Good Practice in E-Mobility

Structured approach to e-bus transition at VHH Hamburg

Wir fahren Sie.

Nina Zeun, April 2021

VHH
Verkehrsbetriebe Hamburg-Holstein

The Transition to E-Mobility

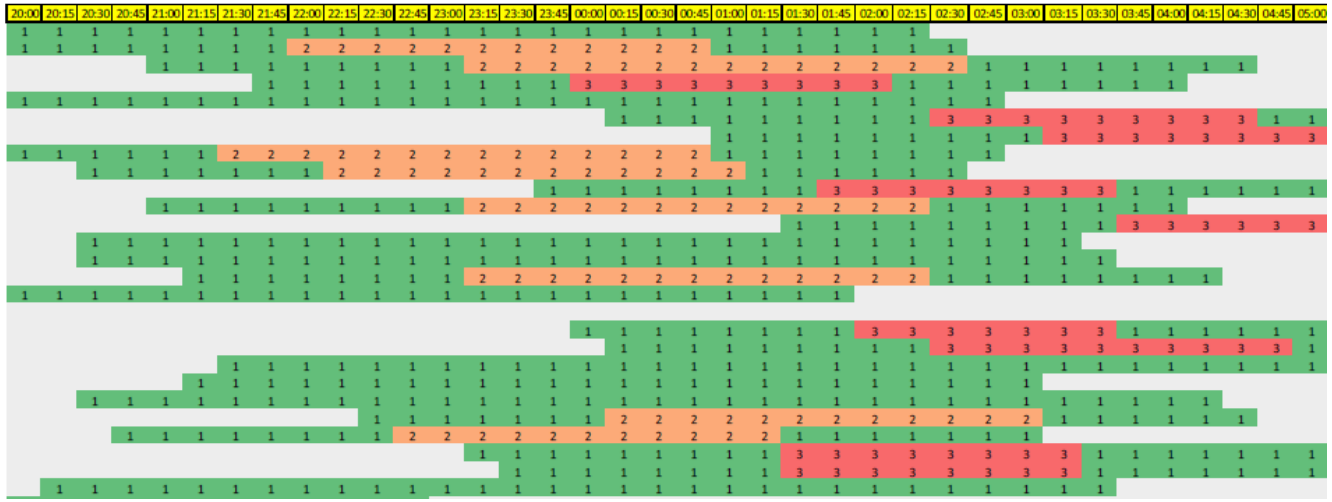
- is a marathon, not a sprint (for VHH approx. 10-14 years to all electric)
- effects almost everyone in the company
- brings new complexities to the business
- for VHH is an organisational change project
- Each company should use workshops to develop their own roadmap to transition.

01 - Energy demand of e-bus operations

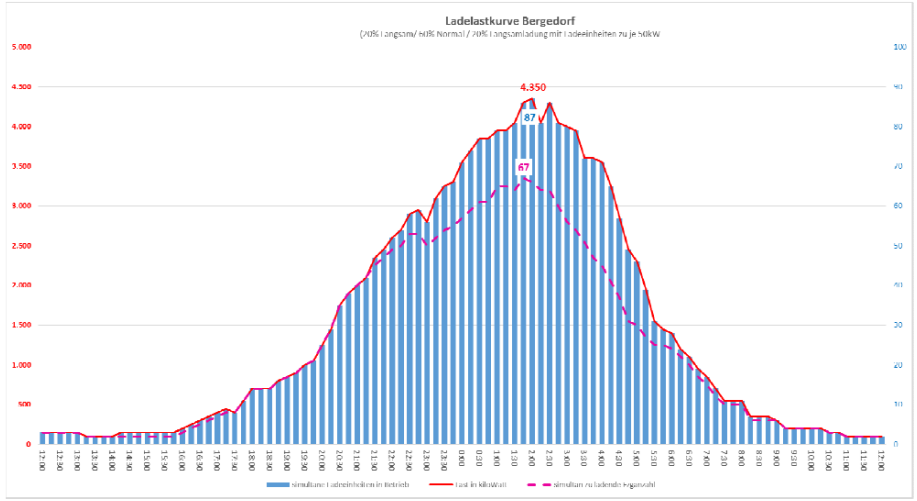
- How to find out how much energy your busses will need?

Estimate energy use per km (e.g. 1,7 kWh/km solo bus / 2,2 kWh/km articulated bus).

Ask the e-bus provider, or even test their buses for this.



Apply to your runs, then draw up needed charging on a timeline.



Add up for a potential load demand curve.

02 - Emergency concepts

What emergencies need to be accounted for?

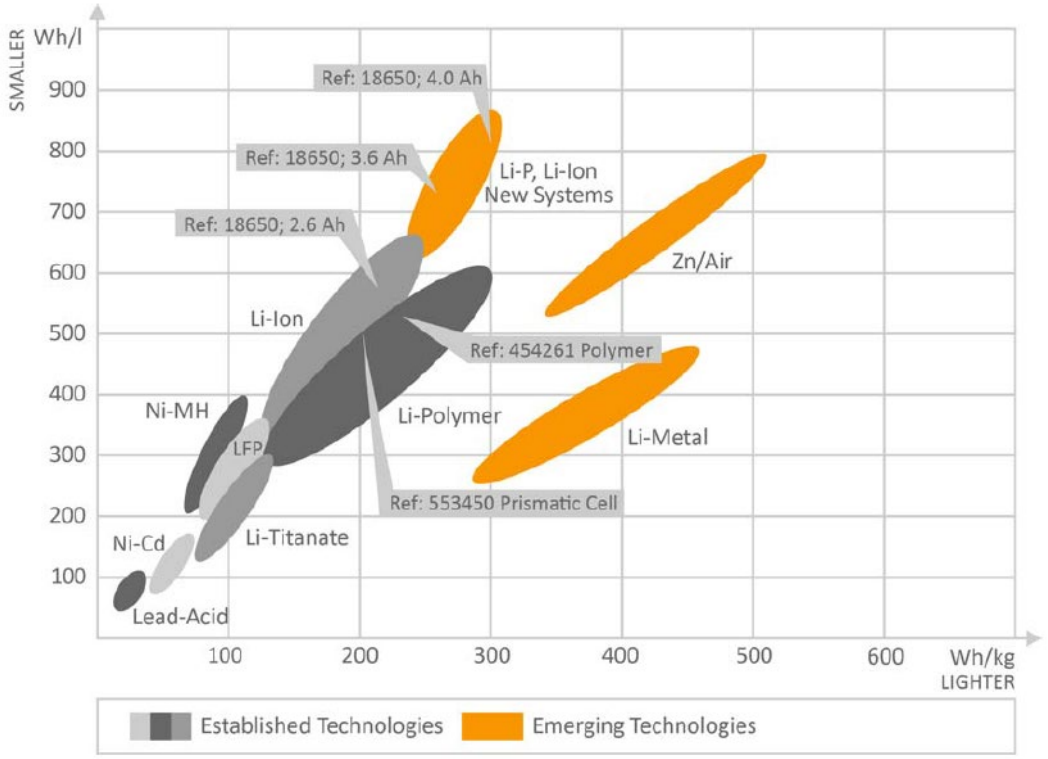
- Loss of power
- Fires or floods etc.
  - Design infrastructure with these szenarios in mind (e.g. use redundancies, Investigate own supply renewable energies maybe, find measures to reduce damage, talk with similar services for emergency support plans, have communication strategies in place.

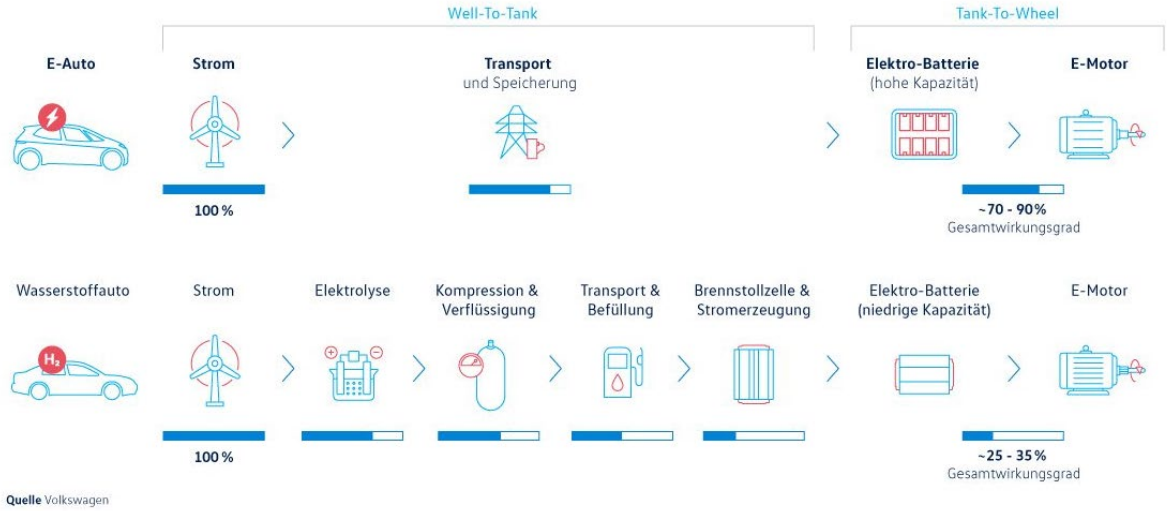
Utrecht Good Practice!

- Plans to provide Emergency services
  - E.g. in case of flooding, VHH is obliged to evacuate a certain area along a dike area. What number of buses have to always be ready at short notice? How to we ensure this at all times?

03 Battery and charging technology

- Make a market analysis to ensure you are not investing in the wrong things.



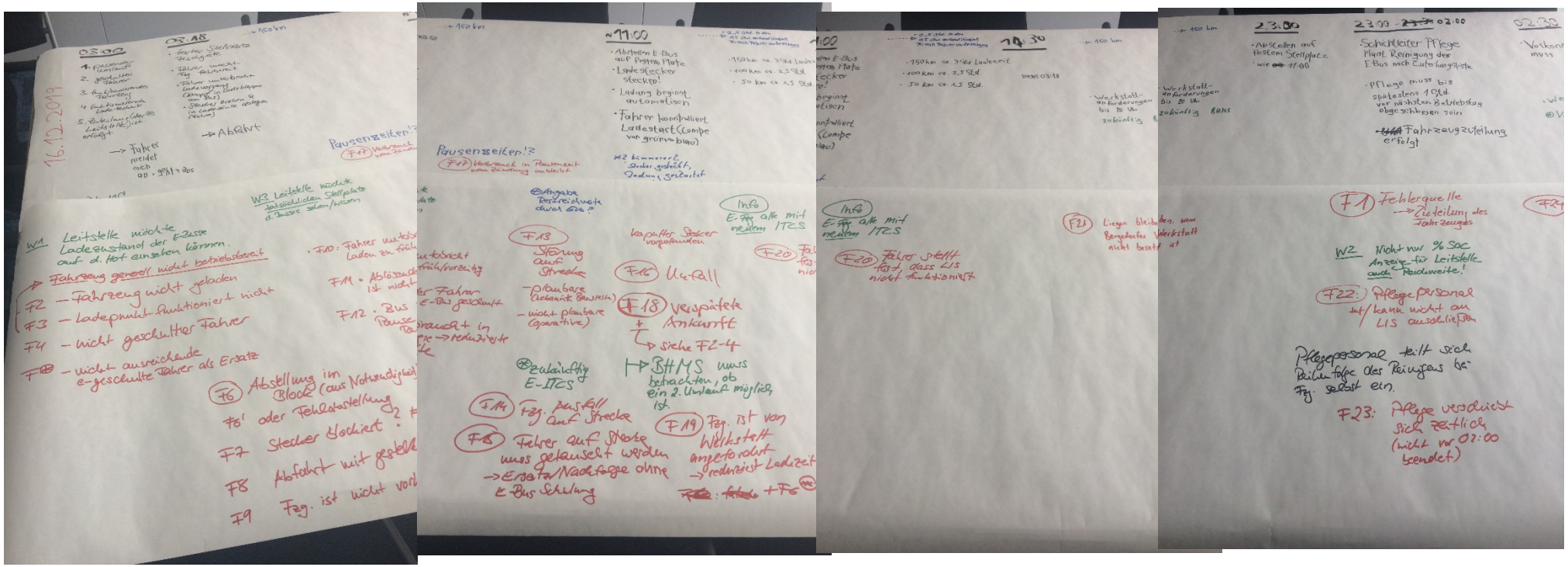


You can also compare with hydrogyn.

04 - charging and battery concepts

Suitability of overnight plug in charging or opportunity charging is largely dependent on parameters such as the traffic network, topography or possibly even climate.

05 Processes in depots and workshops



Run through your daily operations but swap in the e-bus as the protagonist.

- What extra information is needed?
- What complications are expected?
- Where does the regular process need to be adapted to suit an e-bus?

06 Energy provision

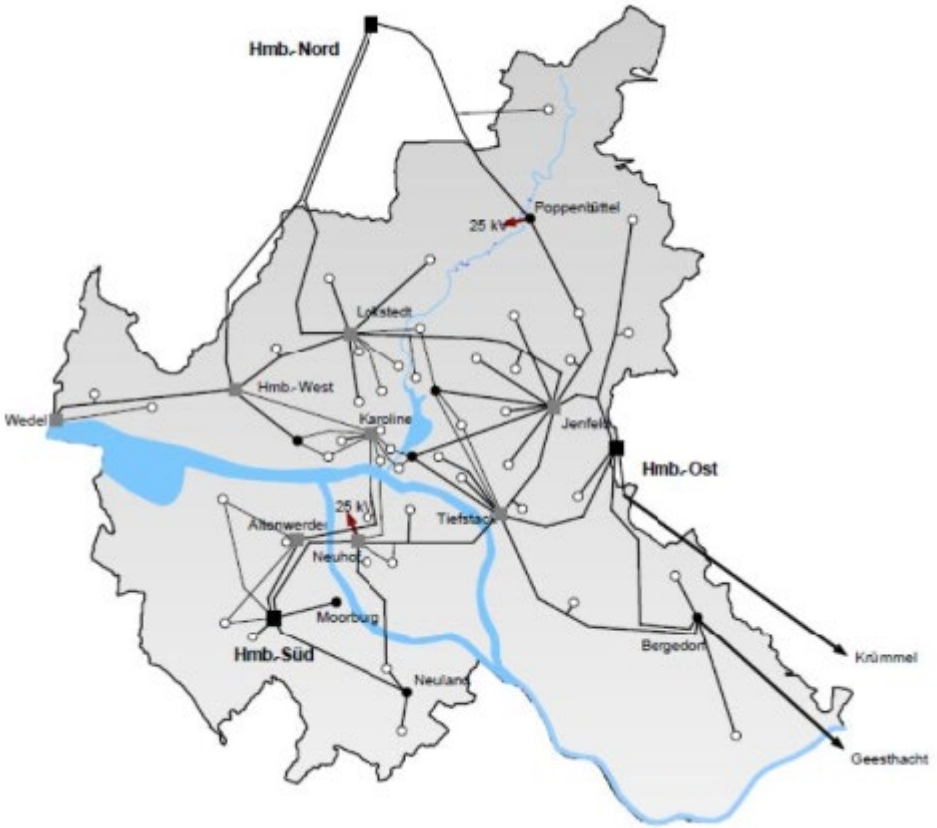
Is enough energy available through the public grid?

Will this be the case in 10 years time when everyone in the neighbourhood has e-cars too?

→ Collaboration with the grid provider and the energy department of the university of armed forces.

It‘s a strategic matter for cities to have a good understanding of the future needs.

Beware: if there is not enough energy, connecting more can take in some cases several years.



07 structural (physical) infrastructure

You will need electrical expertise...

VHH hired new staff and created an entire new department for infrastructure.

08 Third-party concepts for energy and infrastructure

Someone else builds your charging infrastructure and you pay an increased price for energy.

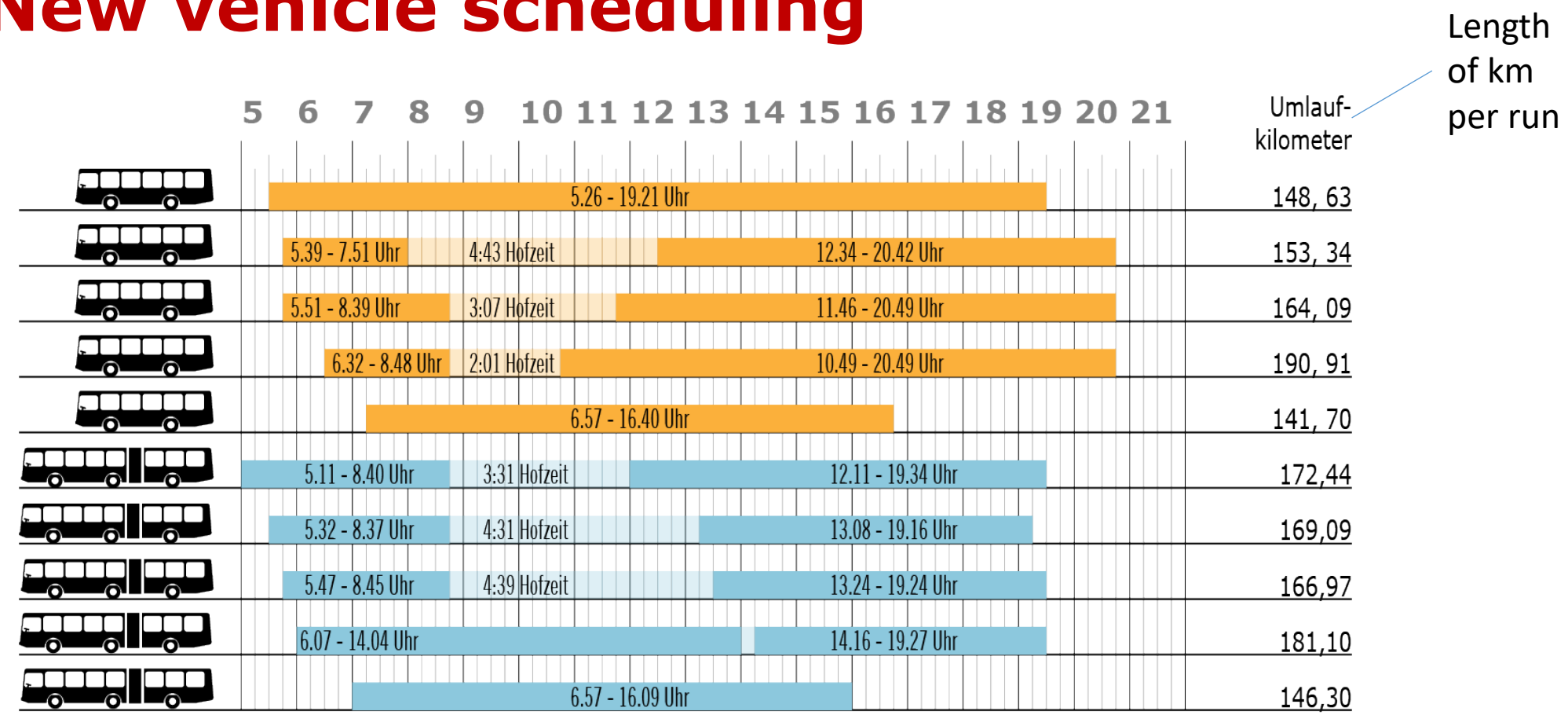
Especially suitable for cities where there is a publically owned energy provider (e.g. Darmstadt in Germany).

Alternatively suitable if the charging infrastructure could be beneficially used during the day by another company (carriers, taxies etc.).

This makes a lot of sense for smaller companies too who can not afford to invest in extra staff with electrical expertise to build, run and maintain the infrastructure.

(This was not persued any further by VHH).

09 New vehicle scheduling



VHH decided to invest in a new software since the old one was now more than 10 years old and not fit for purpose anymore.

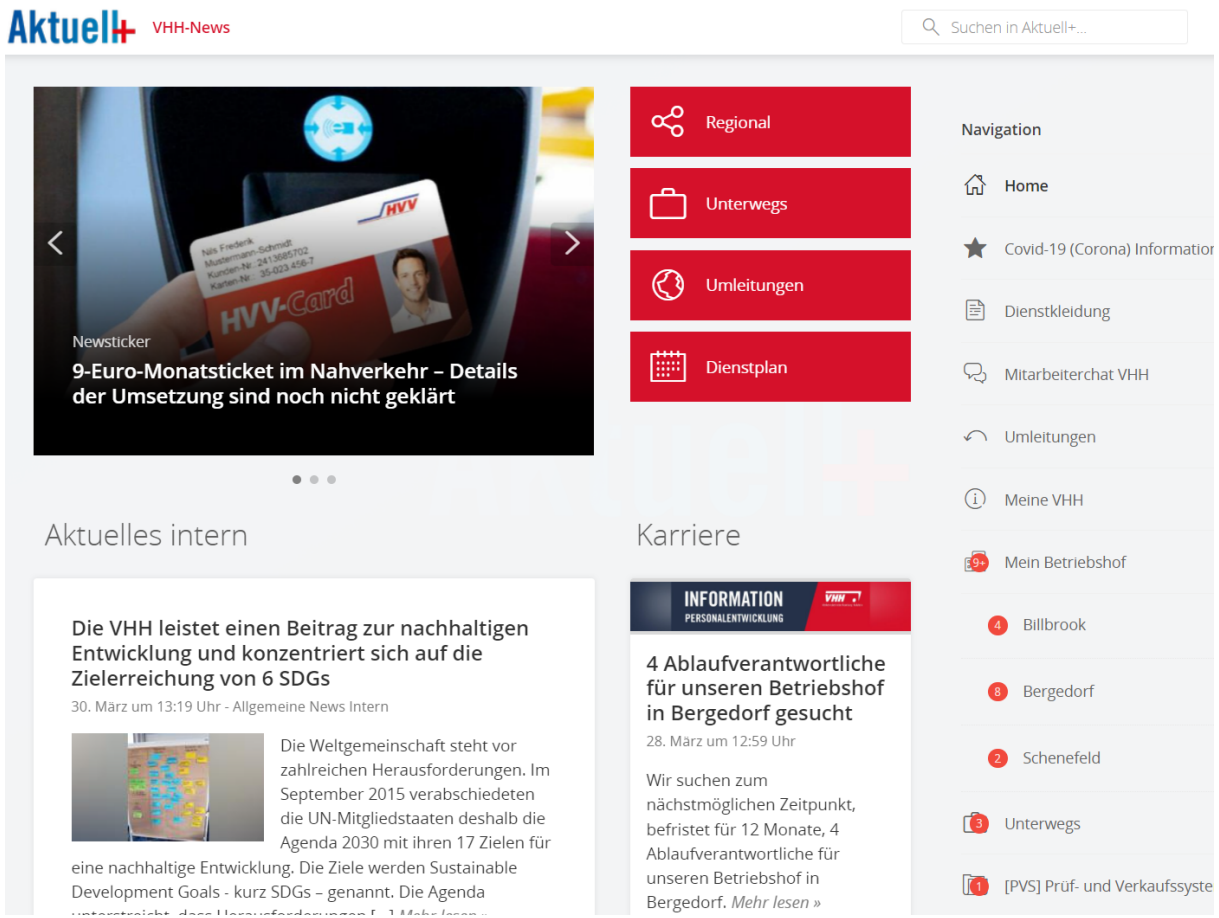
10 Cooperation and strategic partners

- VHH naturally cooperated with the Hamburg Hochbahn (the second local public transport provider)
- Networking across a platform of public transport providers
- Testing ebuses during development stage for a large German manufacturer
- Public-public partnership with the Stromnetz Hamburg to use the back-end software that also powers all public car charging points.
- Join an EU interreg project!

11 Staff training

See good practice from Turku!

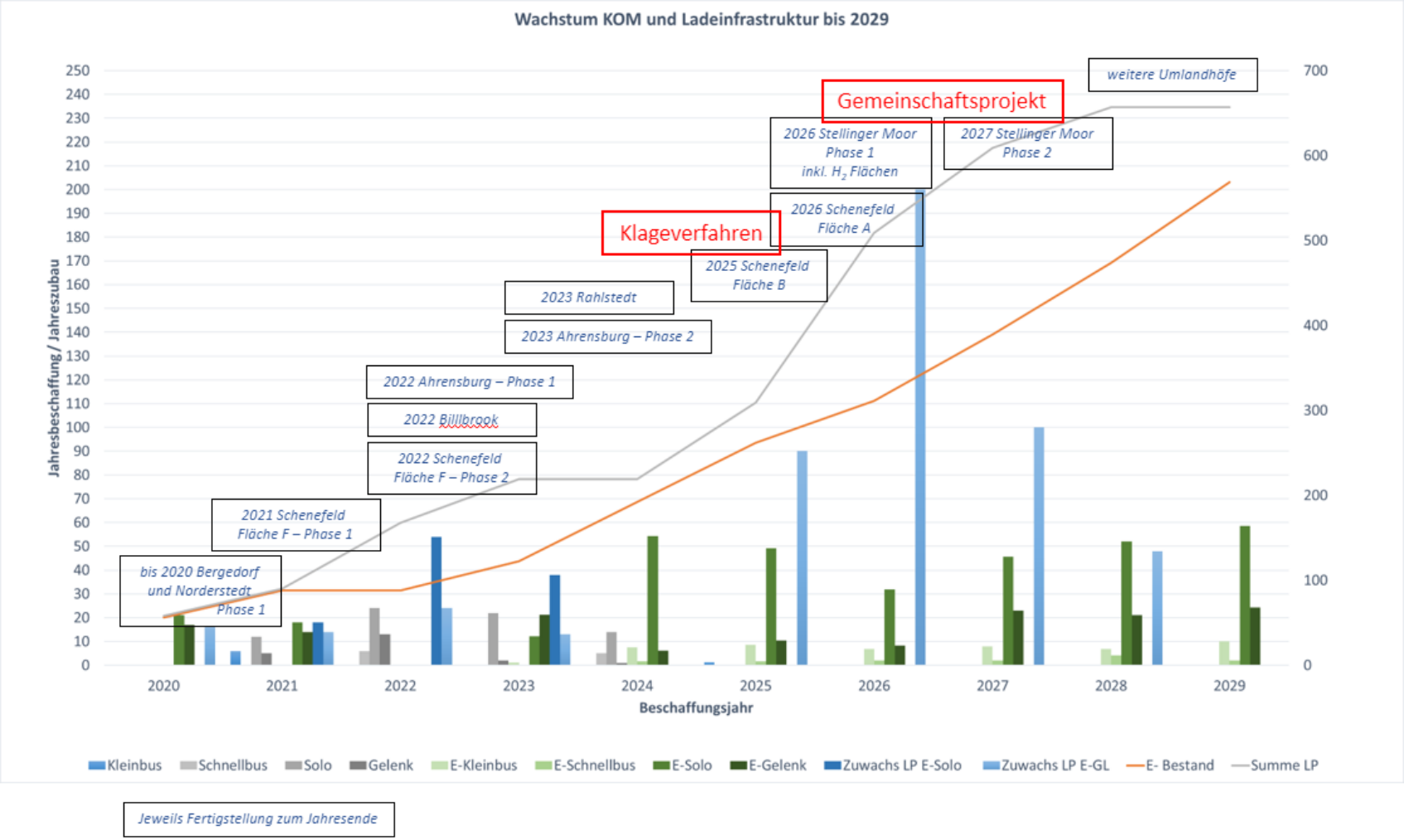
Additionally VHH developed a website/app where small information text items can be posted. A great way to keep the drivers updated on project news.



12 Financial resources required

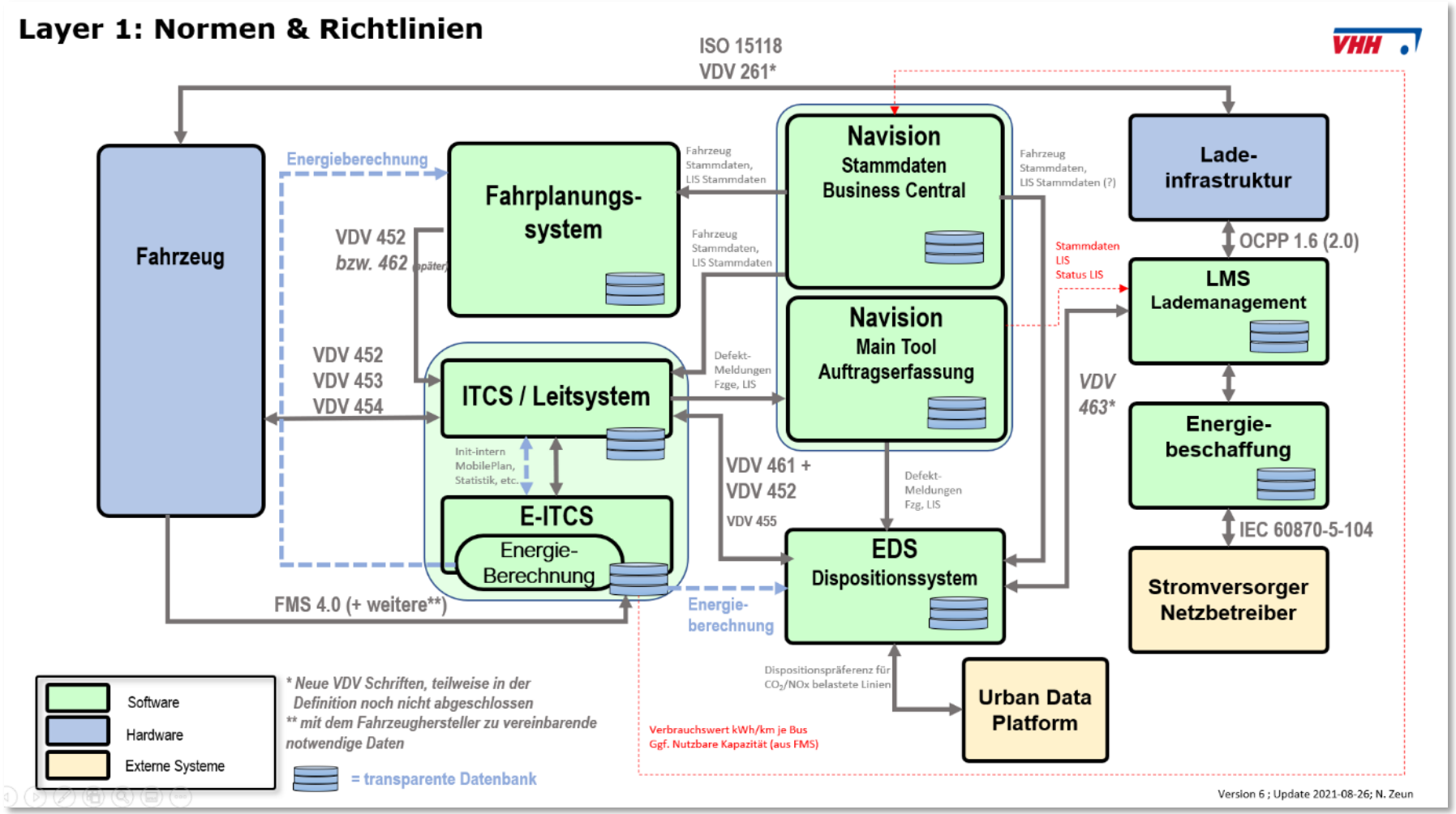
- Application for federal grants
- Loans from the European Investment Bank
- Clever accounting?!?

13 Vehicle procurement



Number of vehicles and number of charging infrastructure must increase simultaneously.

14 Need for development in IT infrastructure



New software at VHH:

- Planning SW
- Deployment SW
- Workshop ticketing
- Loadmanagement
- Energy Procurement

Amended System:
- ITCS with extra %SOC capabilities

15 Planning of infrastructure modification and construction works

Found to be redundant – already part of 07 Infrastructure…

16 Traffic concept 2030

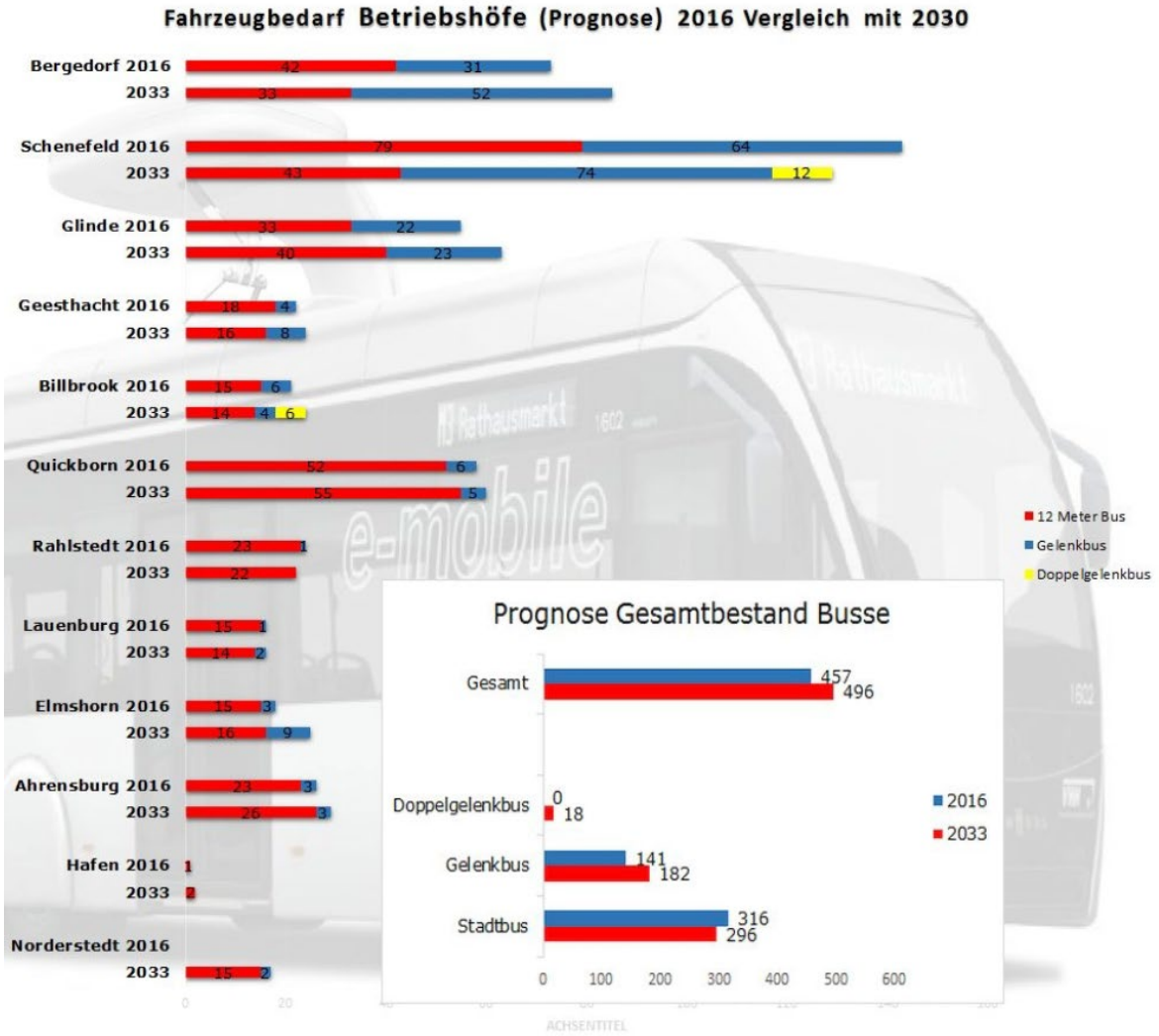
Are you expecting to have the exact same service in the future?

Hamburg will be implementing a couple of high density traffic lines (S-Bahn, U-Bahn) which will lead to a change in service requirements for busses.

Generally the city is likely to gain people and therefore the demand in service will increase.

Maybe political vision will change and new mobility solutions implemented. How might this influence your plans?

(… and then there was a pandemic….)



Plus: Respect the project processes

- Make your stakeholder analysis
- Identify your risks
- Clearly define responsibilities, accountabilities and decision making
- Report regularly and frequently (e.g. monthly)
- Set yourself some milestones performance indicators to keep on track
- Plan to review in certain intervals if your goals are still valid or if you need to make adjustments (things change during such a long project!)

- Try to account for the extra efforts needed to accomodate all this.

Thank you for listening!

Any questions?