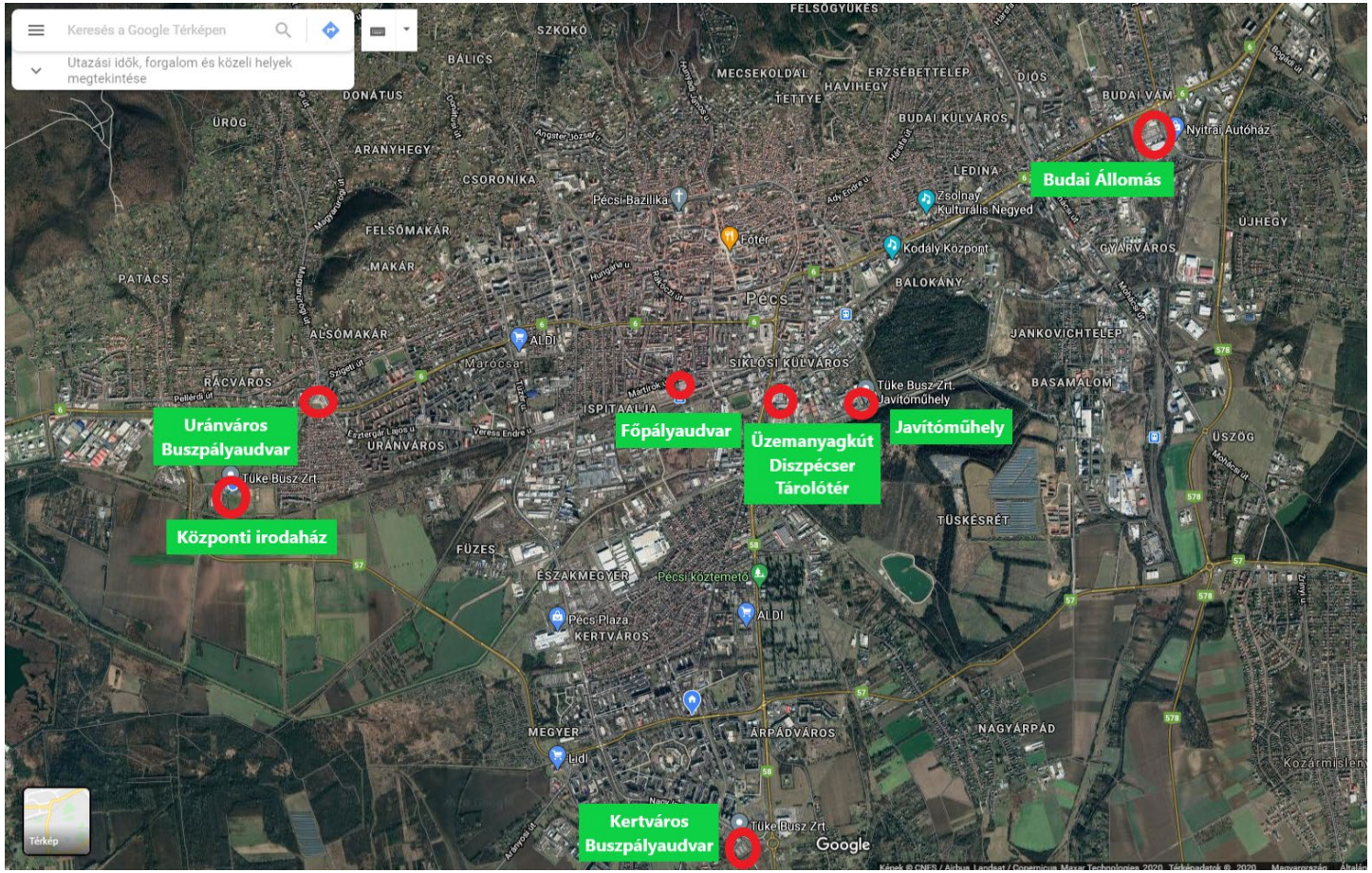
Mobility electrification in the Pécs Public Transport

Tüke Busz Plc.

- Start of operation: 1 April 2012
- Owner: Municipality of Pécs City of County Rank, 100%
- Number of employees: 470 people

City of Pécs and the location of Tüke Busz Plc. premises within the city (headquarter, bus stations, maintenance unit)



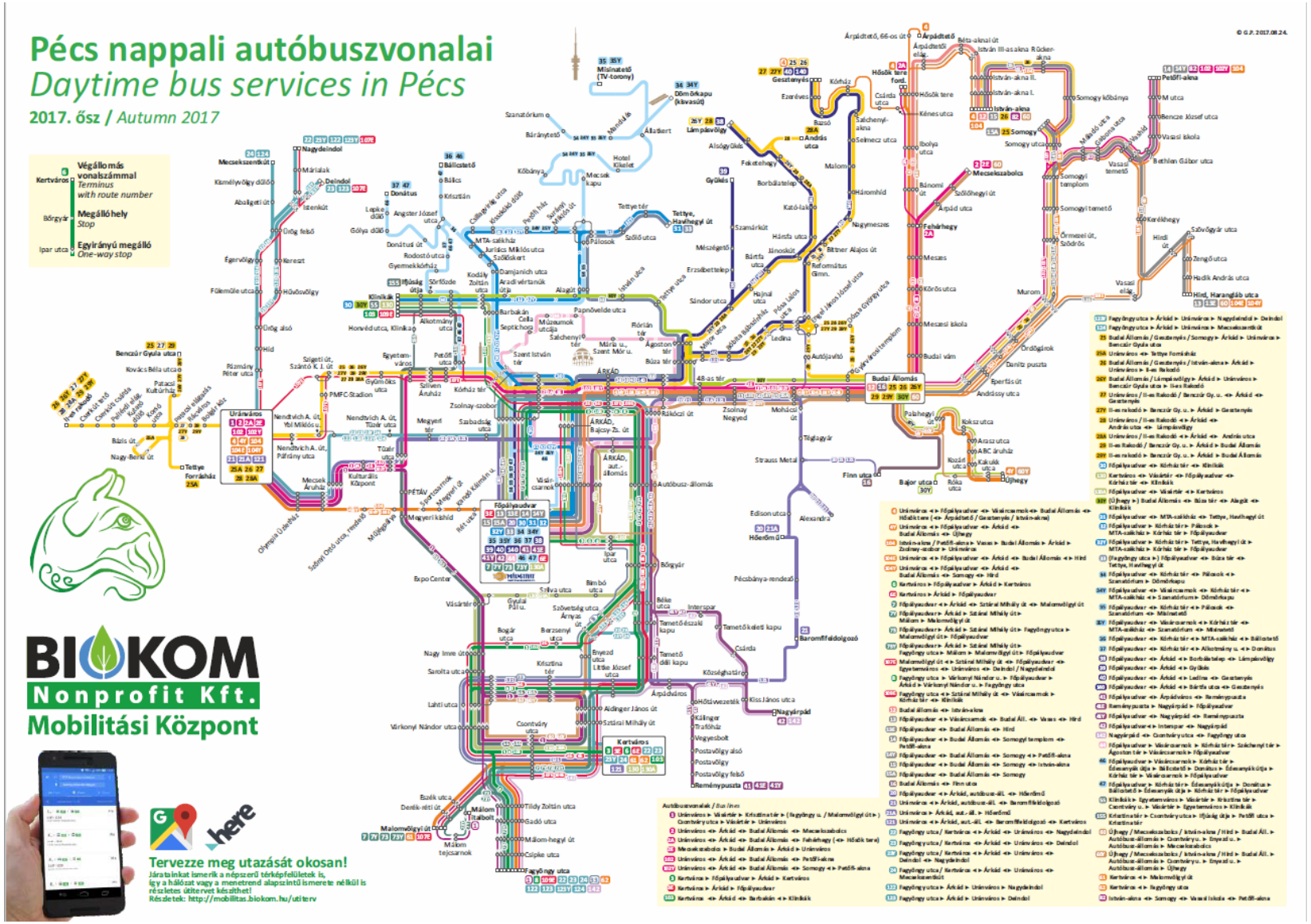
Current bus fleet

Manufacturer and type	Verison	Number of buses
Mercedes-Benz O345G Connecto	Articulated	24
Volvo 7700A	Articulated	38
Volvo 7900 A	Articulated	5
Credo Citadell 12	Solo	20
Credo Econell City	Solo	5
Volvo 7700	Solo	72
BYD K9UB	Solo	10
Total number of buses		174

Main traffic data

- Number of bus lines: 91 (+ 8 night lines)
- Number of bus services per working day: 2,284
- Useful kilometres per working day: 23,549 kms
- Number of passengers transported (2019): 40,103.1 thousand people/year
- Rate of bus services successfully completed (2019): 99,81%
- 7 million kilometres driven per year

Line network



The electric bus fleet as of today

- 10 db BYD K9UB buses
- „Floading” AC chargers
- Solo buses
- Procurement financed from ITDOP
- Planned running 75,000 kms/bus/year
- Average energy consumption

  1,06 kWh/km

Charging infrastructure

- „Floading” chargers

- 10 pcs of 2x44kw AC charger,

2 pcs Type 2 charger with connectror

- Charging time: 4-5 hours

Difficulties in operation

BYD buses

- Construction error of the air conditioners in the passenger compartment. Repair of the problem took 1,5 months.
- Door adjustments, lack of professional support from the manufacturer
- Passenger compartment hand-grips, USB chargers get lose, and turn to different directions
- Motor vehicle body parts are delivered during 5-6 weeks

Difficulties in operation

Charging infrastructure

- Unacceptable sercive support
- Service support headquarters is in the Netherlands, without Hungarian service support
- Slow reaction time to the problems
- Slow management of guarantee issues
- As a consequence, the e-buses are quite often out of service

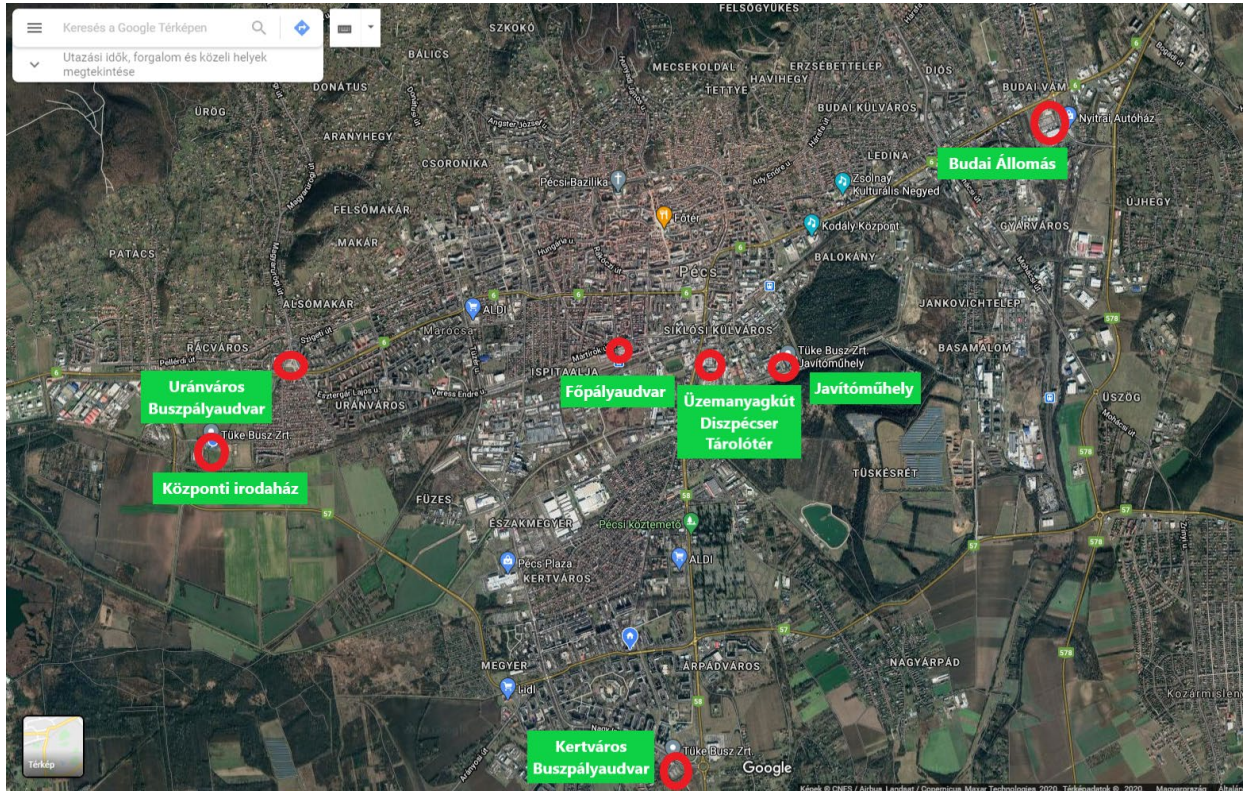
Against all of these we go forward…

- Within the Green Bus Programme in the 4th quarter of 2022 8 new electric buses are purchased with DC chargers
- Deployment of decentralised charging network
- Electric bus lines are introduced that fit the special city needs

ZÖLD BUSZ PROGRAM
powered by HUMDA
Tiszta energiában utazunk

Decentralised charging

- In compliance with the location of the city (morphology)
- In support of maximising mileage
- Energy need of hilly sections
- Securing the operation
- Maximising rolling stock roster
- Meeting special needs



Problems on horizon

- From where we receive/purchase the necessary amount of energy?
- How to charge with photovoltaics during the night?
- What happens if one time 174 buses are connected to chargers?

Opportunities for implementation

- Deployment of PVs, creating a local power station which feed into the city grid that energy during the day which is used by electric buses for charging during the night
- Decentralised charging, with smart management of charging
    - Low cost of investment
    - Provision of optimal use of energy
    - Implementation that result in secure operation
- Storage? €€€+

Questions of the future

- What would happen if the whole fleet is replaced by electric buses?
- How to manage charging?
- What is the solutions to runaway energy prices?
- Hydrogen buses?

Possible answers

- Solution to be sought to the altered, unprecedented energy needs
- Establishment of grid system in charging and in operation
  starting with e-bus charging, ending at passing the buses to drivers, system level automation is needed for optimal operation
- Operation of homogenous fleet
- Using as much as possible renewable enery during operation
- Use of hydrogen driven buses, maximal support provided to green hydrogen projects

Thank you for your attention!