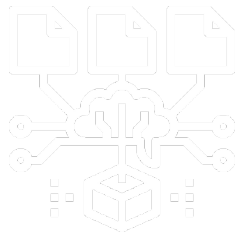


Qbuzz

Content

- Qbuzz profile and zero emission (ZE) roadmap
- ZE buses and chargers Utrecht Area
- Data and Viriciti



We are Qbuzz

Groningen Drenthe region:

- 100.000 commuters per day
- 1.000 employees
- 436 buses (196 ZE)



Qbuzz



Utrecht region:

- 200.000 commuters per day
- 1.200 employees
- 335 buses (69 ZE)
- 44 trams



UOV



DMG region:

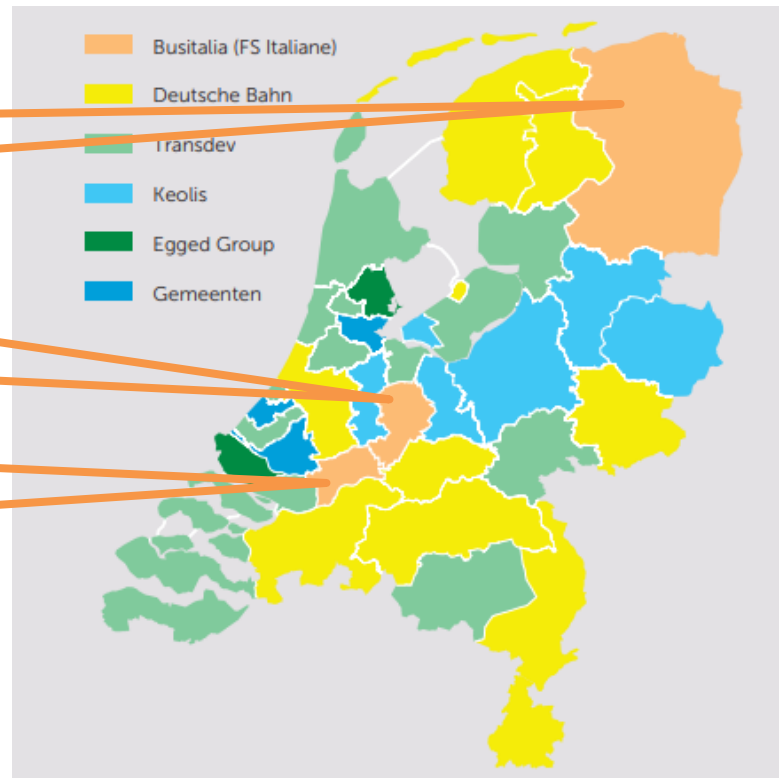
- 50.000 commuters per day
- 450 employees
- 166 buses (45 ZE)
- 10 trains



Qbuzz



Net turnover EUR 300 mln



Qbuzz zero emission roadmap

2014

3 battery



2017

+22 battery



+2 hydrogen



2018 - 2019

+46 battery



2019 - 2020

+169 battery



2021 - 2022

+38 battery



+30 hydrogen



2030

CO₂
0%



video

- <https://youtu.be/YQ7tHaoLac4>

Zero emission bus fleet Utrecht

Concession	#	Brand	Length	Entry	Battery	Type	OC	Autonomous Range	
								Meters	Year
Utrecht	3	Optare	8	2014 Exit: 2021	90	LFP	90	65	86
Utrecht	11	Ebusco	12	2017	311	LFP	150	160	215
Utrecht	20	Ebusco	12	2020	363	LFP	-	185	250
Utrecht	35	Heuliez	18	2021	250	NMC-G	450	95	120
Utrecht	3	Heuliez	10	2021	350	NMC	-	180	240



Methods of charging Utrecht

Bus depot Europalaan:

Overnight charging 11x plug-in (75kW)



Bus depot Zeist:

1,2 MW container + 20x charge satellite (60kW-120kW)



Bus depot Remiseweg:

Portals 36x pantograph charging (50kW-300kW)



Bus stop Utrecht CS:

60kW induction charging



Bus stop Vechtsebanen:

2x 300kW inverted pantograph

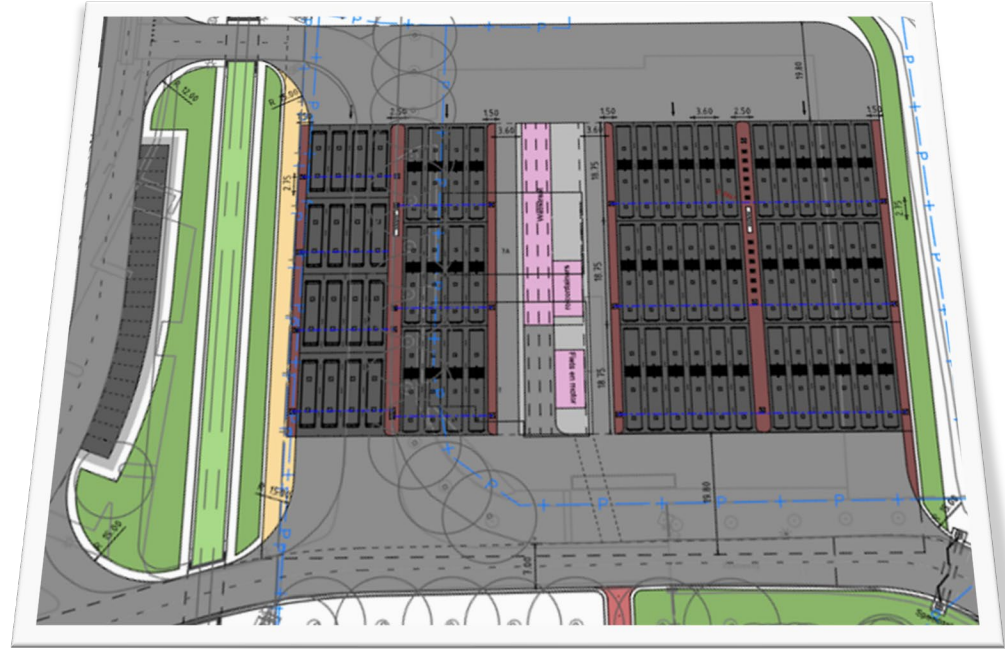
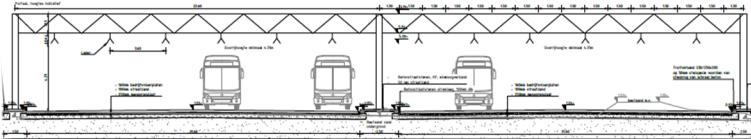


Bus stop Lunetten and Utrecht CS:

4x 450kW pantograph up / contact hood

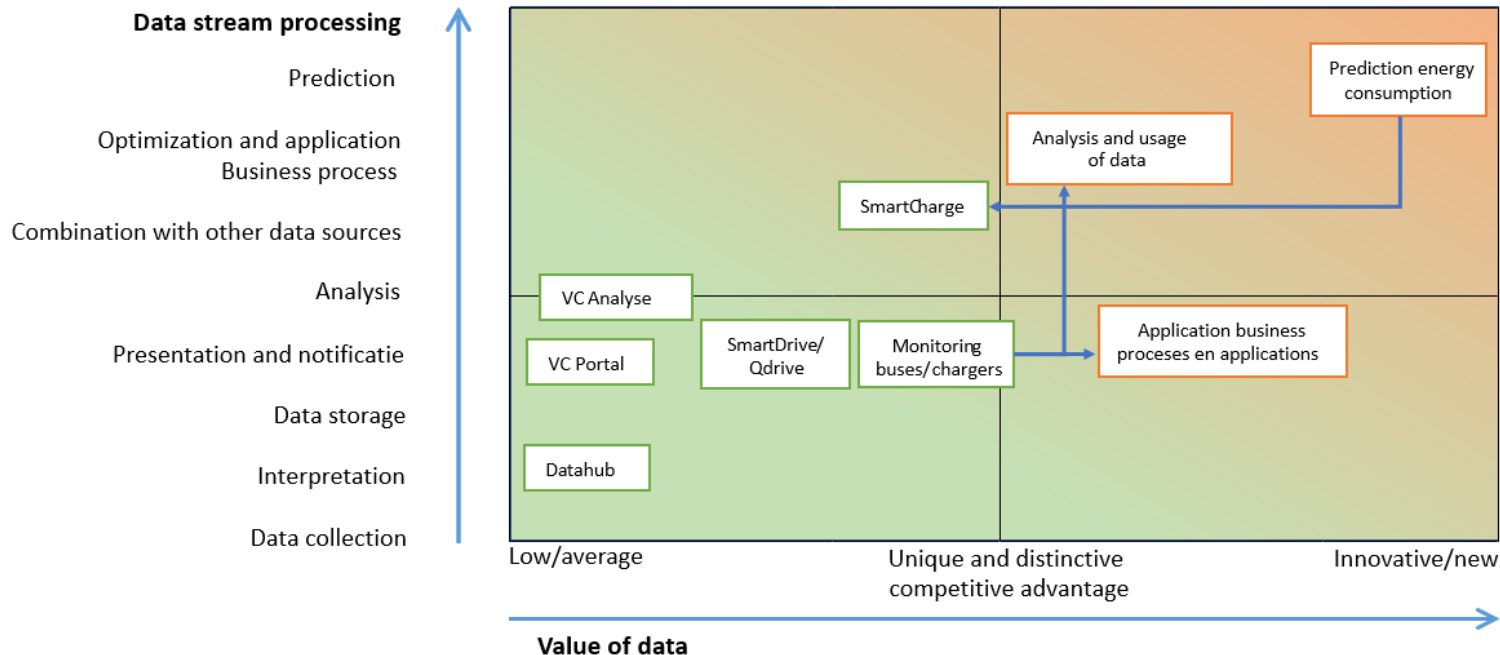


Lay out bus depot Remiseweg



Data and Viriciti

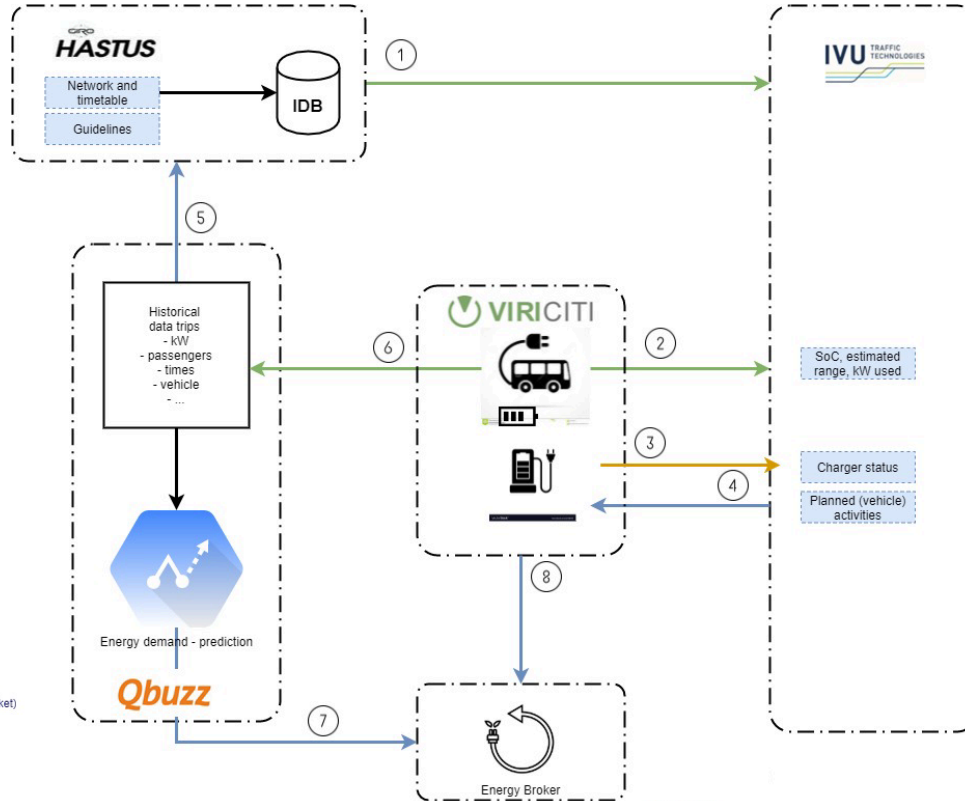
External - Internal



Monitoring



Data architecture



- **Hastus** provides the Network planning, Timetable planning and Planned Vehicle working schedule
- **IVU.fleet** monitors the daily vehicle operation, e.g. the position, punctuality and for EV SoC and estimated range.
- **IVU.fleet** monitors the daily charging operation including charging infrastructure and charge activities: correct charging location and vehicle at the right time.
- **IVU.vehicle** plans and controls the daily vehicle deployment for dispatching, parking location and maintenance.
- **IVU.vehicle** provides input for charging activities (charging plan)
- **Viriciti** monitors SOC and estimated range of electric vehicles.
- **Viriciti** monitors the charging infrastructure and charger status (available, charging, out of service)
- **Viriciti** level 1-3 smart charge
- **Viriciti and IVU** level 4 smart charge
- **Viriciti** controls charging infrastructure through OCPP

interfaces

Operational
Available, to be implemented
To be developed

1. IVU dataset
2. API Viriciti to IVU
3. Chargers API to IVU
4. IVU vehicle planning export
5. Historical data
6. API Viriciti to Qbuzz
7. Energy demand prediction (day ahead market)
8. Charging restrictions

Qbuzz