




VTI'S RESEARCH ON ELECTRIFICATION OF TRANSPORTATION

Jonas Jansson

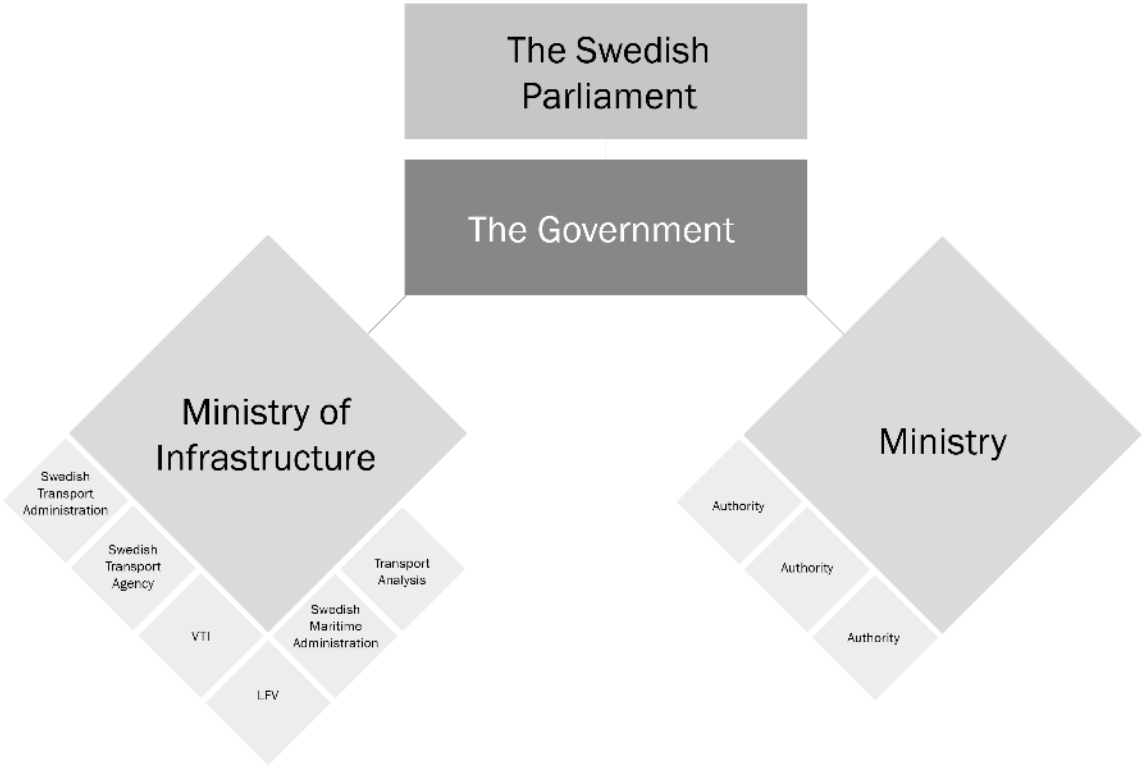
vti







THE SWEDISH PARLIAMENT, GOVERNMENT AND AUTHORITIES AND VTI



OBJECTIVES OF TRANSPORT POLICY

The overall goal of transport policy is to ensure a socio-economically efficient and long-term sustainable transport supply throughout the country.

Functional goals

- contribute to giving everyone a basic accessibility with good quality and usability
- contribute to development power throughout the country.
- equal, respond to needs of women and men respectively.

Considerations goals

- no one is killed or seriously injured
- contribute to achieving the overall goal for the environment and increased health.

Specific goals

Greenhouse gas emissions from domestic transport must be reduced by at least 70% by 2030 compared to 2010.

The number of fatalities as a result of traffic accidents in road traffic, shipping and aviation will be halved by 2030.

vti

VTI GOVERNMENT ASSIGNMENT – TRANSPORT SYSTEM ELECTRIFICATION

Knowledge for rapid, smart and cost-effective electrification:

https://www.regeringen.se/regeringsuppdrag/2021/08/uppdrag-att-bidra-till-okad-kunskap-om-elektrifieringen-av-transporter/

Government assignment to VTI:

” Regeringen uppdrar åt Statens väg- och transportforskningsinstitut (VTI) att bidra till kunskapsuppbyggnaden kring en snabb, smart och samhällsekonomiskt effektiv elektrifiering av transportsektorn.

A SYSTEM PERSPECTIVE ON A SUSTAINABLE AND RESCILIANT TRANSPORT SYSTEM

Sustainable transports:

CO2 neutral

Good air quality

Low noise

Fredom of movement for all

Rescilient transports:

Local energy/fuel production

Extream wheater

Research at VTI:

Technology, Logistics, Transport Economy, User behavior, Environment effects, Maintenance/resilience…

vti

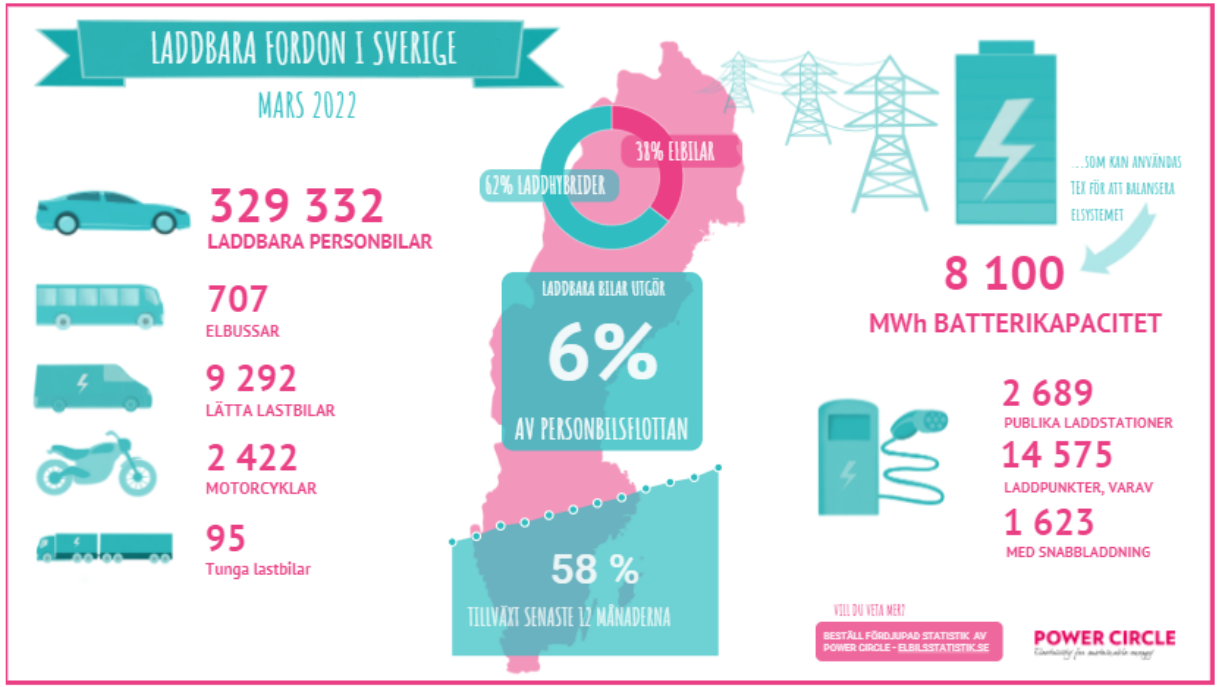
ENERGY FOR ROAD TRANSPORTS





vti

SWEDISH BATTERY ELECTRIC TRANSPORTS



Source: Power circle - Elbilsstatistik

- Swedish Electric power consumption 2021 -140 TWH = 383 GWH/daý
- Current battery park (2022-05-02) will Power Sweden for ~ 30 min
- Interpolating 100%, ~ 8 hours

ELECTRIC ROAD TRANSPORTS KEY TECHNOLOGIES

Sustainble electric energy

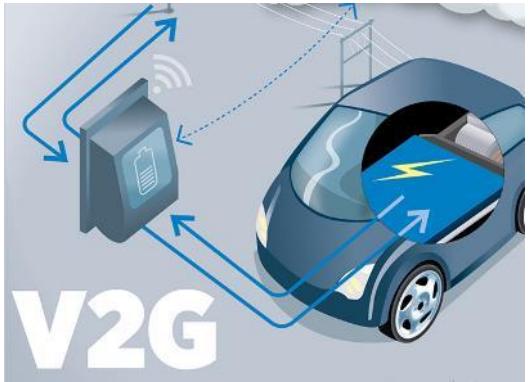
Battery swapping

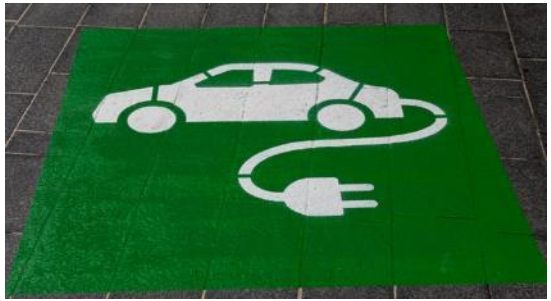
Energystorage

V2grid

Fast charging

Electric road systems



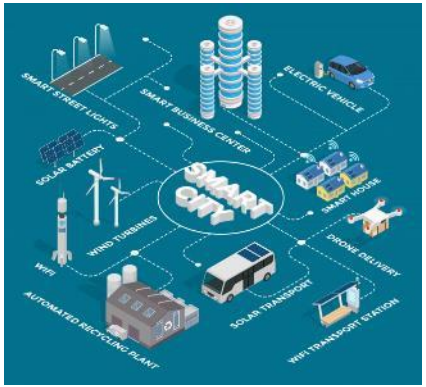


vti

ELECTRIC SCENARIOS - WHAT SYSTEM DO WE WANT?

Worst case – electrification with a lot of requirements on the power grid and the user:

- High Power demand
- High demand of natural resources
- Impaired logistics operations.
- High demand of space



Best case – a resilient and collaborative power and transport system:

- Power demand is minimized
- Transport system stabilize the power grid
- Energy demand slightly reduced and produced locally
- Efficient use of resources
- Logistics and operations are more efficient than today
- Lower cost for transport and travel

RESEARCH REPORTS

- Publications from 1925 and onwards are available for download from VTI's website www.vti.se/en/publications.

vti

CONTACT US

- vti@vti.se
- Jonas – jonas.jansson@vti.se
- Joakim – joakim.dahlman@vti.se
- Jan – jan.andersson@vti.se
- Ellen – ellen.grumert@vti.se
- Ingrid - ingrid.skogsmo@vti.se
- Magnus – magnus.eek@vti.se
- Anna – anna.anund@vti.se
- Arne – arne.nabo@vti.se