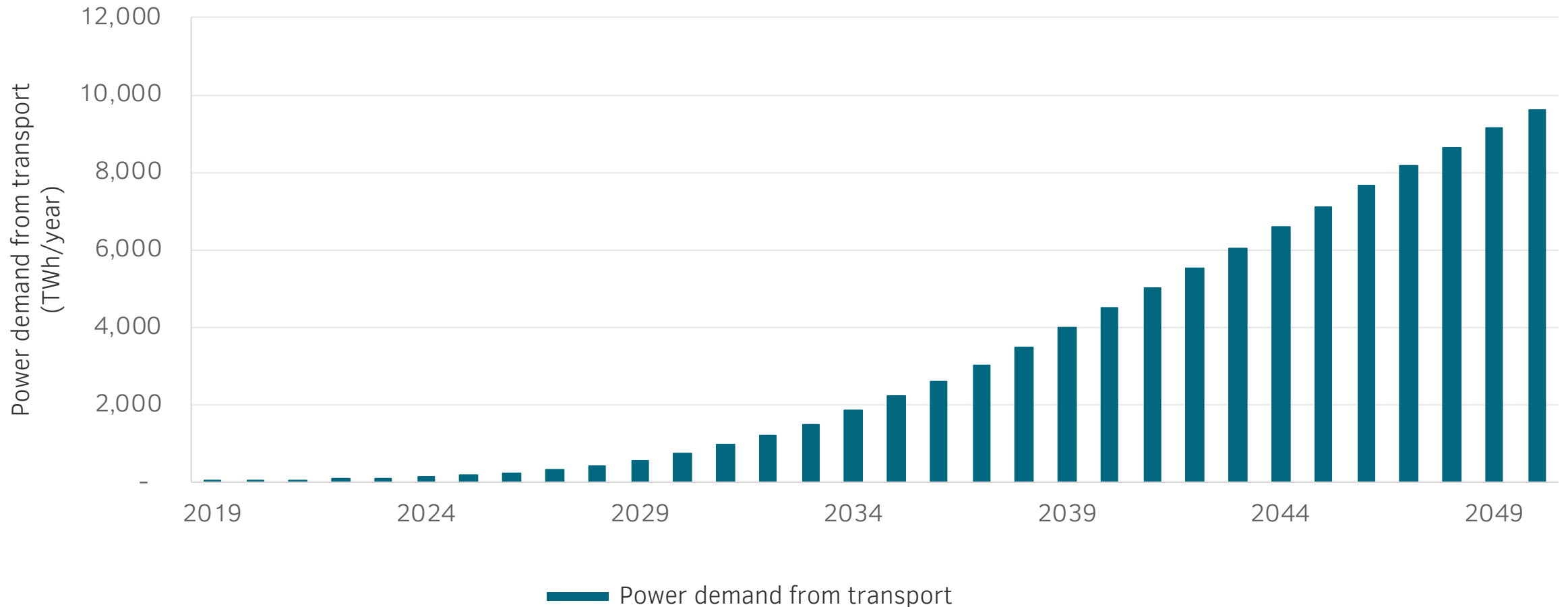
# Europe as a forerunner in globally rising EV sales

Global EV market share uptake in new vehicle sales



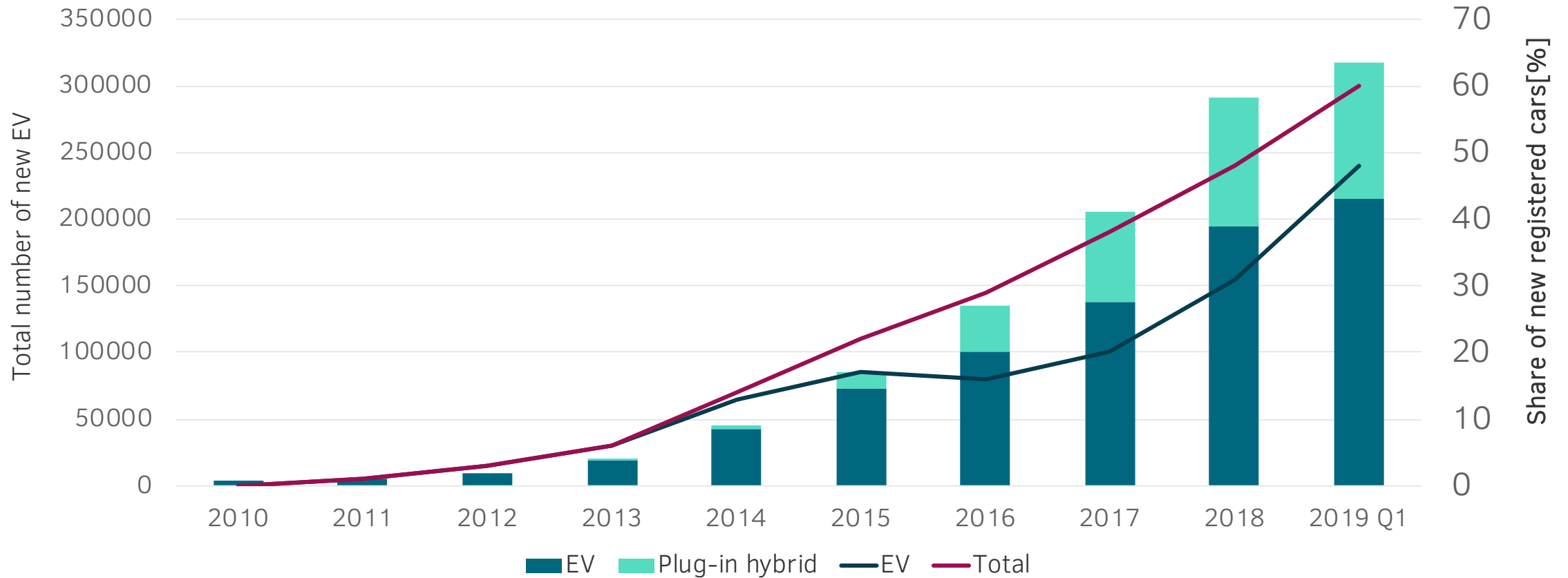
# EV uptake leads to additional electricity demand

Global power demand caused by electrification of transport



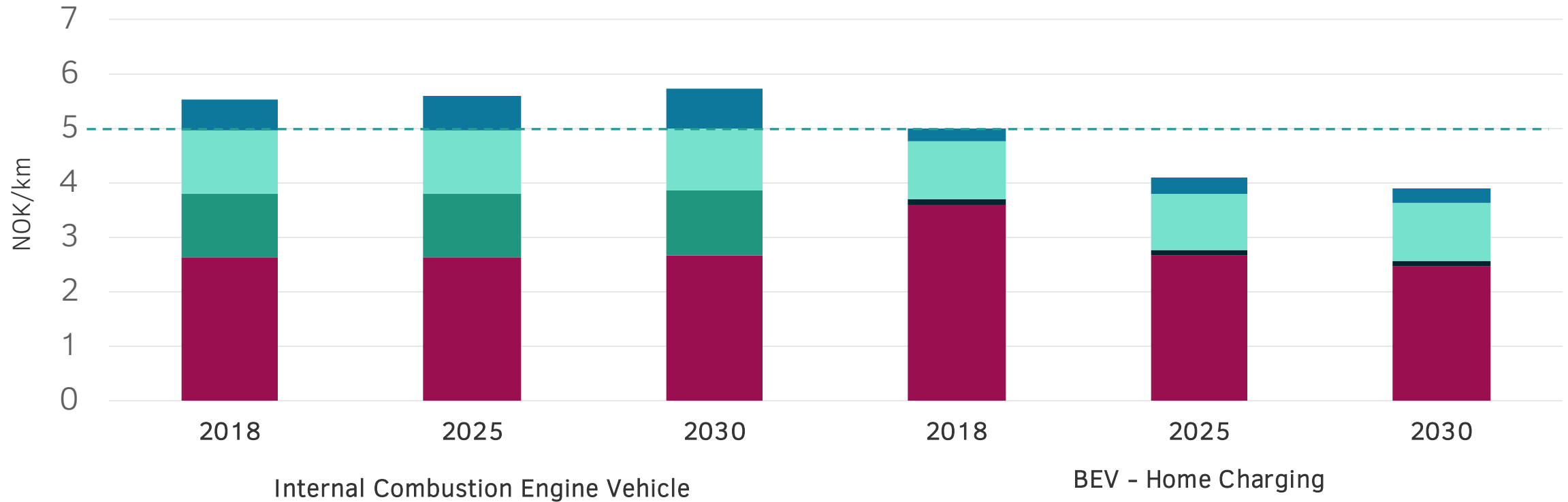
# In Norway already in 2019 50% of new cars are EVs

Number of new registrations and share of EVs in Norway



# EVs are still getting cheaper in the future

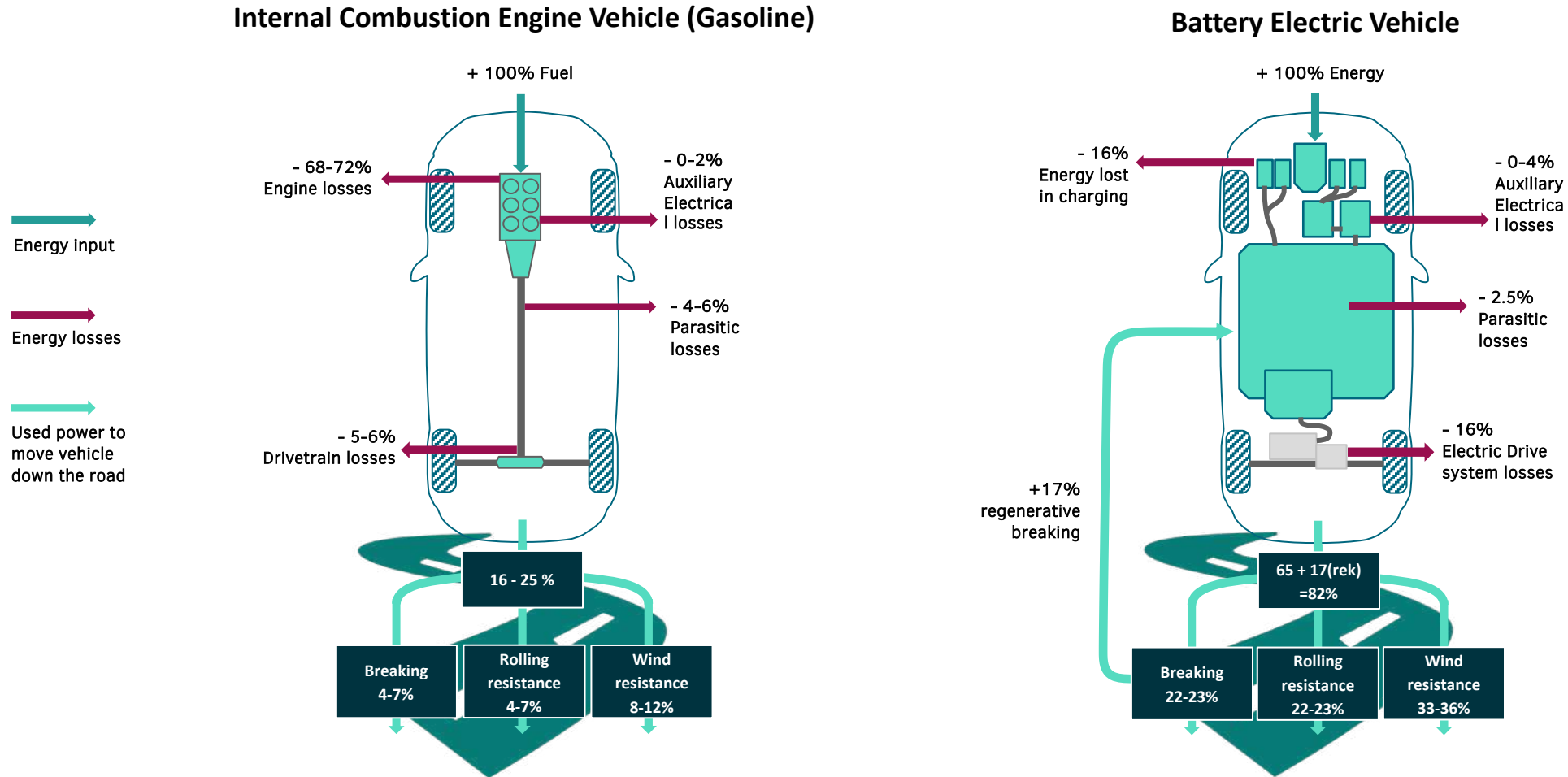
Total cost of ownership comparison for Norway



- Purchase price NOK/vehicle/year
- Charging infrastructure NOK/vehicle/year
- Fuel/Energy NOK/vehicle/year
- Registration duty NOK/vehicle/year
- Operation and maintenance NOK/vehicle/year

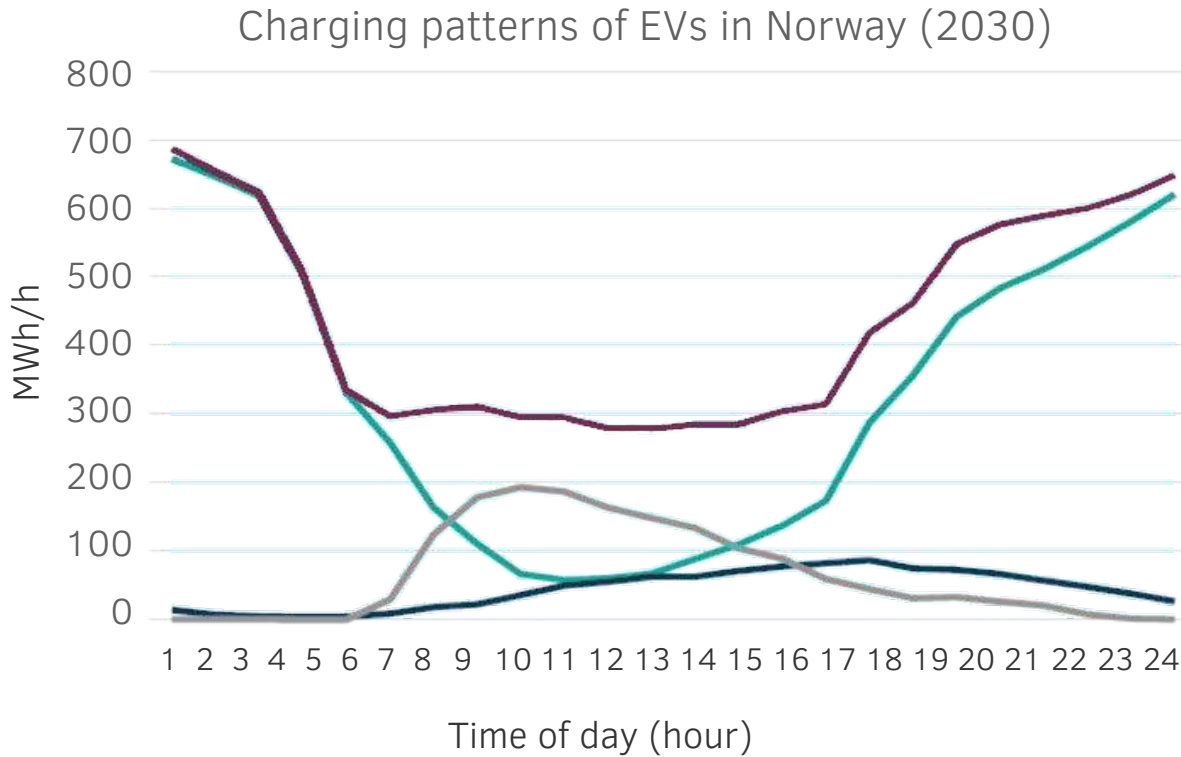
# Electric drivetrains provide higher energy efficiency than ICEs

Energy efficiency comparison of ICE and BEV

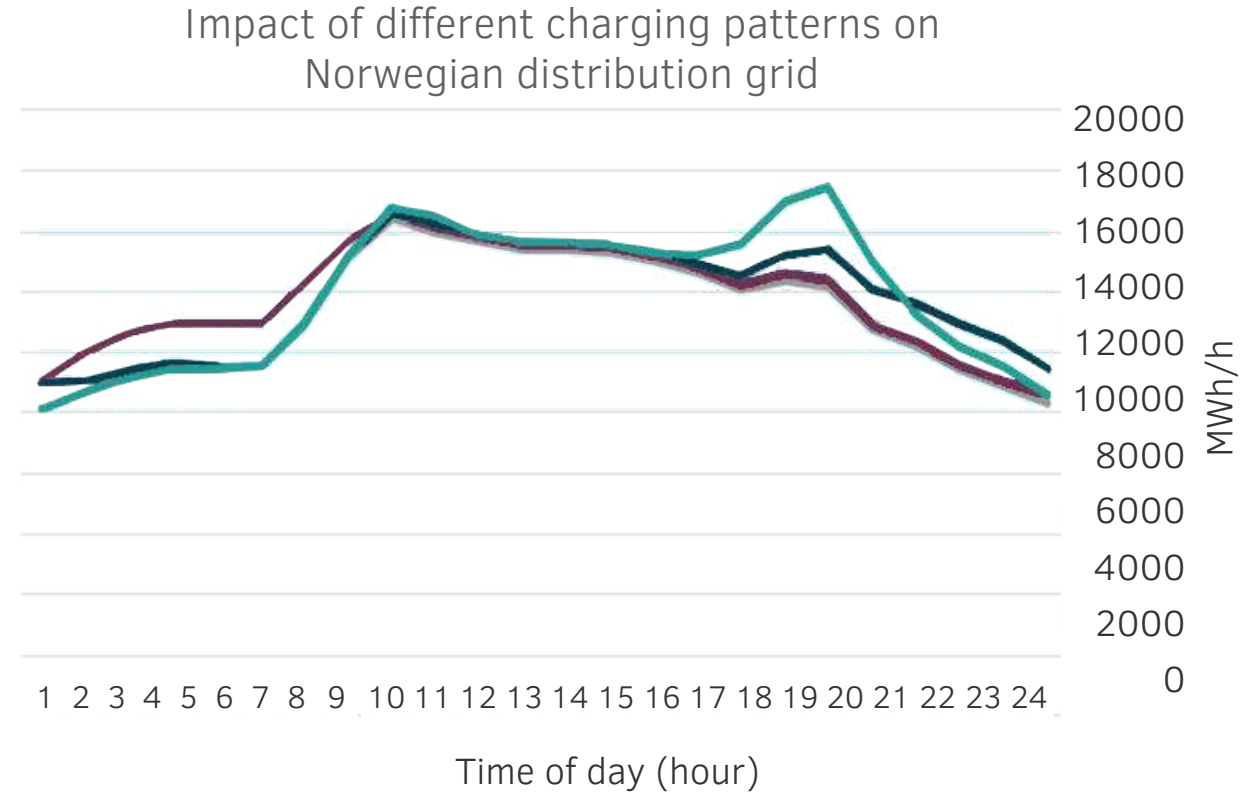


# Uncontrolled home charging with biggest impact on grid

Charging patterns of EVs and their impact on the Norwegian distribution grid



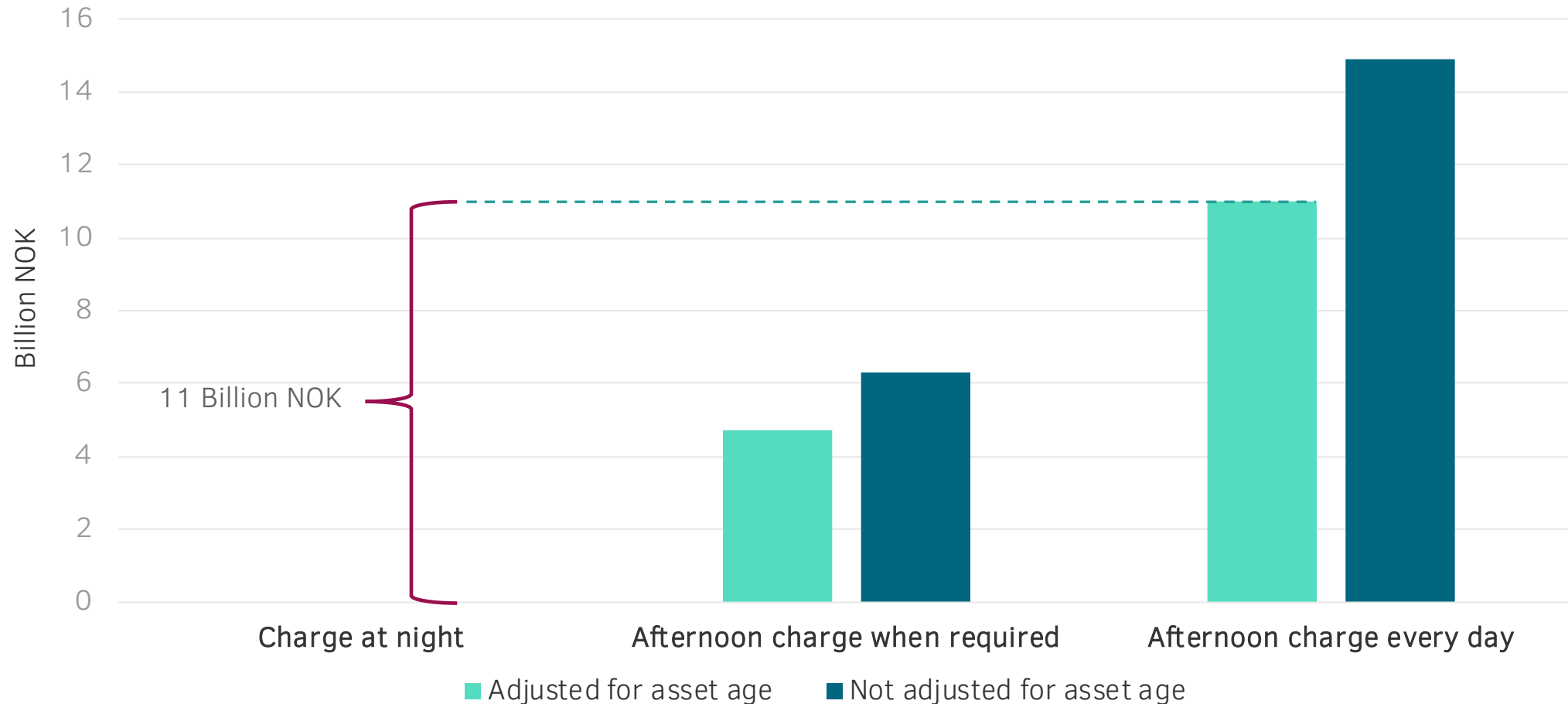
- Home
- At Work
- Fast
- Total



- Without EVs
- Charge at night
- Afternoon charge everyday
- Afternoon charge when required

# Managed charging can save up to 11 Billion NOK

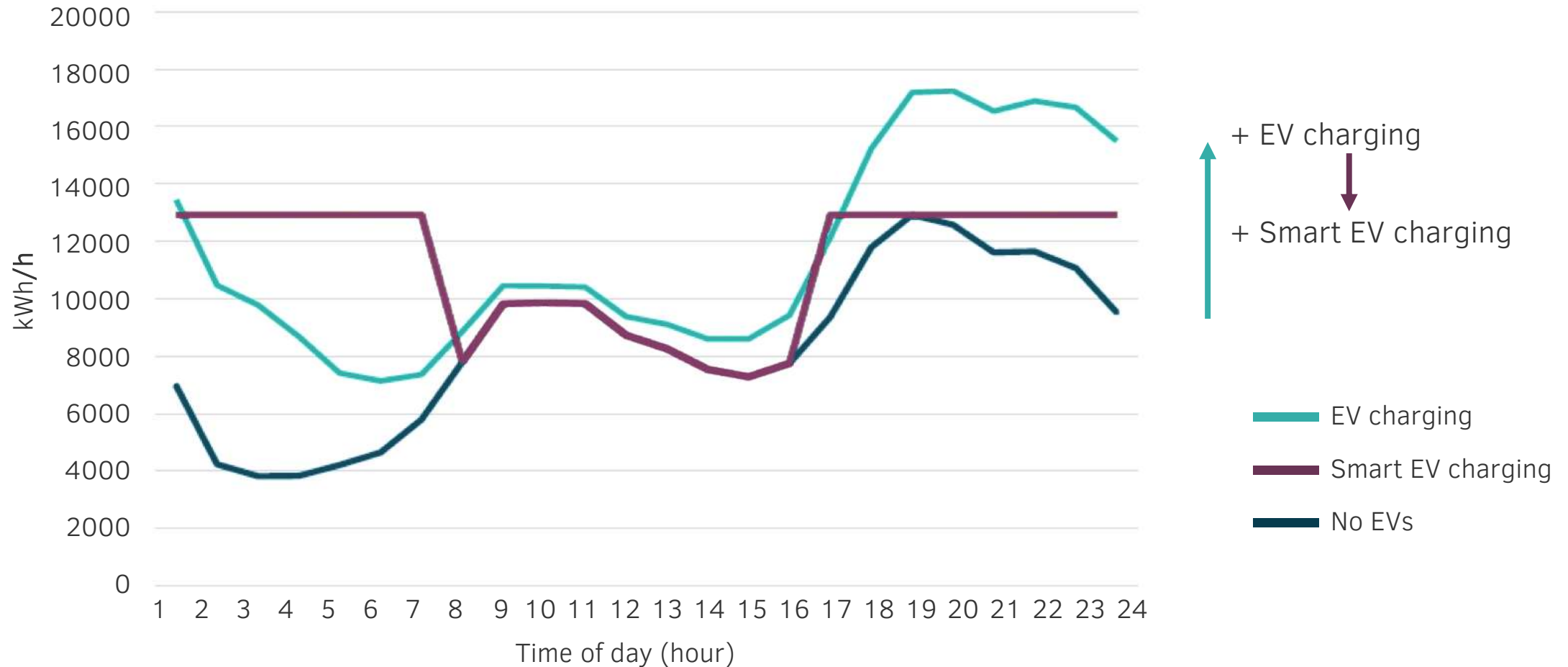
Extra grid investments on a national level caused by different charging patterns





# Smart Charging eases burden on the grid caused by EVs

Electricity load of Norwegian households on a cold winter day



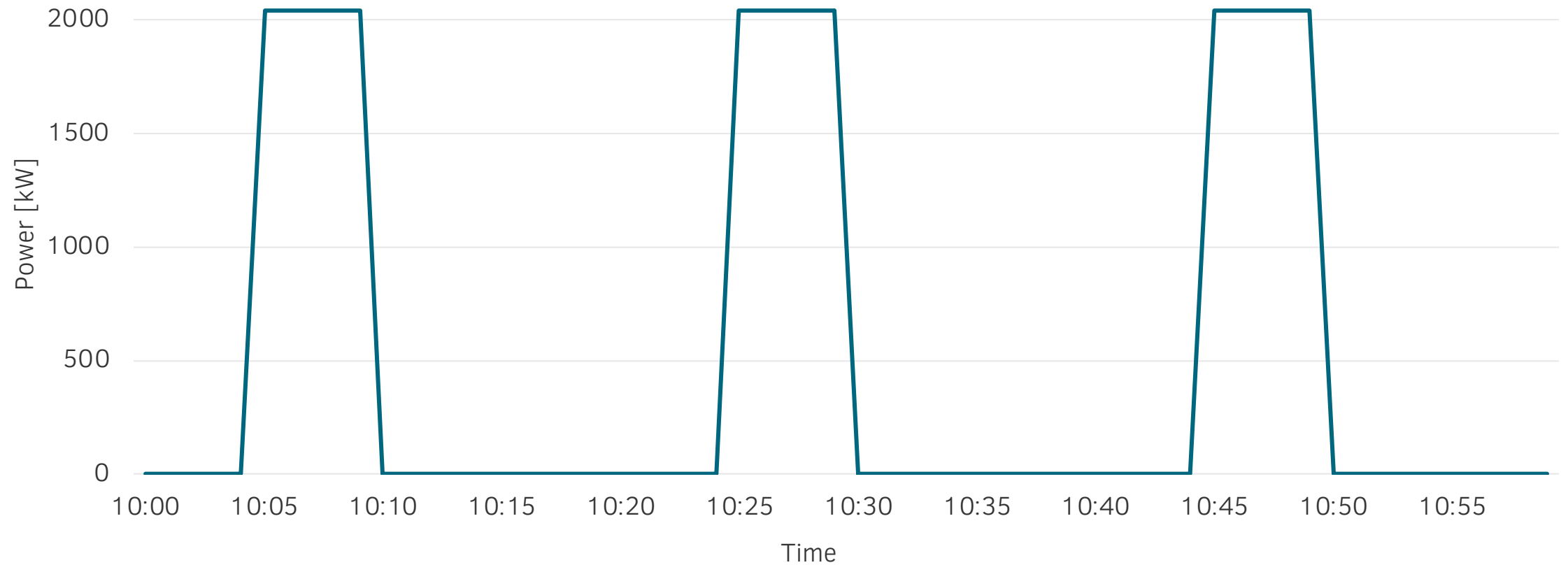
# High density of electric ferries challenging network operators

Planned and existing ferry stations in central Norway



# Short stops lead to high power but low energy demand

Typical charging pattern of ferries during the day



— Typical charging pattern of ferries

# Key takeaways from the Norway Way

Larger grid impact expected in other markets with lower average electricity load



More investments in distribution grids are required and the effects are localised



Smart charging and intelligent market design help avoiding high grid investment costs



Accelerating electrification of transport drives new load and charging infrastructure requirements



Ferries and other vehicles with a unique charging pattern can cause additional challenges

