

CAR

Transformation to e-mobility

Goal: Establish Competitive E-Mobility Systems

Establish competitive electric vehicle systems in 4 countries

- Sverige
- Danmark
- Tyskland
- Polen

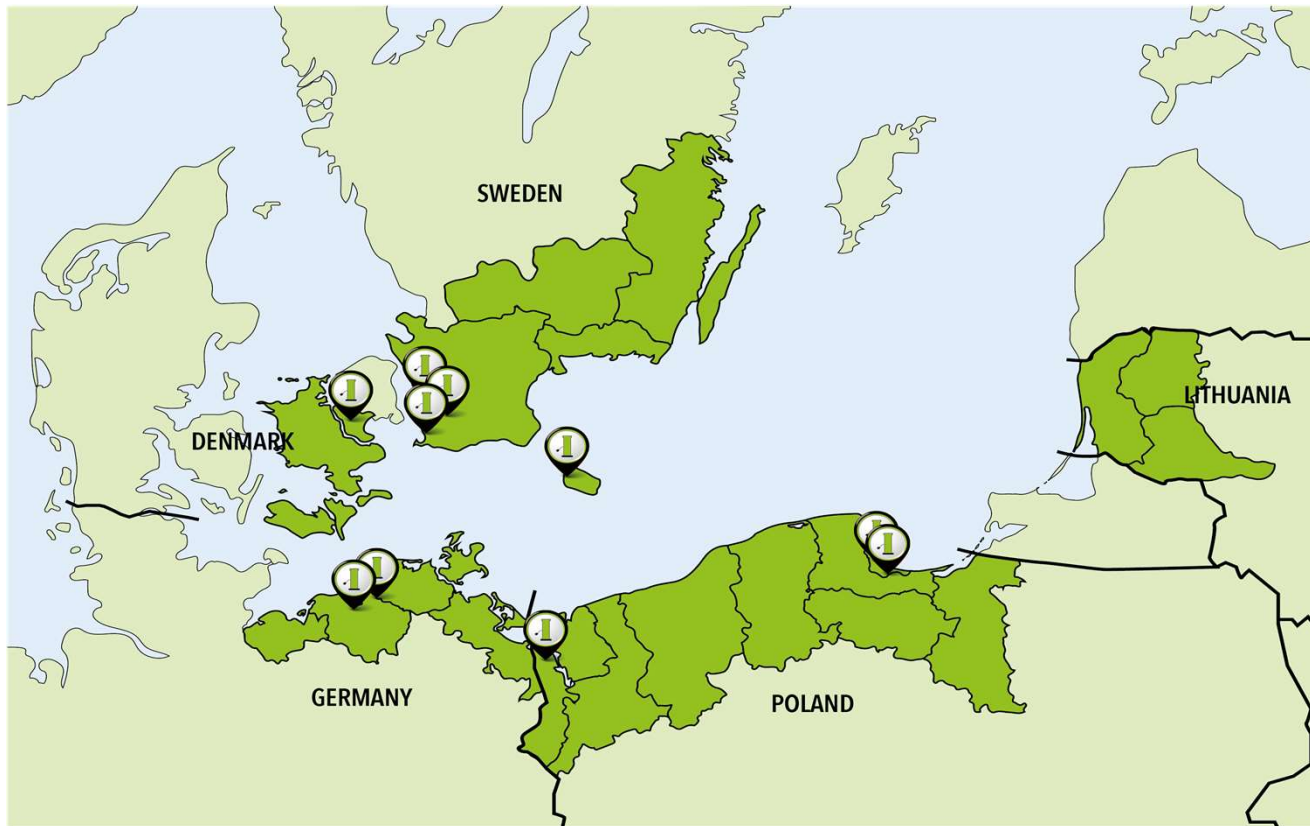
Also develop battery recycling technology

4 municipalities and 1 municipal company and 1 institute develop systems

- Lund
- Bornholm
- Szczecin
- Gdynia
- Rostock Port
- RISE

The technical university in Gdansk develops battery recycling solution

Partners



Close cooperation with stakeholders – Development of Strategy Setting Cluster

Car manufacturers

- Trends in technology and systems solutions

Charging

- Build charging infrastructure

Services

- Information and payment services etc.
- Business development

Industry organizations

- Trends and influencing

Authorities

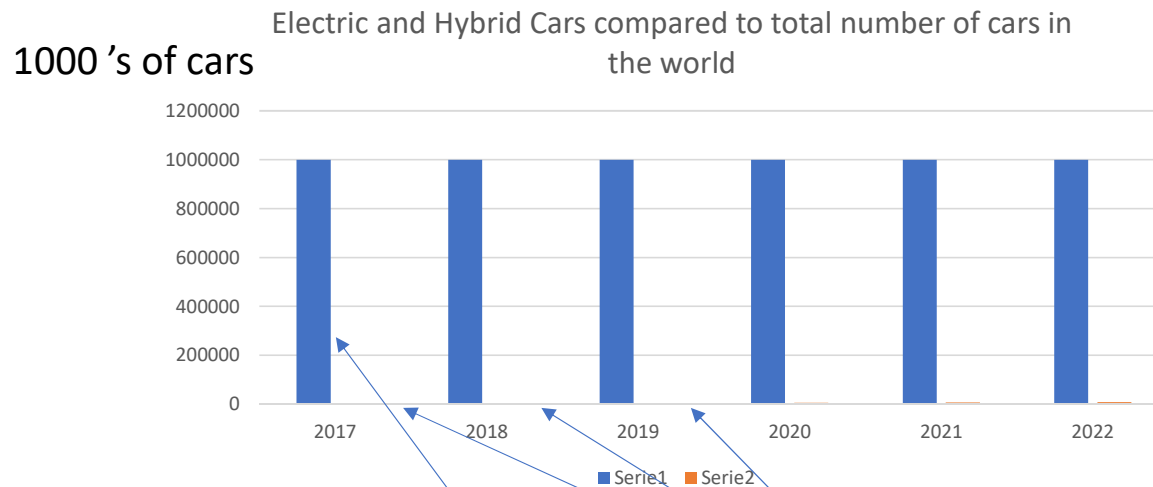
- Legislation
- Susidies
- Financing

Important Activities

- Pilot investments
 - Charging infrastructure
 - Services
 - Facilitating growth of electric vehicle fleets
- Preparing, performing investments
- Cluster development
 - Seminars
 - Workshops
 - Study visits
- Analyses, reports

E-mobility transformation

World: 1.2 Billion Cars, 100 Million Heavy Vehicles, Very Few EV's



Total number of cars exceeding 1 billion.

Number of electric and hybrid cars is so small that
The bar cannot be seen. 3 million 2017, 4 m 2018, 5 m 2019,
6.5 m 2020, 9 m 2021

30 million cars in Poland

Power from 12 nuclear reactors (equivalent from wind/solar) needed to fuel fleet with electricity

Power from 12 nuclear reactors needed to fuel heavy vehicles as well (very rough estimates)

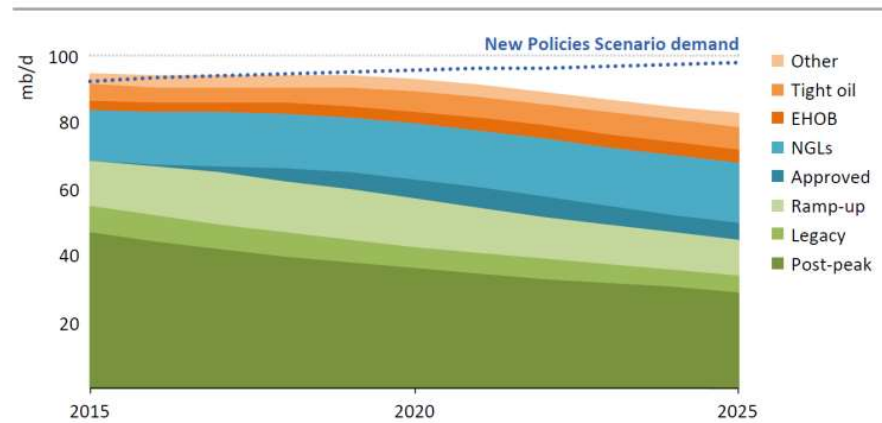
Polish car fleet is old and EV's are very expensive

- Few used EV's available
- 2500 eV's registered in Poland

Oil Production Will Decline

Peak Oil

Figure 3.16 ▶ Global supply outlook from selected sources in the New Policies Scenario



A supply-demand gap emerges that must be filled by production from conventional crude oil projects yet-to-be-approved

Source: International Energy Agency

In Norway (leader) 40% of new cars are electric or hybrids – in Sweden 3% - the world 1.5%

60,000 electric and hybrid cars are sold in Norway every year

– about 6% of global production.

65 million cars are sold globally every year. 40% electric would mean 26 million and only 39 million petrol and diesel.

- Not possible to change demand and production so fast.

Information and implementation of electric cars started at the Olympic Games in Lillehammer in 1994.

- The Norwegian electric car Think was launched.
- Since then information has been spread and communication has been on-going.
- Taxes, traffic rules have been changed, charging opportunities created.
- Many have received information about electric cars and driven one themselves.

The Transformation Will Take Decades in All Countries

Now, early generations of EV's

- Not competitive

Few charging stations

Very large investments needed

Competitive EV's will be developed

- Several generations of vehicles required

Dense network of charging stations