



2017 ANNUAL POLIS CONFERENCE

6-7 December 2017, Brussels
Innovation in Transport for Sustainable Cities and Regions



Experiences establishing public charging for EVs in Stockholm

Eva Sunnerstedt
City of Stockholm



Stockholms stad







ENERJUMS
TORGET

ICA
Kvantum
7-22

Green logo

H&M

PILATES

clás
ohlson

← NYBOHOV

→ SÖDERMALM

→ ÅRSTADAL

P



30 min

Endast
fordon med
pågående
laddning





e-on

addning med örnbar energi

Med tillägg med energipass 1
100kWh



Blue parking sign with text: "PARKING" and "15-18" and "19-21" and "22-24" and "25-28" and "29-31" and "32-35" and "36-39" and "40-43" and "44-47" and "48-51" and "52-55" and "56-59" and "60-63" and "64-67" and "68-71" and "72-75" and "76-79" and "80-83" and "84-87" and "88-91" and "92-95" and "96-99" and "100-103" and "104-107" and "108-111" and "112-115" and "116-119" and "120-123" and "124-127" and "128-131" and "132-135" and "136-139" and "140-143" and "144-147" and "148-151" and "152-155" and "156-159" and "160-163" and "164-167" and "168-171" and "172-175" and "176-179" and "180-183" and "184-187" and "188-191" and "192-195" and "196-199" and "200-203" and "204-207" and "208-211" and "212-215" and "216-219" and "220-223" and "224-227" and "228-231" and "232-235" and "236-239" and "240-243" and "244-247" and "248-251" and "252-255" and "256-259" and "260-263" and "264-267" and "268-271" and "272-275" and "276-279" and "280-283" and "284-287" and "288-291" and "292-295" and 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"4108-4111" and "4112-4115" and "4116-4119" and "4120-4123" and "4124-4127" and "4128-4131" and "4132-4135" and "4136-4139" and "4140-4143" and "4144-4147" and "4148-4151" and "4152-4155" and "4156-4159" and "4160-4163" and "4164-4167" and "4168-4171" and "4172-4175" and "4176-4179" and "4180-4183" and "4184-4187" and "4188-4191" and "4192-4195" and "4196-4199" and "4200-4203" and "4204-4207" and "4208-4211" and "4212-4215" and "4216-4219" and "4220-4223" and "4224-4227" and "4228-4231" and "4232-4235" and "4236-4239" and "4240-4243" and "4244-4247" and "4248-4251" and "4252-4255" and "4

Public normal charging – off street

Conclusions:

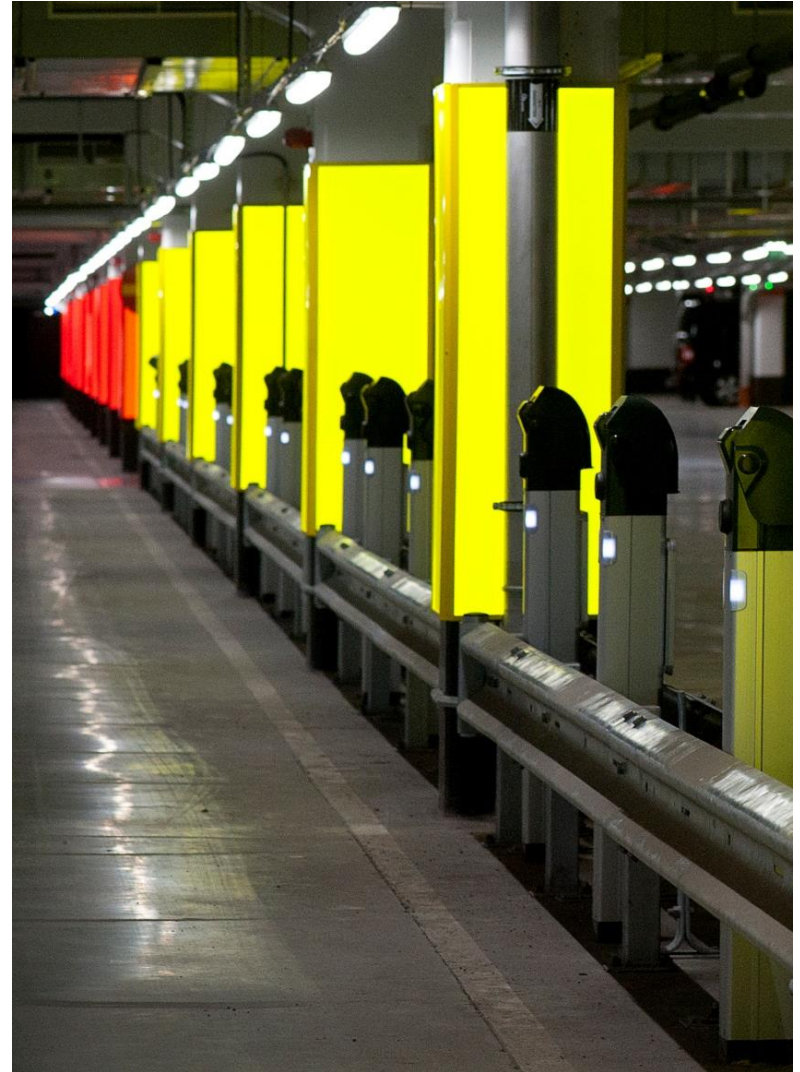
Public chargers: Typ 2 mode 3,
16A, one-phase

For normal charging the price for
the electricity is included in the
parking fee for the parking.



When the system grows....

- Invest in "intelligent" systems to balance the load of electricity-use, this will reduce cost
- Procure the charging units and the installation separately
- If you have a large amount of charging, do not reserve for EVs only. Put the charging units on the parking places that will be occupied last.



Public charging – on street

Access right agreements

- 3 – 5 years
- Fast charging standards: CHAdeMO, CCS and AC 43
- Normal charging: 3,7 – 22 kW
- Give data to the city – possible to evaluate



Lessons learnt on street charging

- Possible to add more charging later, at the chosen locations
- The fast charger has to be placed so that the car has its front or back towards the charger
- Close to coffee and other services?
- Lights?
- What colour? Grey!
- In operation at least 90 % of the time or the 5 year contract can be lost
- Enough room to clean the sidewalks
- Signs and legal aspects are complicated!



Signs are complicated!

How to put up signs is depending on the type of land, on street/off street

The charging sign always has to be in connection with (below) a P-sign

30 minutes free parking at fast charging stations (however, the operator of the fast charger can charge for the charging itself)

Normal charging: 3 hour parking during the day. Possible to park all night

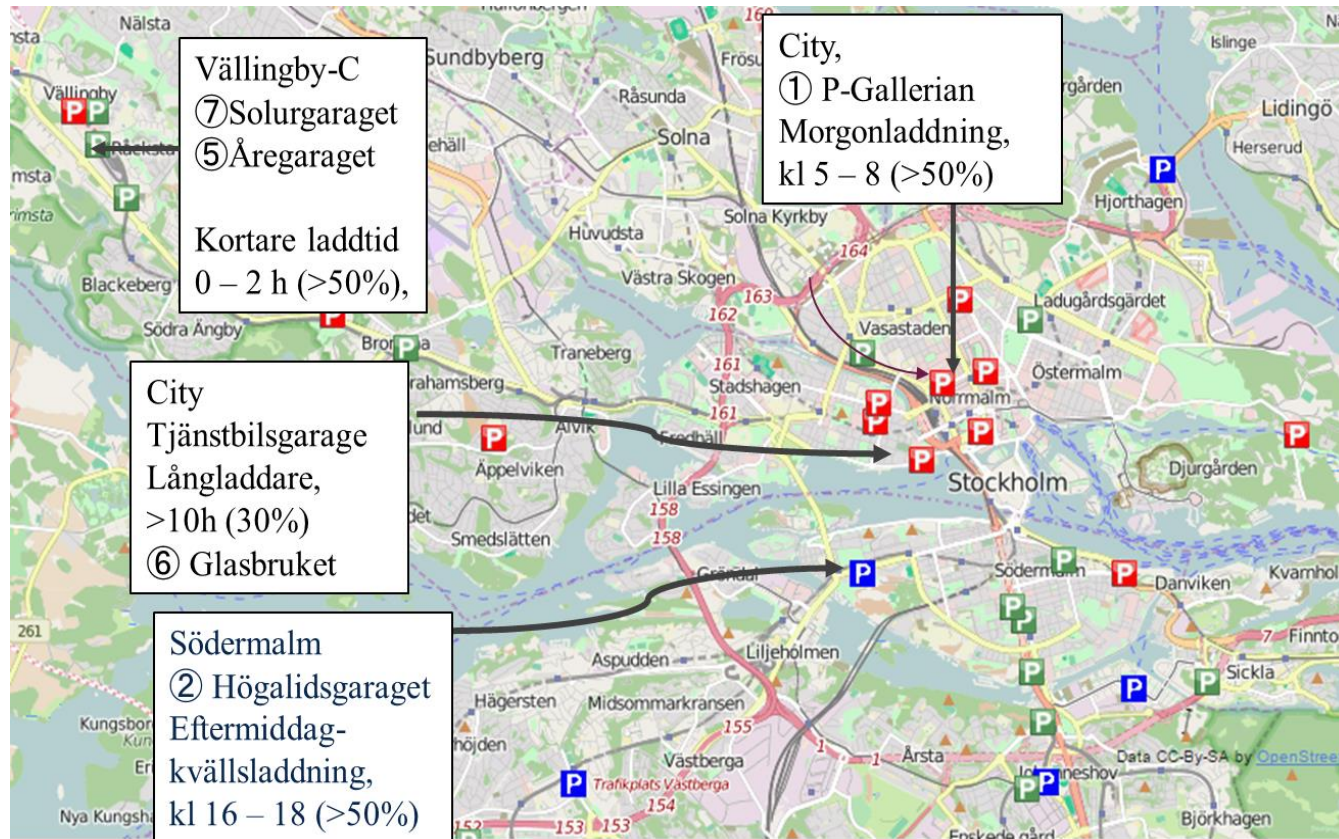


Payments?!

- Fast charging
 - Free parking (30 min)
 - Electricity 3 – 3,40 SEK/minute
 - mobile app, RFID-badge, sms, special card, credit card
- Normal charging
 - Regular parking fee
 - 3 SEK/kWh



Normal charging – different charging patterns in different garages

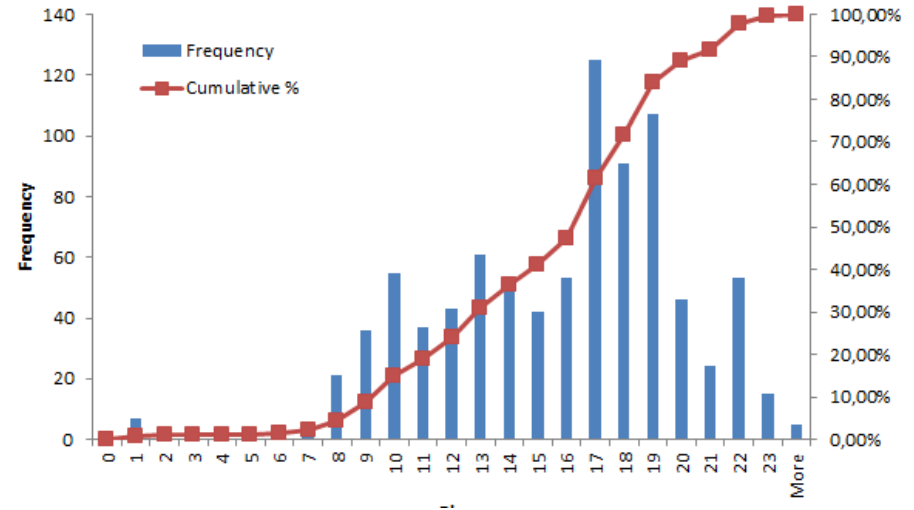


Statistics (2014 – 2016)

Normal charging:

- Most popular to start up normal charging from 6-8 or 17-19
 - same for every day of the week except for that early mornings are only popular on weekdays
- Charging time in average 3 hours
- Average: 7 kWh

Histogram: Clock @start
Normal Chargers, 2Q14 to 1Q15

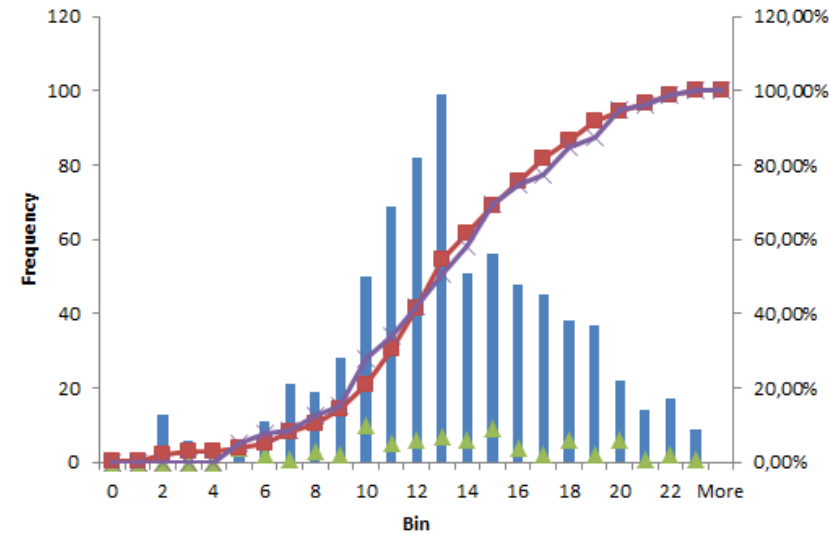


Statistics – 2014 -2016

Fast charging:

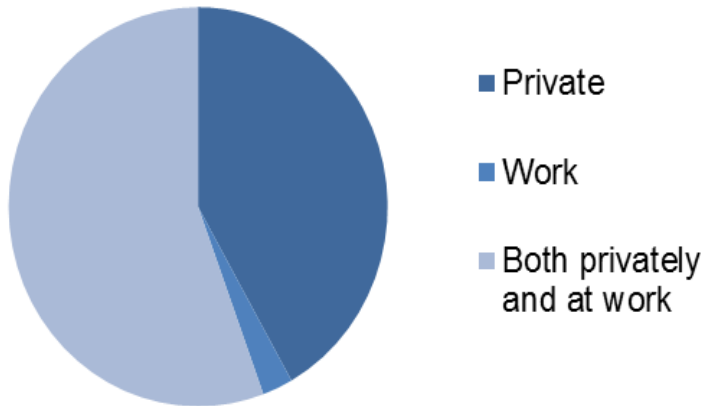
- Most fast charging starts between 10 and 15
- Weekdays are more popular than weekends
- Average charging time 22 min
 - Most common 10 min or 25-30 min
 - Large increase in number of charging sessions
- Average: 6 kWh

Histogram, Klockslag 2014 + Q1-2015

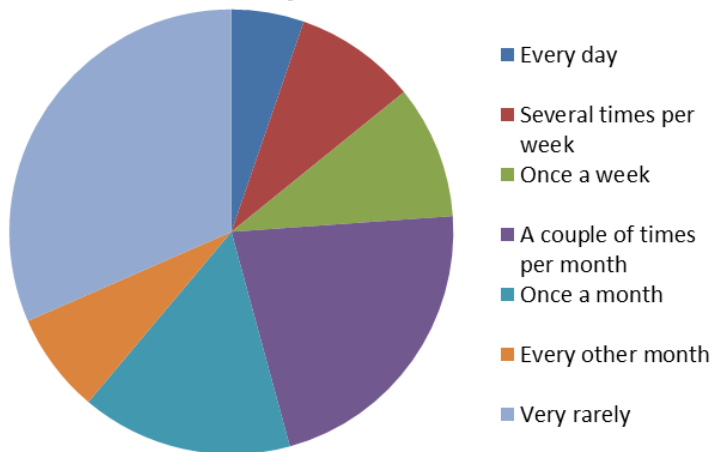


Fast Charging, 269 respondents, Oct 2015

Do you drive PEVs privately and/or at work?

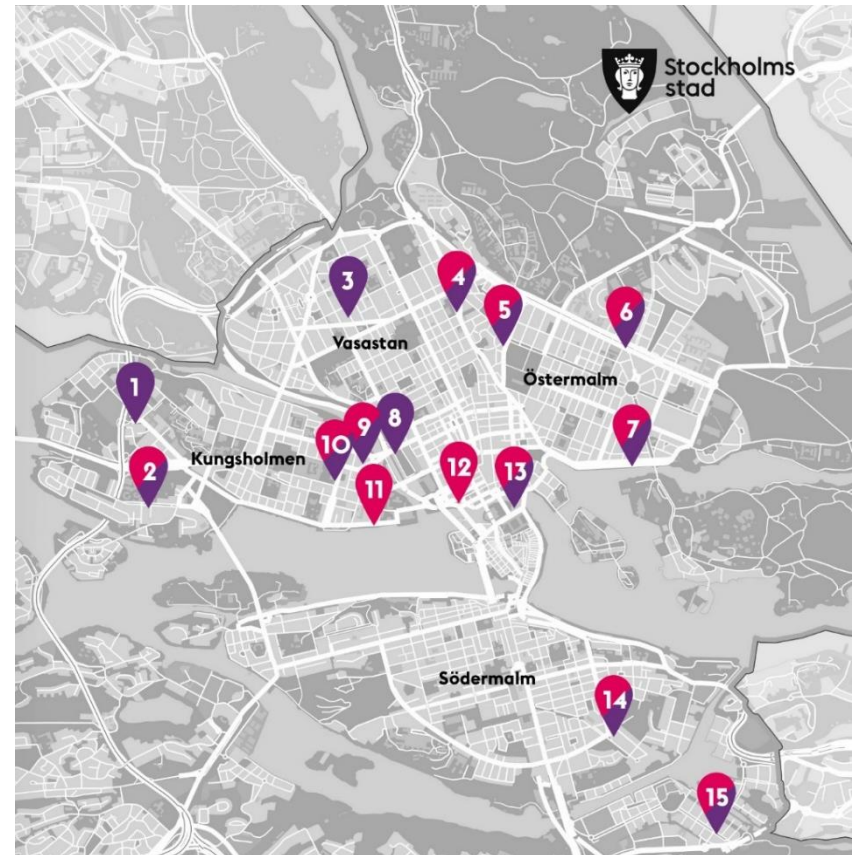


Approximately how often do you fast charge your PEV?



GOAL : 500 on street charging points by 2020

- Today (Dec 2017) 110 charging units at 20 locations
- Over 2000 new locations recently mapped and published



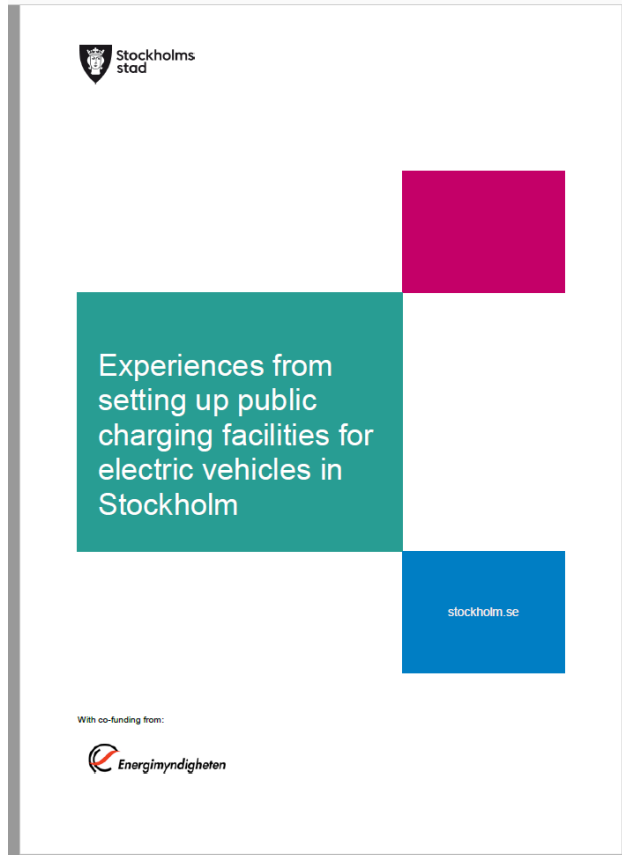
Improvements for the future!



Mapping good locations where private operators may establish public charging on street



More information!



<http://www.stockholm.se/Fristaende-webbplatser/Fackforvaltningssajter/Miljoforvaltningen/Miljobilar/Broschyror-och-rapporter/>

Thanks!

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