



The Netherlands: Living lab for Smart Charging

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Initiated by the Dutch Grid companies

**ElaadNL researches and tests
the possibilities for Smart Charging
on behalf of the Dutch grid operators.**





3,000 public charge stations in 324 cities



8 different chargestation-vendors



80.000 kWh in 10.000 transactions (weekly)



Agreements with 13 EMSP's in NL and 4 cross-border



Connected with European network (e-clearing.net)



Share static and dynamic geo-data with over 25 parties

ElaadNL

With a strong global network

International collaboration

- UK: adoption protocols
- Germany: 15118 alignment met OCPP
- Japan: adoption protocols
- France: Renault; unlock SoC
- California: implementation OCPP
- Italy: adoption protocols
- Poland: University Lotz
- China: BYD: AC redelivery
- Norway: adoption protocols
- Sweden: Lund, chargestorm
- Denmark: Clever, eon, cotevos
- Ireland: ESB & OCA standardization
- Spain: Tecnalia, protocols
- Slovakia: adoption protocols
- Austria: collaboration through e-clearing.net

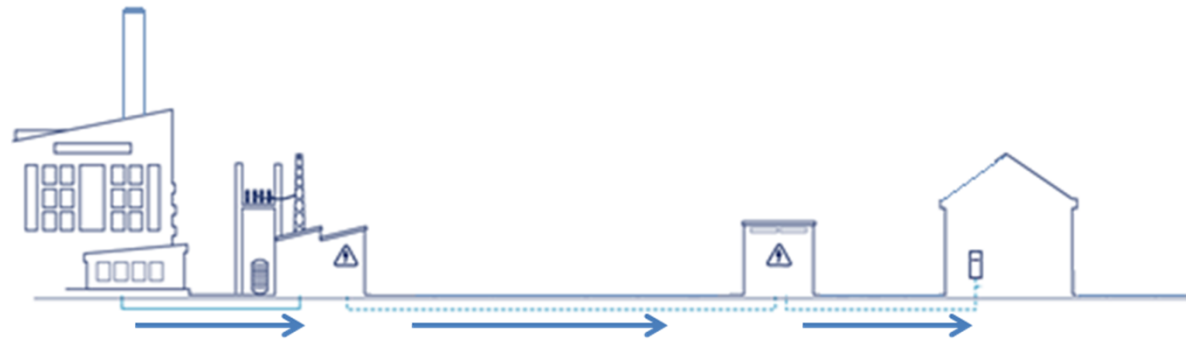


Responsibilities and ambitions DSO's

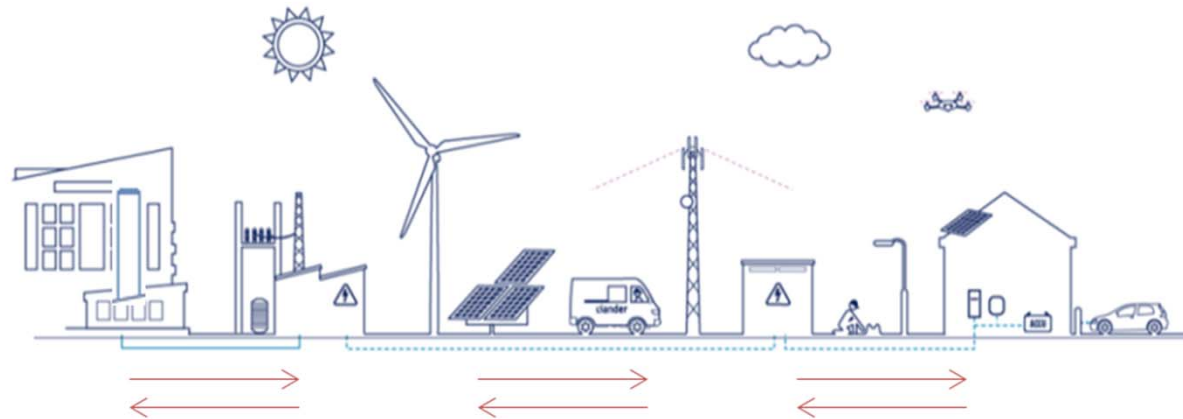


The energy landscape is changing

From



To

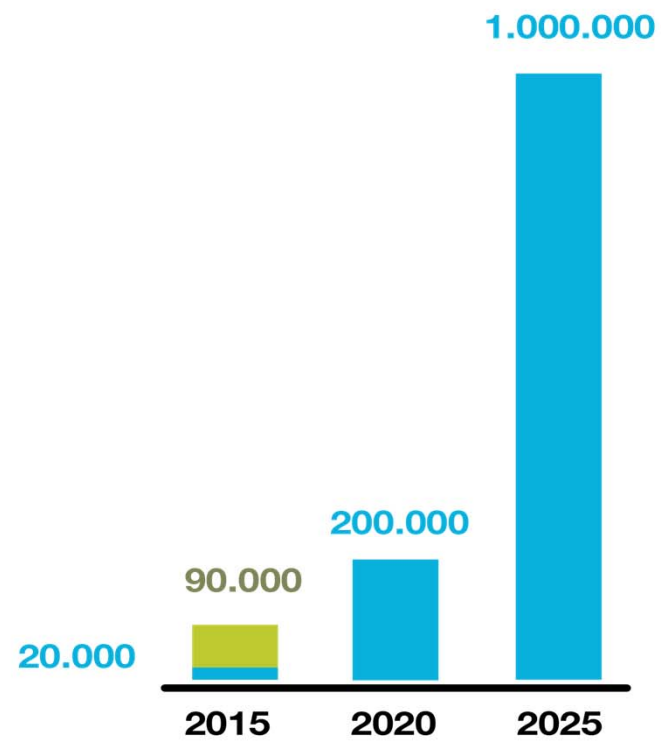


Many stakeholders many drivers

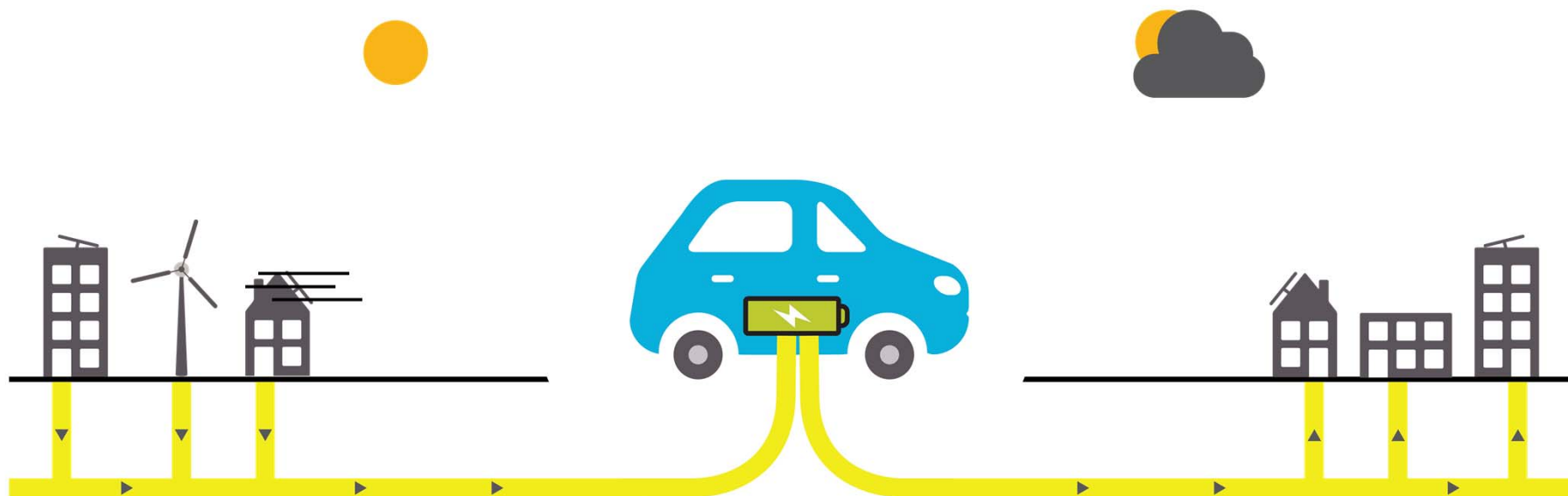


- Customers, OEM's, Cities, DSO, TSO, Market etc.
- Improving airquality
- Facilitate sustainability
- Economic perspective
- Control Grid Costs





Balancing supply and demand



Smart Charging



Chargepoint



Building



Ring, District, City, Country



Uncoordinated
charging

Local load balancing

Master/slave facilities

Negotiate charging on
the basis of few signals

Negotiate charging on
the basis of all signals

Co-ordinated charging



**Vehicle
2
Grid**

Storage and V2G by
EV



- Step 1: make charging stations smart!





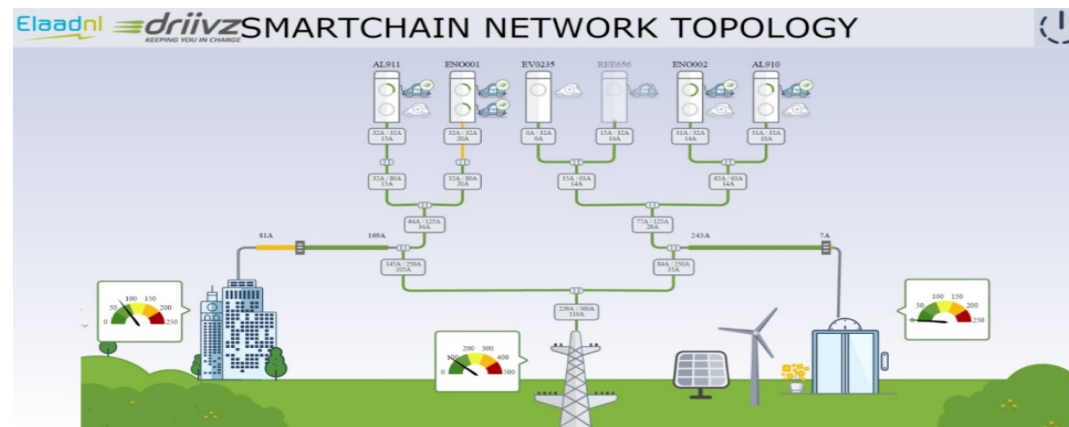
SMARTCHARGING

- **Step 2: researching and testing Smart Charging**

Ichargesmart



V2G Lombok



- Step 3: developing international standards
 - for Smart Charging

OCPP (Open Charge Point Protocol)

OSCP (Open Smart Charging Protocol)

OCPI (Open Charge Point Interface)



Why?

- Money, efficiency, tempo and quality
- Available for everyone: grow the market
- Open/IP free
- No vendor lock in
- Avoid chaos

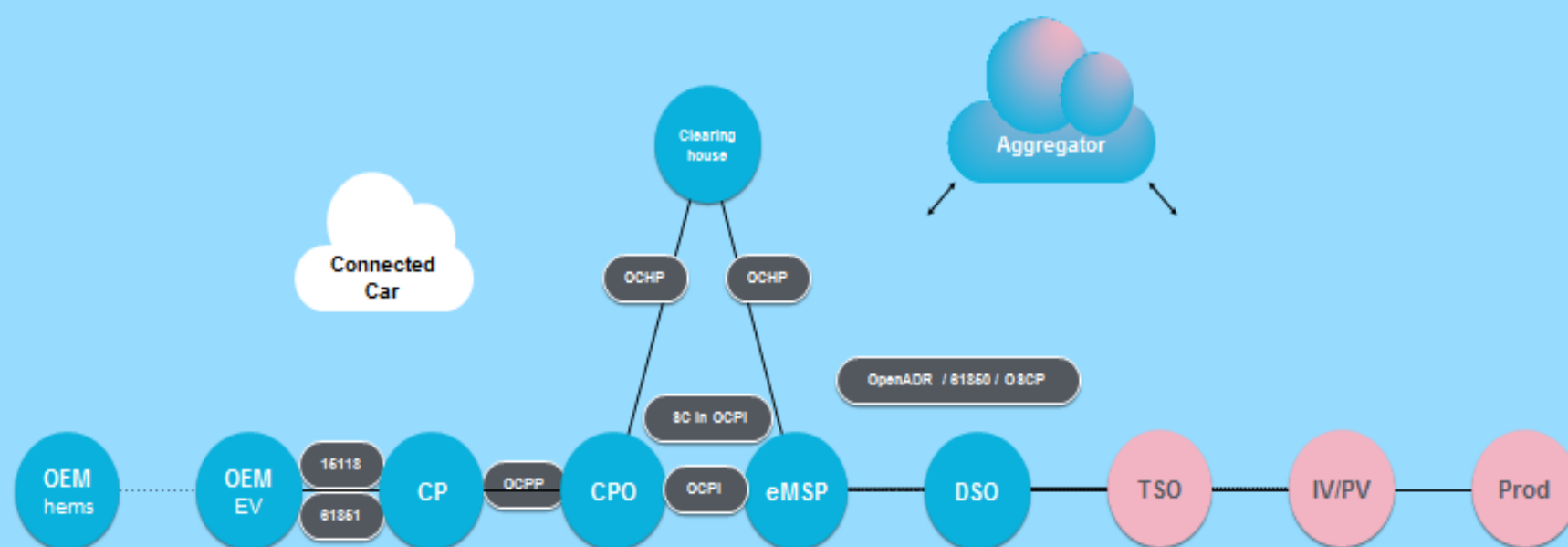
Which interoperability/standards?

- Paymentsschemes
- Dataexchange
- Sockets
- Behaviour
- Safety
- Customerapproach
- Communication Protocols
- Etc.



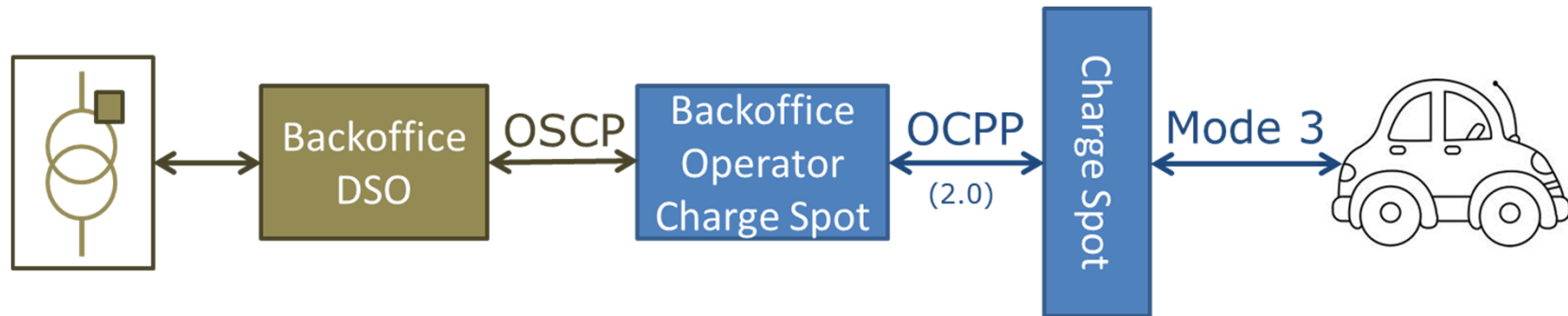
The good old days...when life was simple.

Complicated Landscape



Successes and challenges:

Interoperability



- Roadmap to interoperability:
 - **Unified procedures**
 - **Harmonization** (reducing burdens for operating businesses)
 - **Standardization** (the process of developing and implementing technical standards)
 - **Homologation** (the granting of approval by an official authority)

- **Smart Charging market standard**

11 maart 2016: signature Paris



conclusions

- Ecosystem with many stakeholders
- Reality is faster than most predictions
- Key role for Cities
- Interoperability and open standards are key

Let's join forces to make living off the wind and driving on the sun available for Europe and worldwide!

