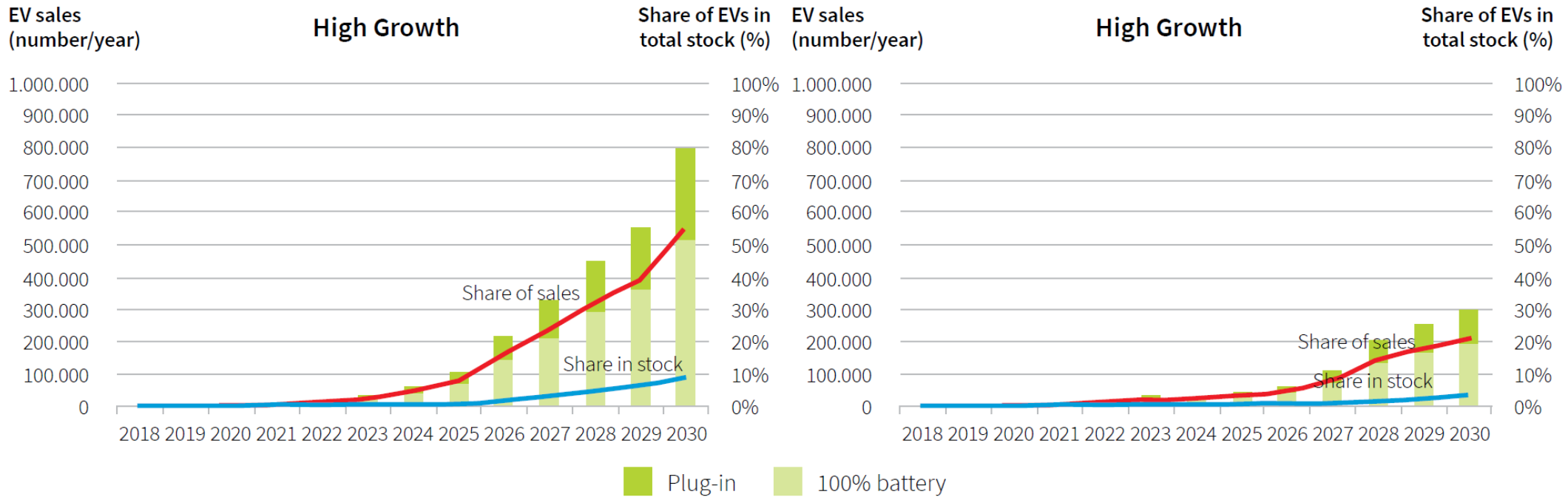
Transport sector transformation:
Integrating Electric Vehicles into Turkey's Distribution Grids

IRENA-CEM Second International Forum
Long-term Energy Scenarios for the Clean Energy Transition
Session 3: Systemic Innovation in energy demand and consumer behaviour

26 March 2020

Dr. Değer Saygın, Director – SHURA Energy Transition Center

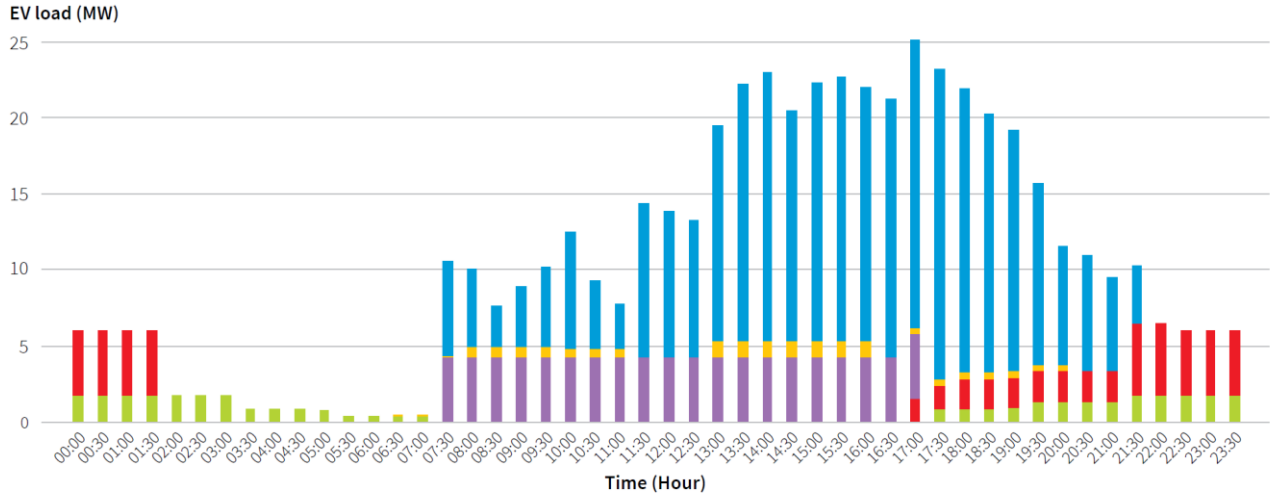
Projections in EV sales



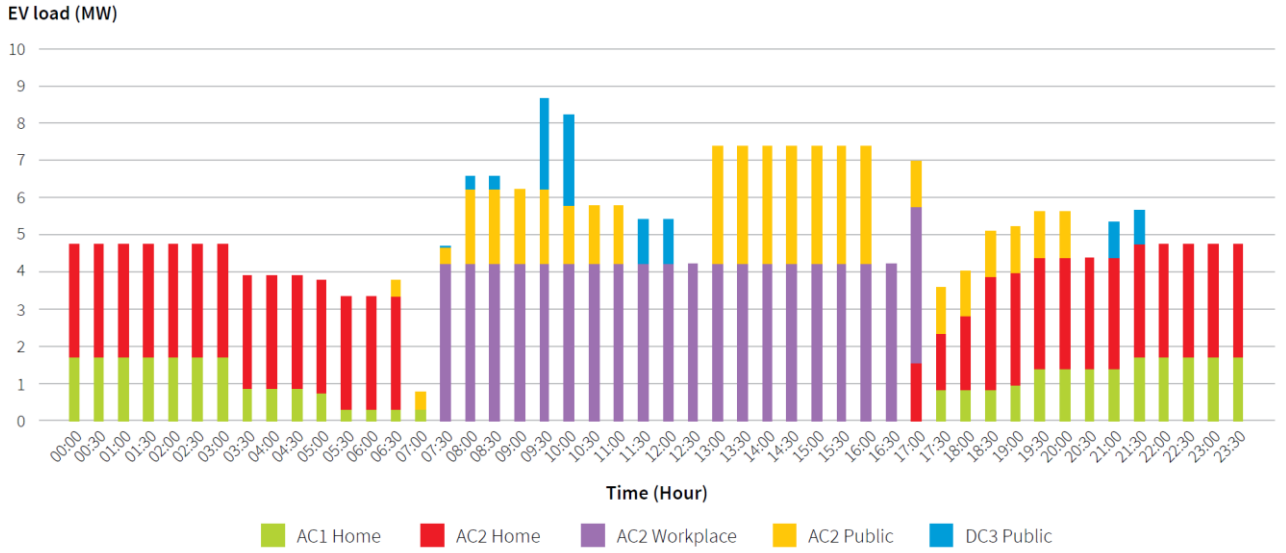
- Vehicle ownership has been assumed to increase to 300/1000 capita by 2030 up from 154/1000 capita in 2018
- Share of total EV sales (battery and plug-in) has been assumed to increase to 20%-55% by 2030
- Total number of EVs reach 1-2.5 million by 2030
- Breakdown of total EV and hybrid vehicle sales by 2030
  - High Growth: 15% hybrid, 55% BEV, 30% PHEV
  - Moderate Growth: 30% hybrid, 45% BEV, 25% PHEV
- Assumed characteristics of the average EV: 17 kWh/100 km ; 10,000 km/year total distance driven

Distribution of charging behaviour according to different charging support scenarios

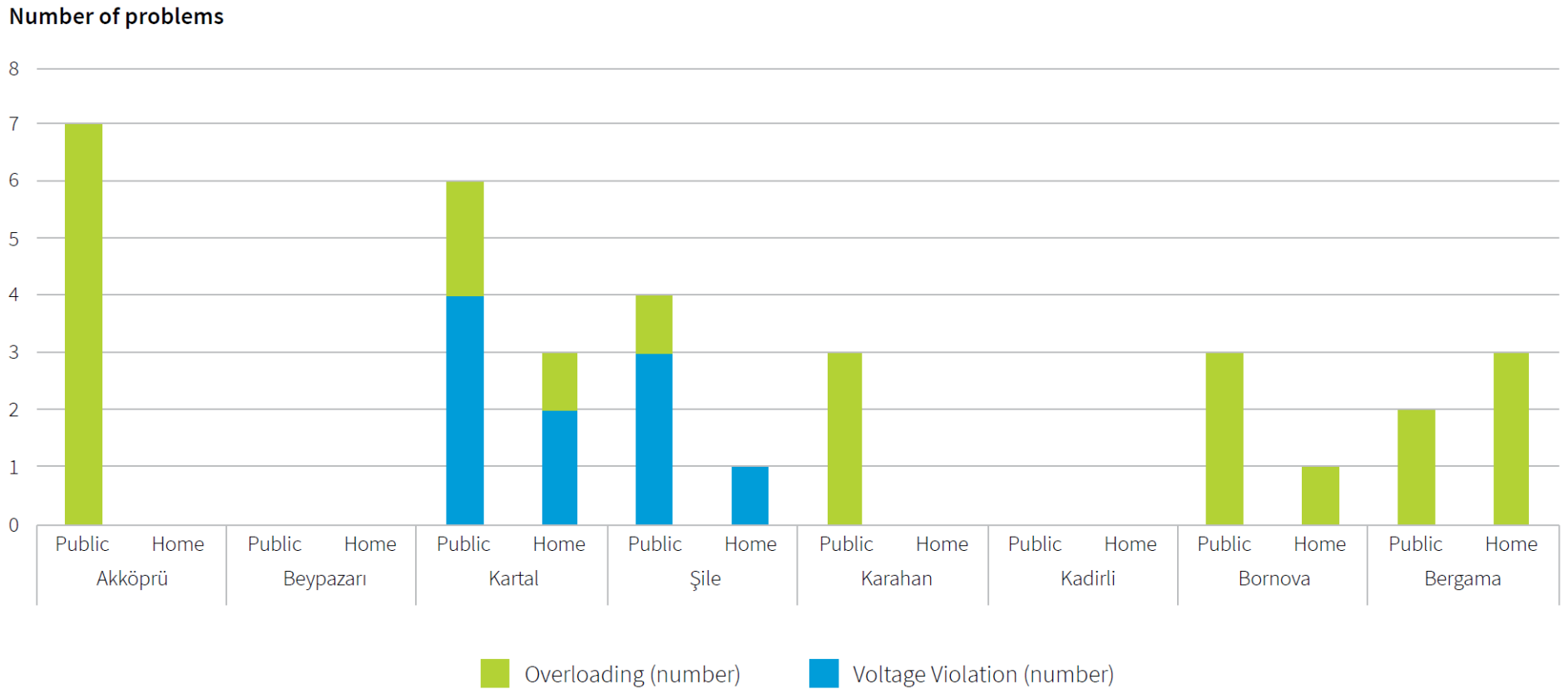
Public-based charging support



Home-based charging support



Impact of EV integration (High Growth scenario)

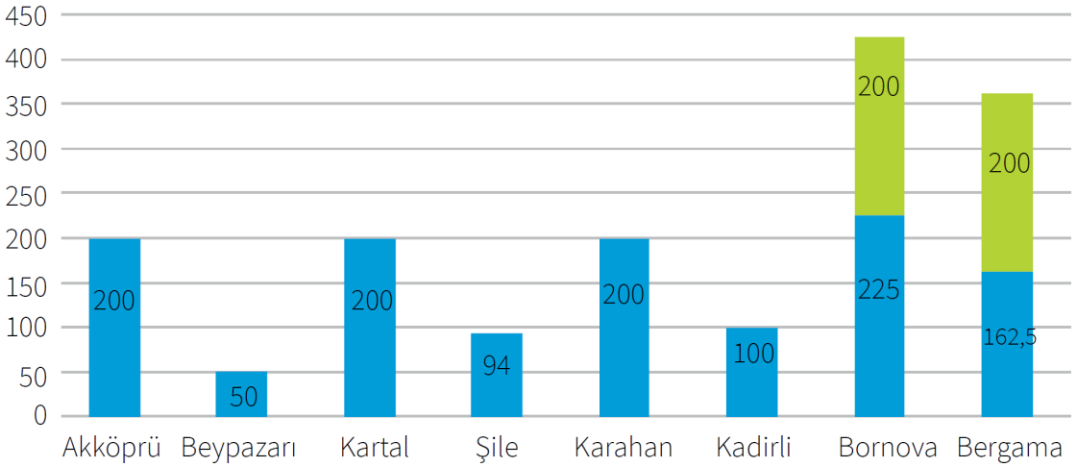


There is sufficient LV and MV distriubtion grid capacity available according to the investments in the Reference Model

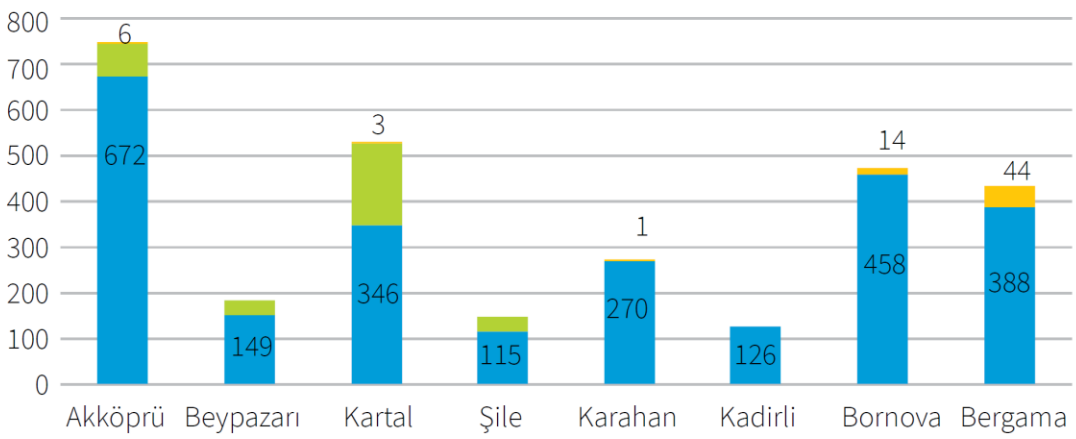
As a result, there is no additional investment needed in grids for EV integration, however, to minimise overloading limited additional investments may be needed in LV/MV transformer stations

Impact of EVs (High Growth scenario)

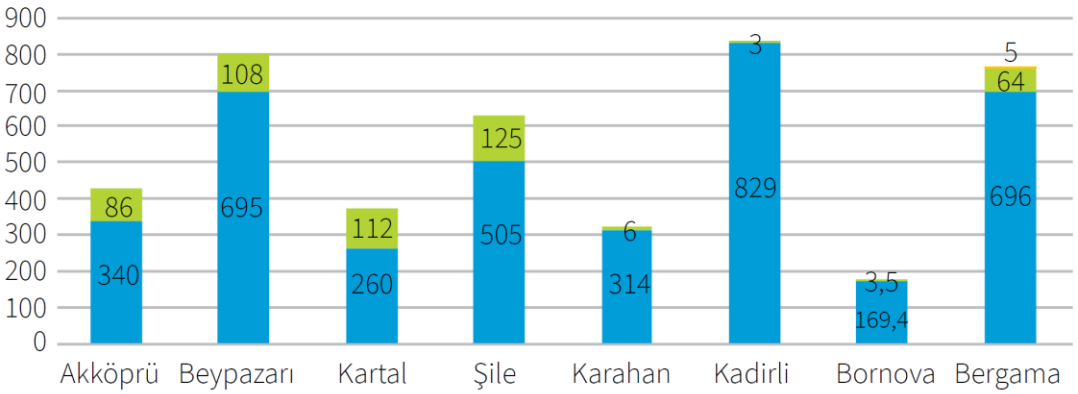
Transformer Capacity (MVA) - HV/MV



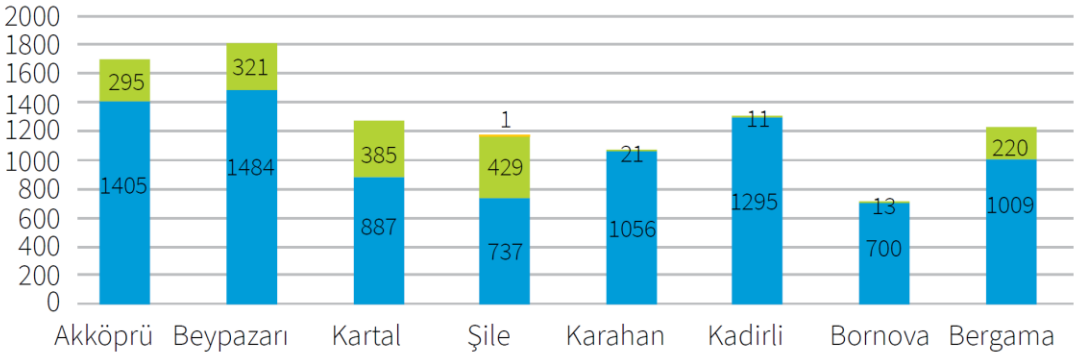
Transformer Capacity (MVA) - MV/LV



Line (km) - MV



Line (km) - MV



2018 Reference Model EV integration

Priority areas for transport sector transformation of Turkey

- Accelerate the market for EVs and charging services in parallel
- Develop and implement smart charging mechanisms for load management
- Develop region-specific measures to avoid overloading and voltage violations
- Assess, develop and implement new business models for EV charging
- Continue the planned investments in distribution grids in line with the growth in electricity demand
- Utilise synergies between EV charging and renewable energy integration and energy storage
- Assess and plan for utilising the benefits of EV development jointly with other sectors

Thank you!

Değer Saygın (deger.saygin@shura.org.tr)

@shuraedm

@company/shura