

Stolpnummer 1

Fortum Charge & Drive Munich

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 **CHARGE
& DRIVE**

Starta laddning

What about the customers... can we afford giving them more problems in their daily life?



«I've been left standing four times without any chance to get further, and one of the times I've had to use road assistance... there I was in 32 degrees Celsius and three children in my car...»

Fortum Corporation and Charge & Drive



Fortum Corporation

- Leading power company in Nordics with Generation, Distribution and Sales of electricity and heat
- Division in Russia and investing in India Solar PV

Fortum Key figures 2013

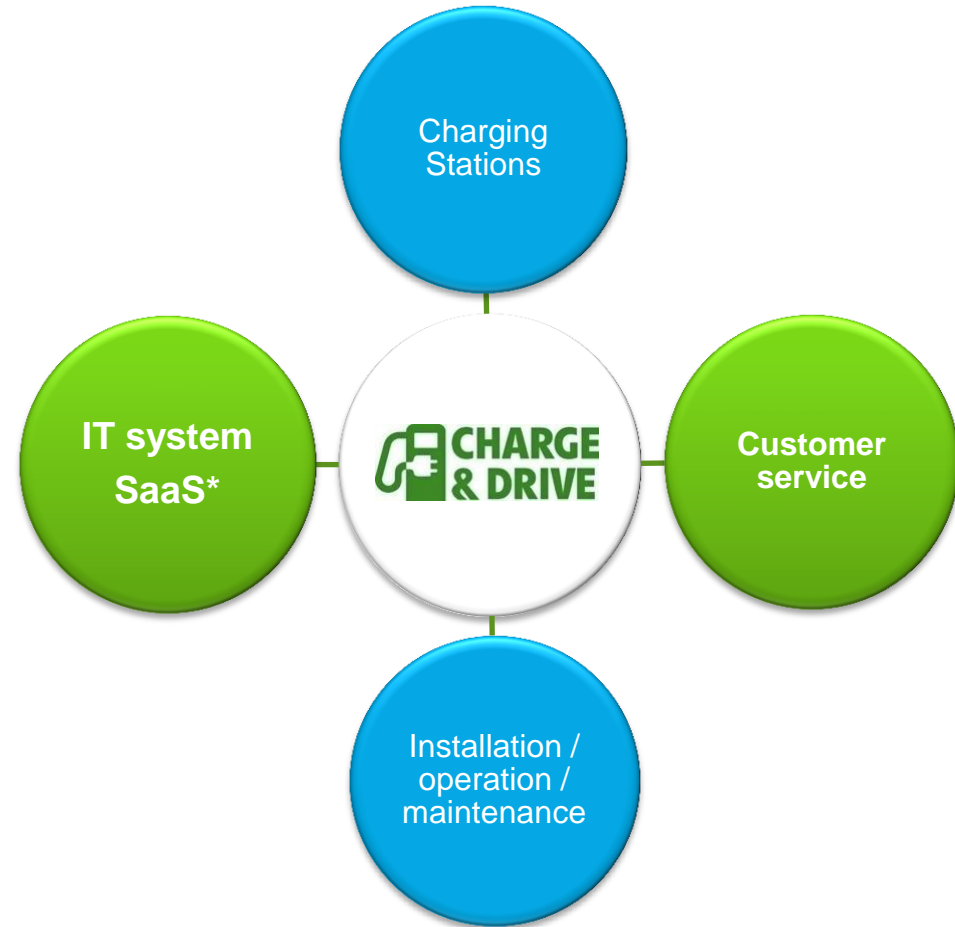
- Sales EUR 6.1 bn
- Operating profit EUR 1.7 bn
- Capital Empl. EUR 19.8 bn
- Personnel 10,200



Charge & Drive

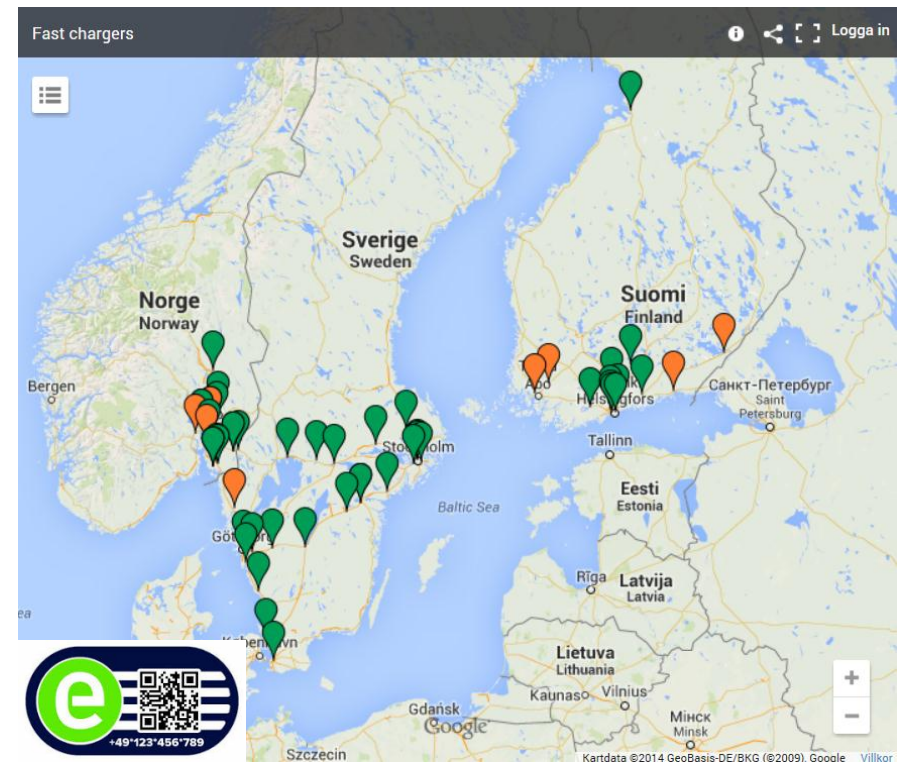
- Derived from Fortum's EV **experiences since the 90-ties** with the Charge & Drive platform operational since 2011
- Full service **Charging Operator** with turn-key installations, customer operations and payment solutions
- The Charge & Drive platform is operating charging stations **in three countries as a Service Provider also for other Utilities**

The Charge & Drive platform offers 360 solution with our core in the IT system and orchestration of operations

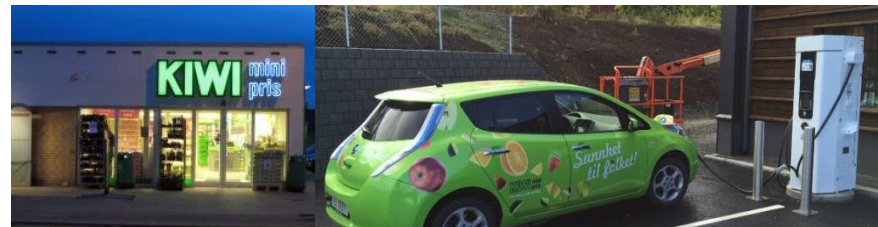


Our own Rapid Charging network connects the four Nordic capitals

- **60 own rapid chargers** in Norway, Sweden and Finland makes up the **largest network in the Nordics**
- **Operating additional 15 rapid chargers** with surveillance, 24/7 customer service and payment solutions for clients
- Locate stations and their status at **map.chargedrive.se**
- **Cooperation with Hubeject for eRoaming services** is ongoing to be fully implemented by end of this year



Fortum Charge & Drive recently entered two new cooperations to taking us to approximately 650 connected chargers in 9 months

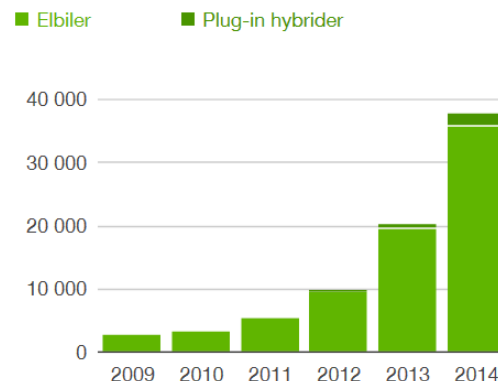


- Installation and operations of 150 - 450 smart chargers at shopping malls, restaurants etc.

- Operations of 50 rapid chargers 50kW at Kiwi's grocery chains across Norway



- **Norway is the world leading market of EVs per capita**
- **YTD September 2014 - 37.000 EVs**
- **Q1-Q2 2014 15% of new car sales where EVs**



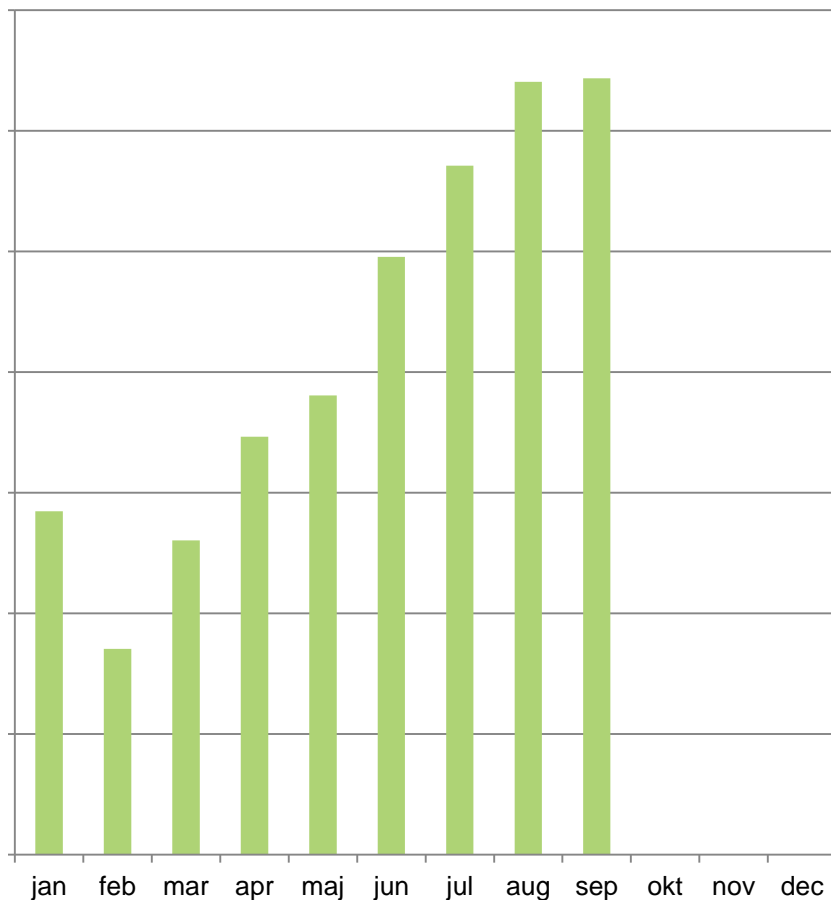
Immature products have caused severe amount of work to still keep EV drivers happy

- Tedious work to detect and isolate the actual problem
 - Customer
 - Components and transients
 - Communication car - charger
 - Software in charger
 - Modem
- Very often these fault requires field service both to detect the actual problem and often also to remedy the fault

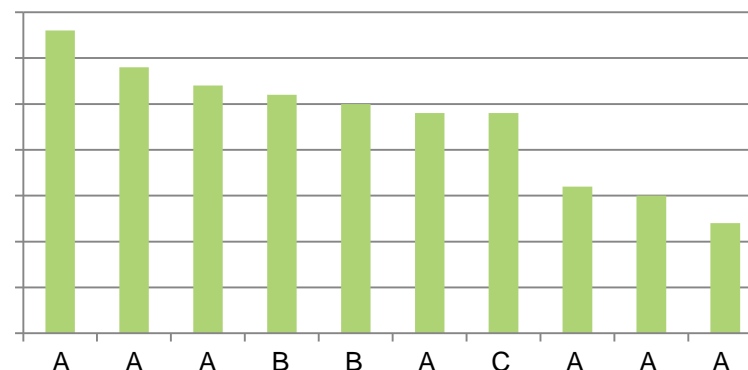


First line support is driven by the number of cars using rapid chargers in the market

Nbr incoming phone calls to first line support



Top 10 chargers by supplier A-D



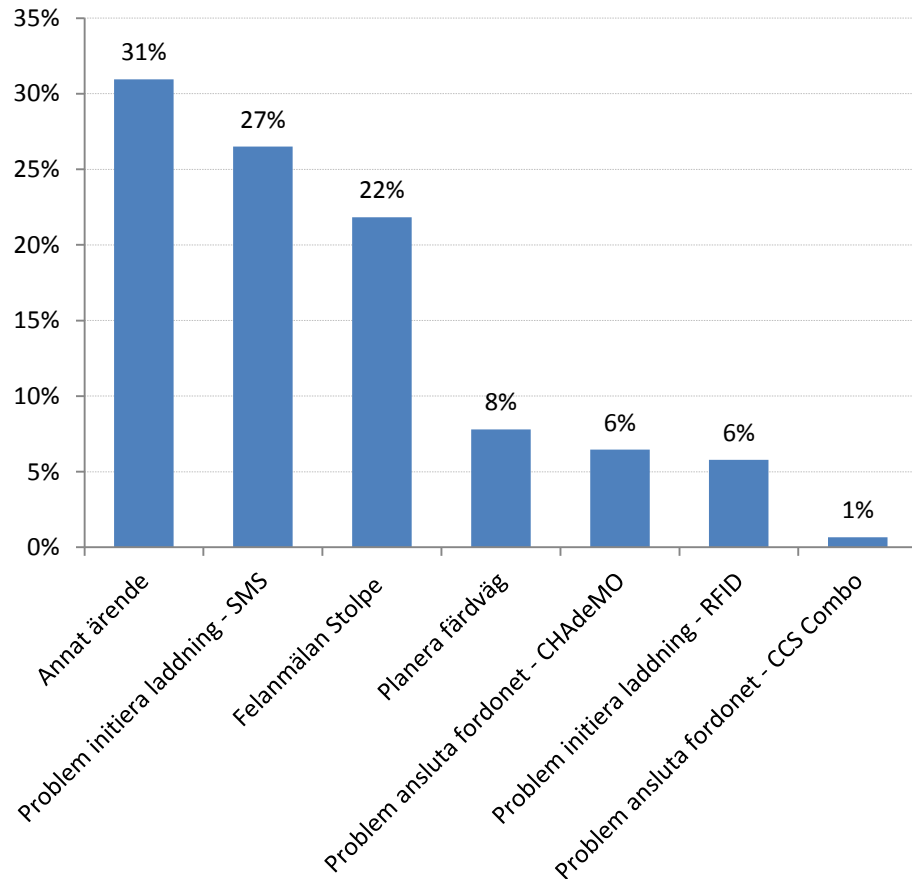
Supplier

1. A McDonalds Berger
2. A McDonalds Alnabru
3. A McDonalds Vestby
4. B Sandvika
5. B Fortum Fredrikstad Apenes P-hus
6. A McDonalds Gardermoen
7. C McDonalds Sarpsborg
8. A McDonalds Nygårdskrysset
9. A McDonalds Liertoppen
10. A Sandvika

Supplier D is not in top 10

Major improvement potential in the customer interface and communication – we all need to improve

Jul-14



31% Other

- HW user interface not responding correctly
- Driver not following sequence

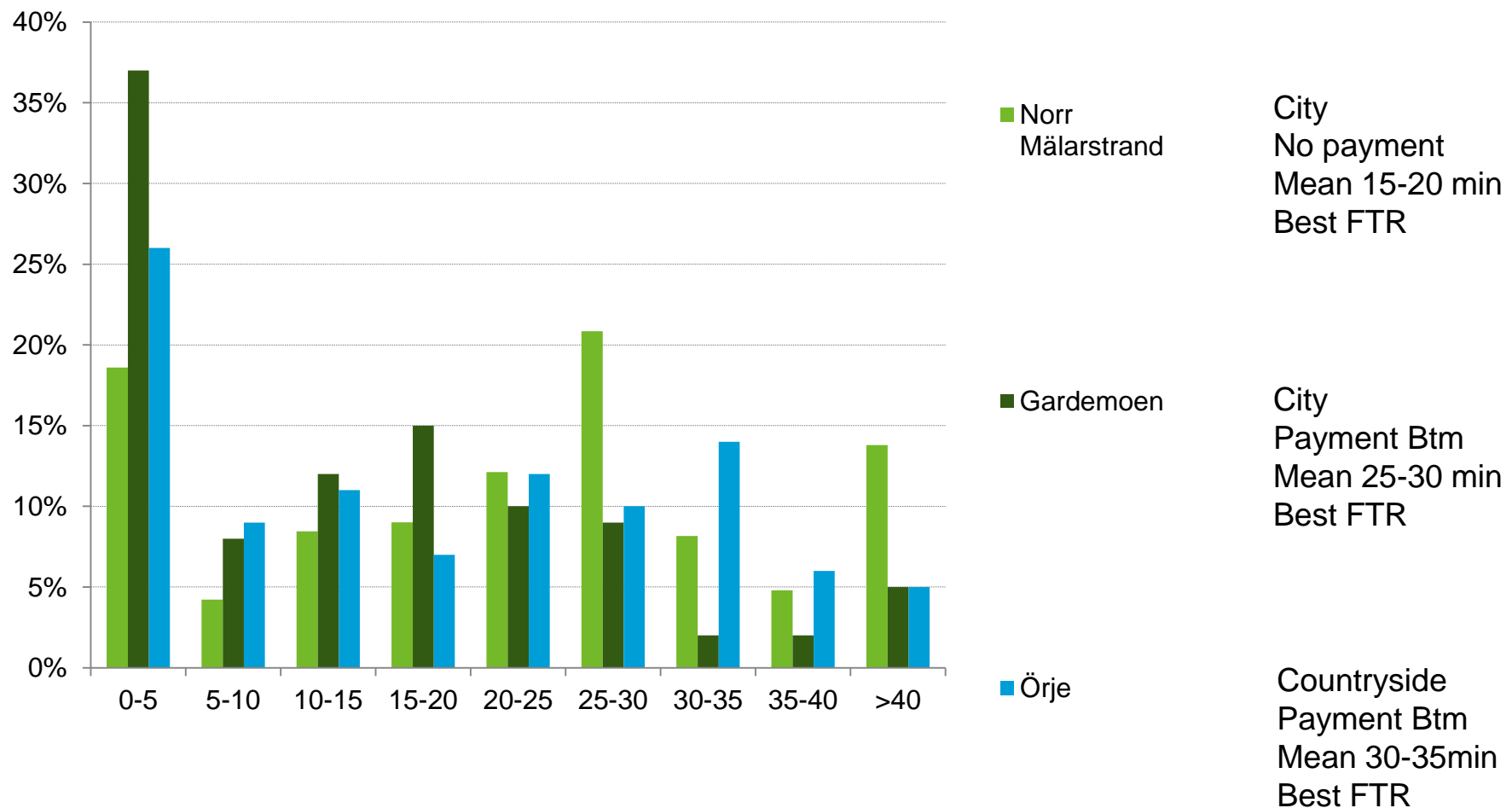
27% SMS initiation of charging

- Long process make initiation time-out
- Instructions not correct
- Typo of SMS command by customer

22% "Call to say it does not work"

8% "Help plan my route"

By-the-Minute payment gives right incentive and our customers likes this, but **First-time-Right** must improve



Most output for the investment going forward?



Important questions to ask

- Systems point of view what is the ratio of destination charging (3-22 kW) vs rapid chargers?
- As battery size grows, will 50 kW be enough?
- As car volume increase and battery capacity grows, how to make this at reasonable cost?

Summary – increase reliability and user experience

Key for the rapid charging

- Quality of equipment and software need to improve to get acceptance and mass-adoption



Otherwise...

- ... early majority of customers will be hesitant to EVs
- ... income for charge point operators will not bear the cost of CAPEX and O&M

Thank you!

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