



Seamless Charging

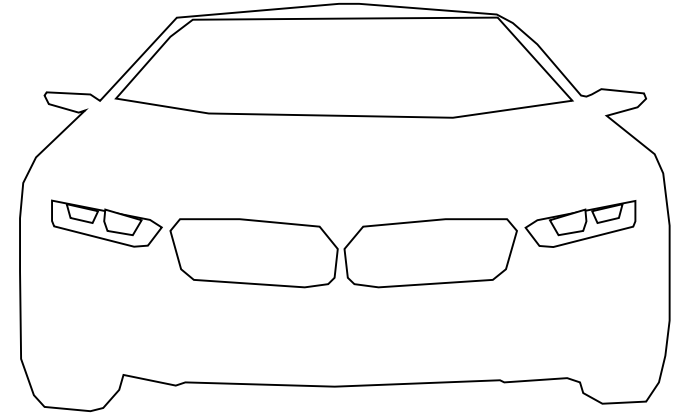
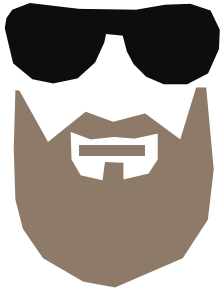
Draft animation

1 Persona: Max, his EV & wallet

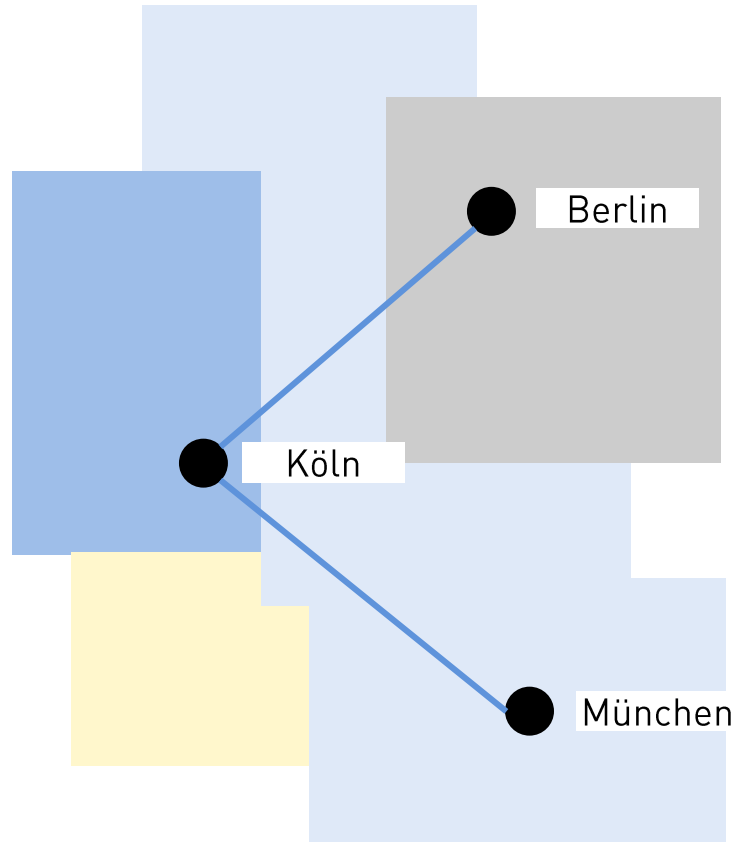
<https://bellroy.com/slim-your-wallet>



2 Persona: Max, his EV & wallet

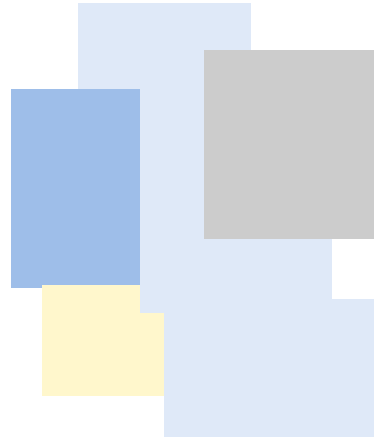
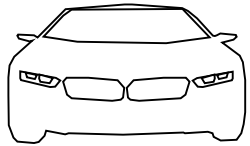


3 Charging demand



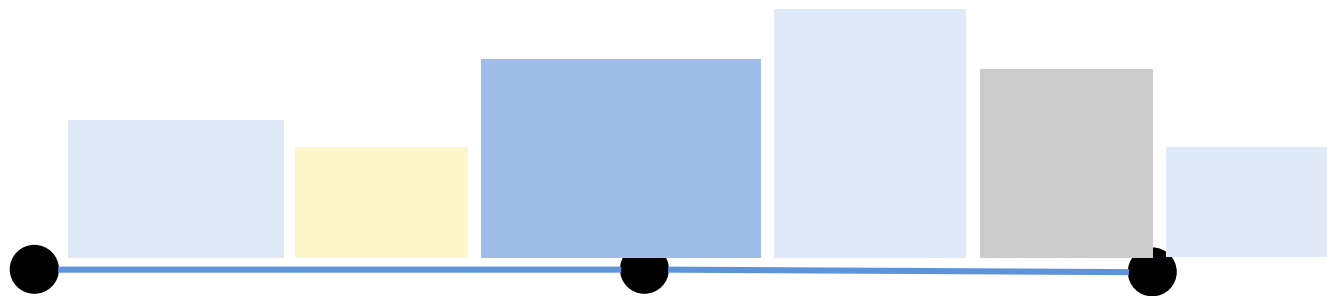
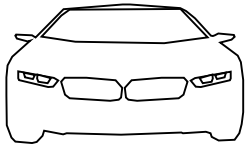
Max likes to drive long distances by his electro vehicle. He does not like to worry about charging.

3 Charging demand



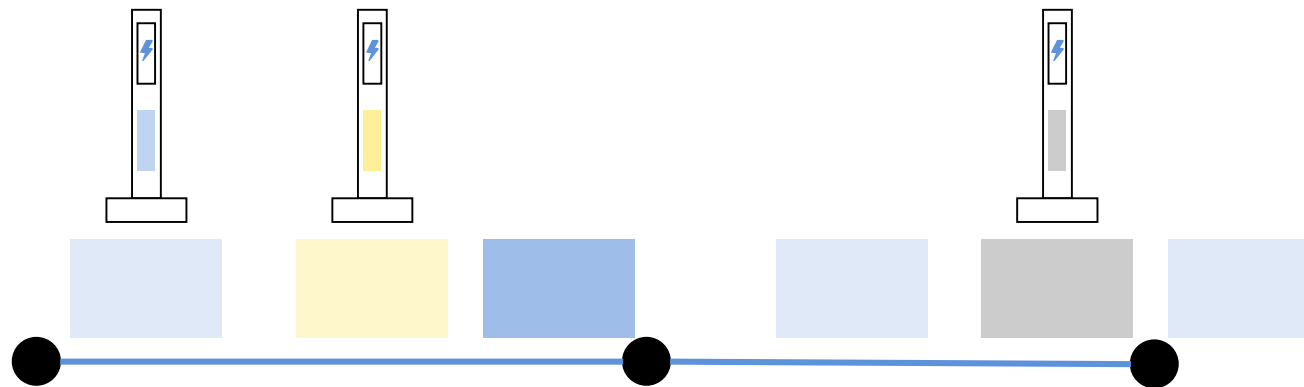
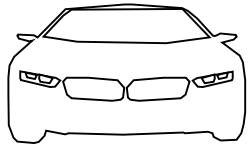
Anyway on long distance trips he has to recharge his EV.

4 Plenty of cards



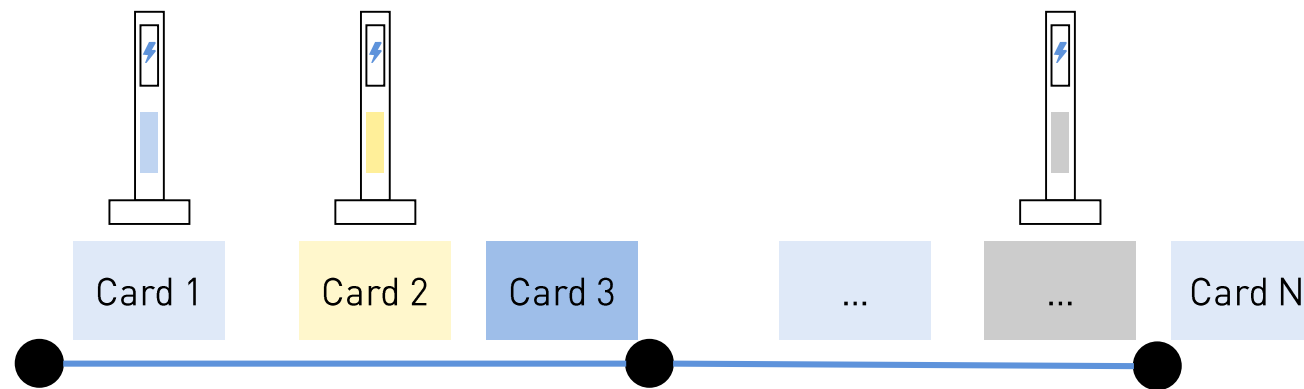
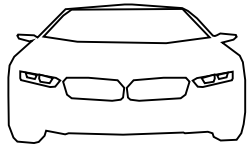
For each charging operation he needs some access entities.

4 Plenty of cards



Entities like charging cards.

4 Plenty of cards



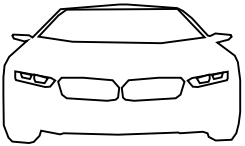
... he has many of them. But what is behind the card usage?

5 Trust via contract in advance

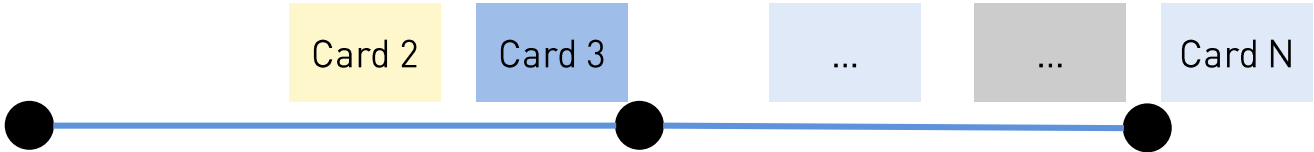
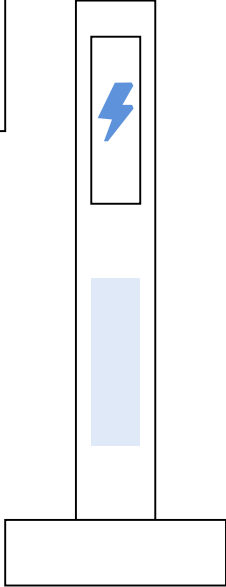


kWh?

€?



Charging Station:	OK	Card 1
Max:	OK	
Charging Operator:	OK	Contract 1

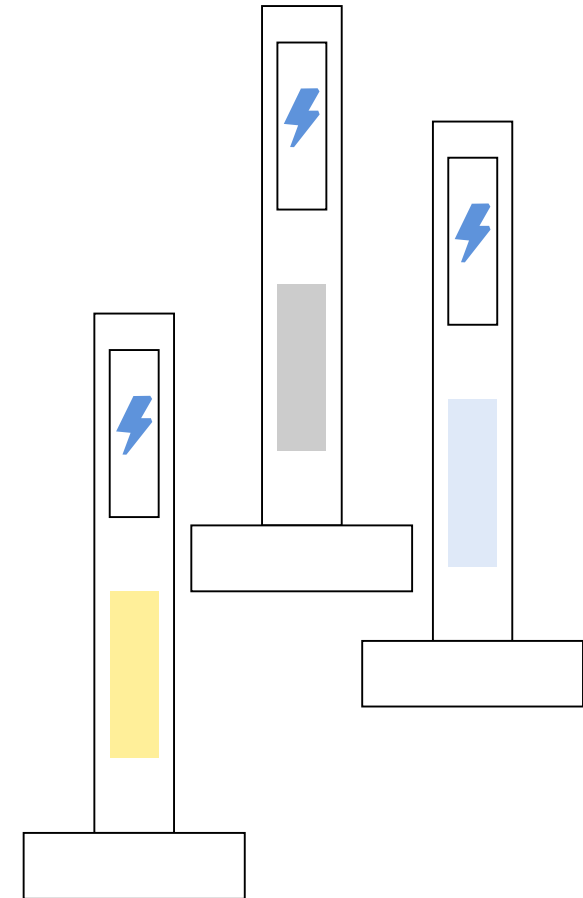
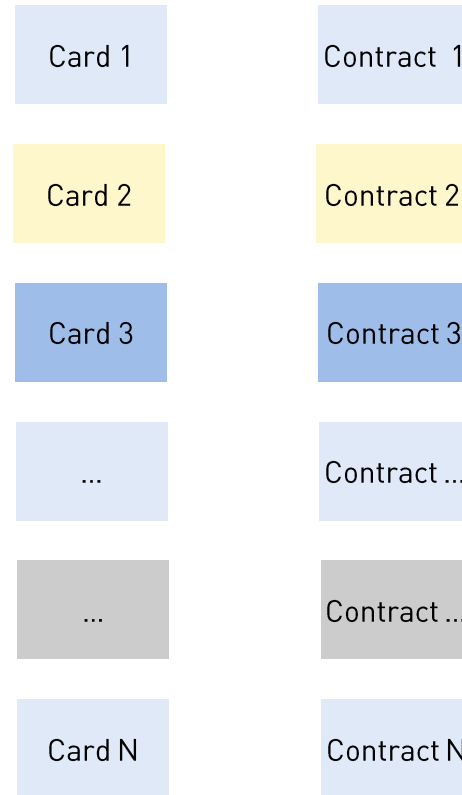
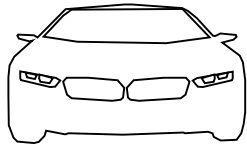


The card approves the identity of Max and charging station. Contract guarantees some service levels.

6 Plenty of charging contracts.

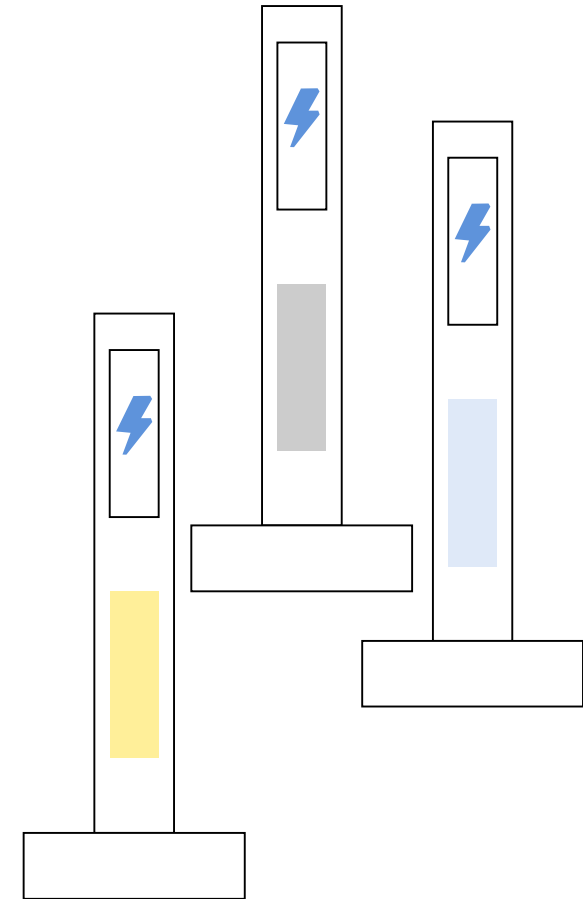
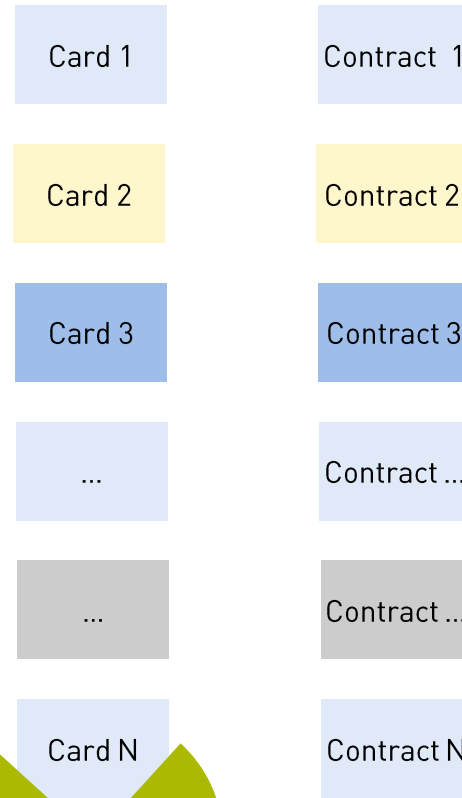
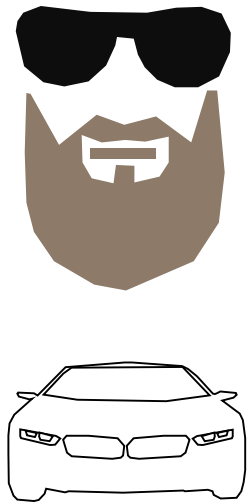


Why that many?!



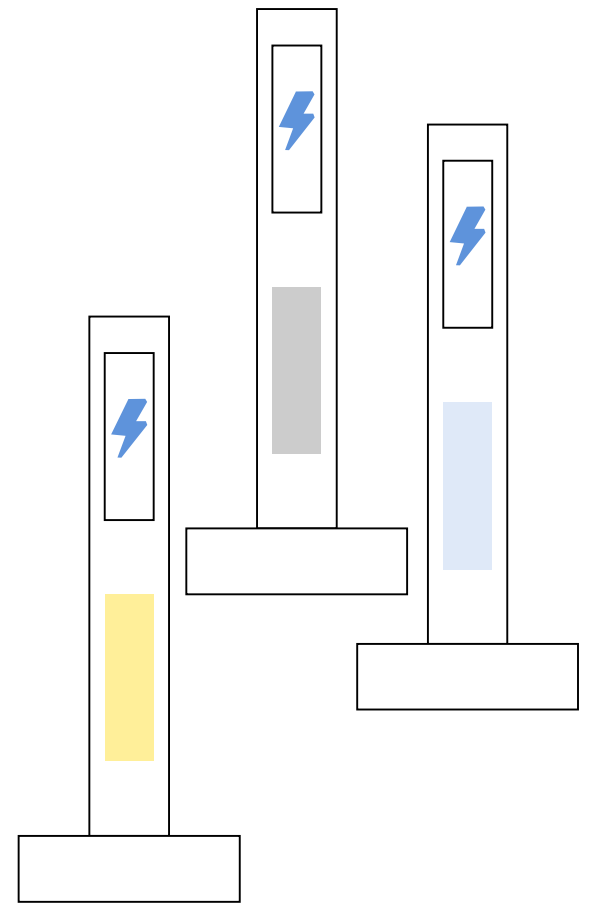
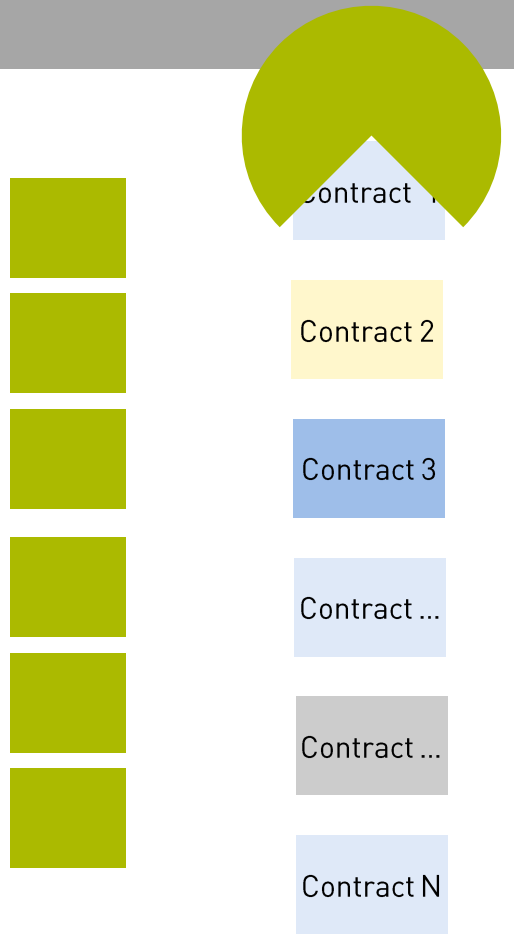
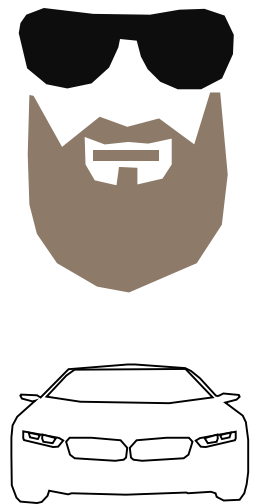
To be able to drive accross country Max has to close contracts with many energy services.

7 Blockchain likes contracts!



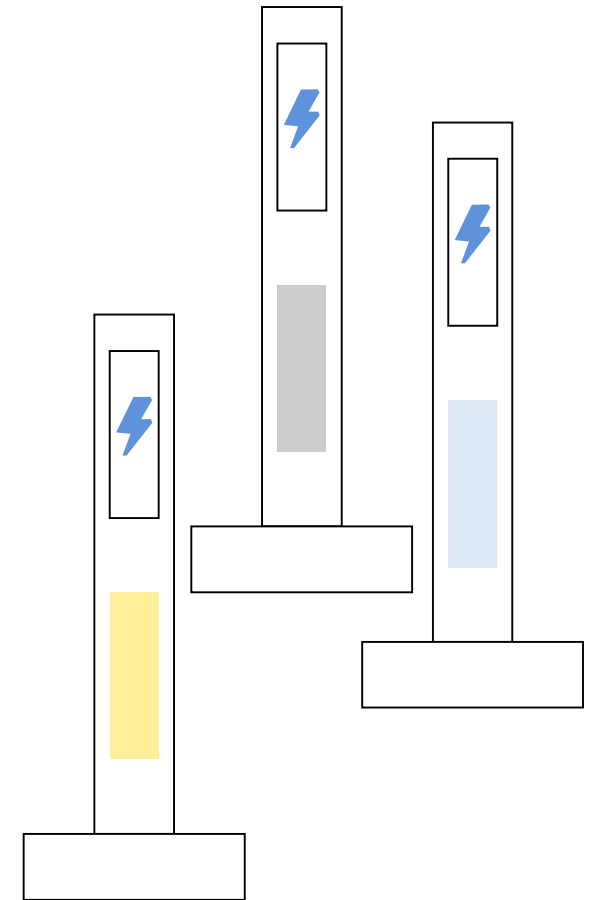
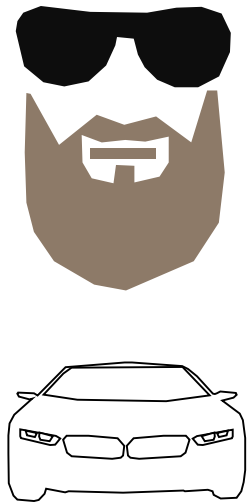
Blockchain eats them all! Authorization via the card is not required anymore. Athorization can happen ad-hoc.

7 Blockchain likes contracts!



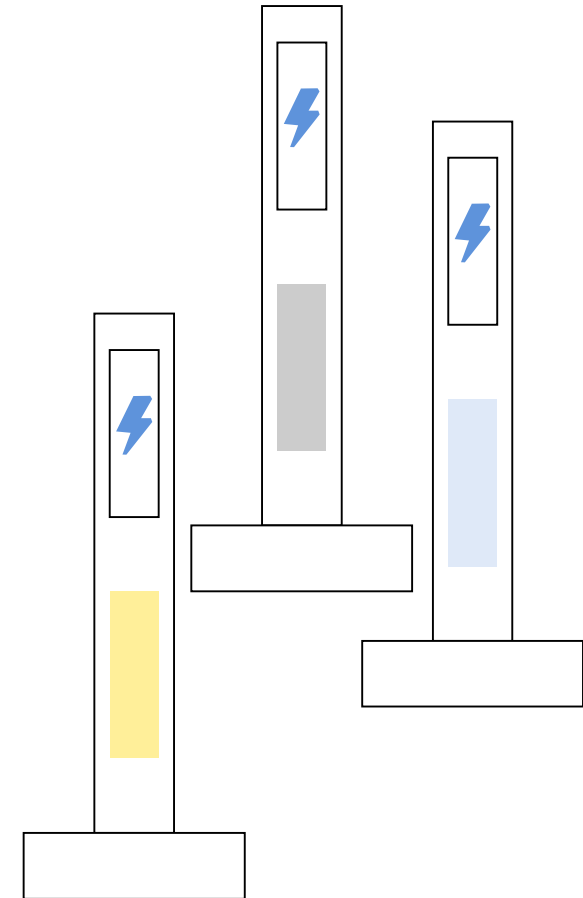
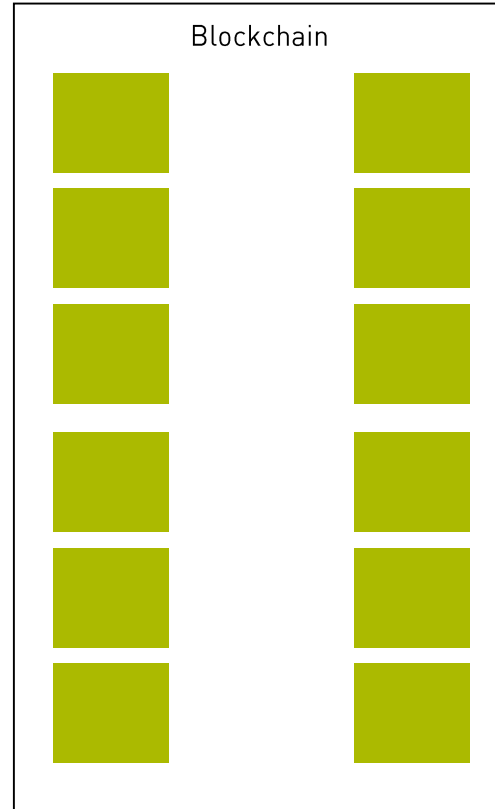
The contracts are replaced by smart contracts on the blockchain.

8 Trust on chain



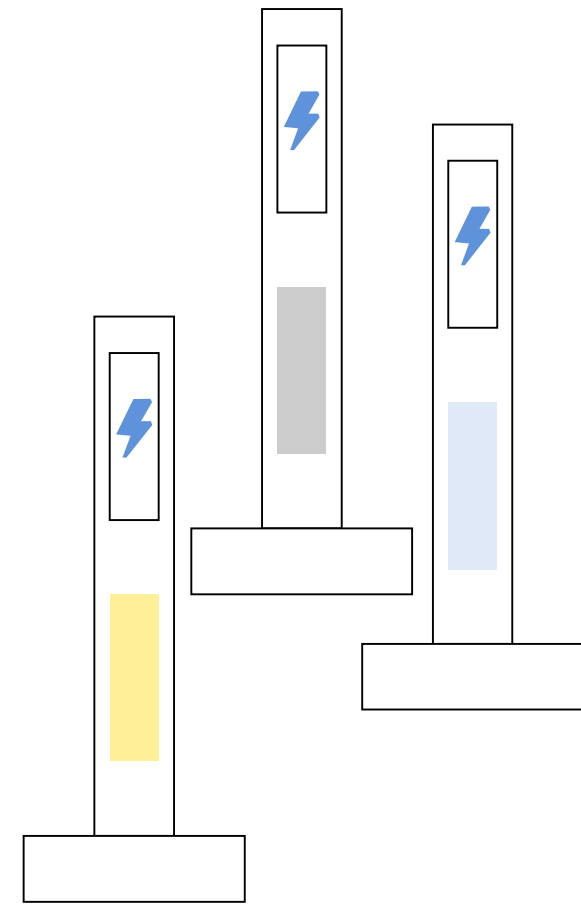
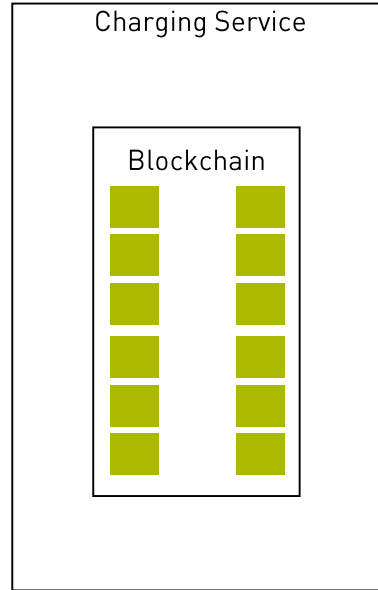
Blockchain provides trust, security, transparency

8 Trust on chain



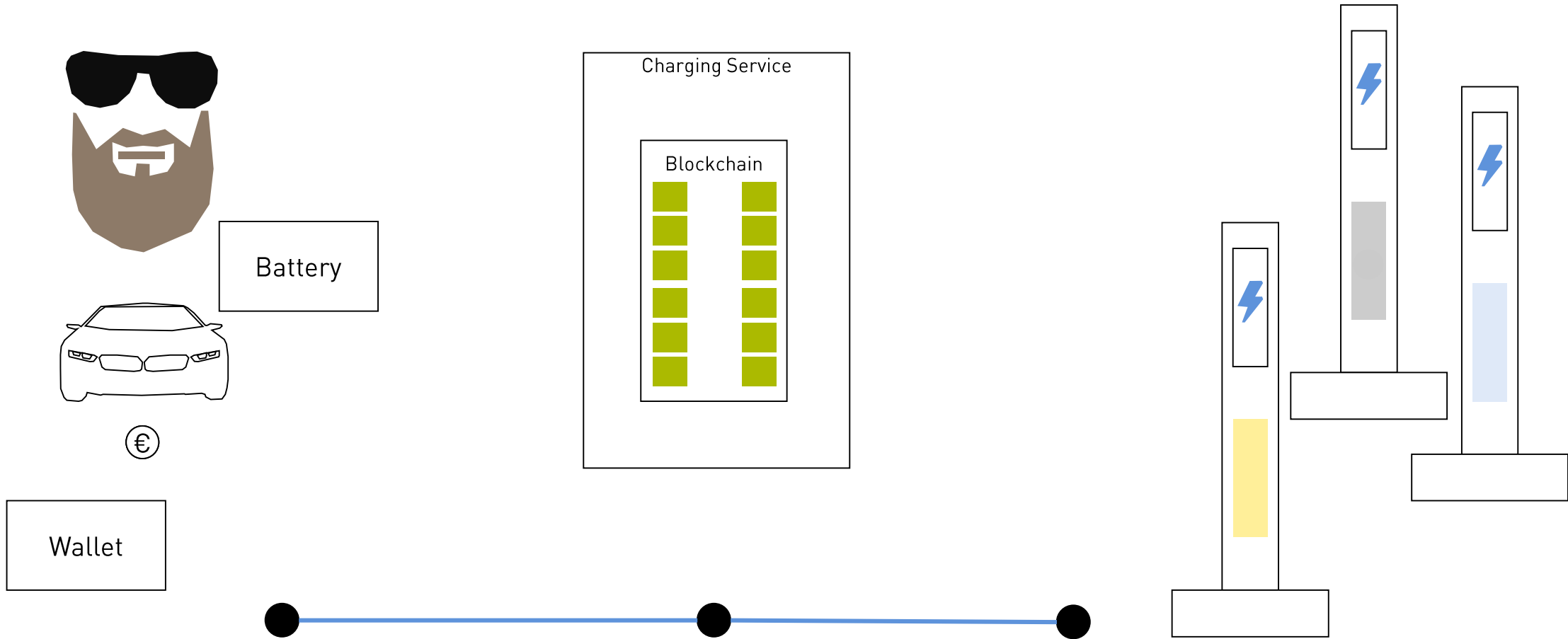
and reliability.

9 Plug, charge & pay



The blockchain based charging service enables Seamless charging operations and simplifies the access to the blockchain.

9 Plug, charge & pay



The blockchain based charging service enables Seamless charging operations and simplifies the access to the blockchain.

Max:

- Ease of use – does not require contracts or any registrations in advance, just use the service once required. By using the selected service Max implicitly approves a smart contract which is executed on the blockchain.
- Flexible contracts – using smart contracts a broad range of pricing models can be accessed.
- Participate the energy network – Max can connect his home charging station (e.g. BMW Powerwall) to the charging service and get paid for charging transactions at his station

Energy provider / charging station operator:

- Ease of integration – connect to the service, describe price model and contract rules.
- Compliance – Ladesäulenverordnung. The energy providers have to ensure charging options without contracts in advance
- ?Every provider gets benefits if the service is being used -> Motivate growth and collaboration

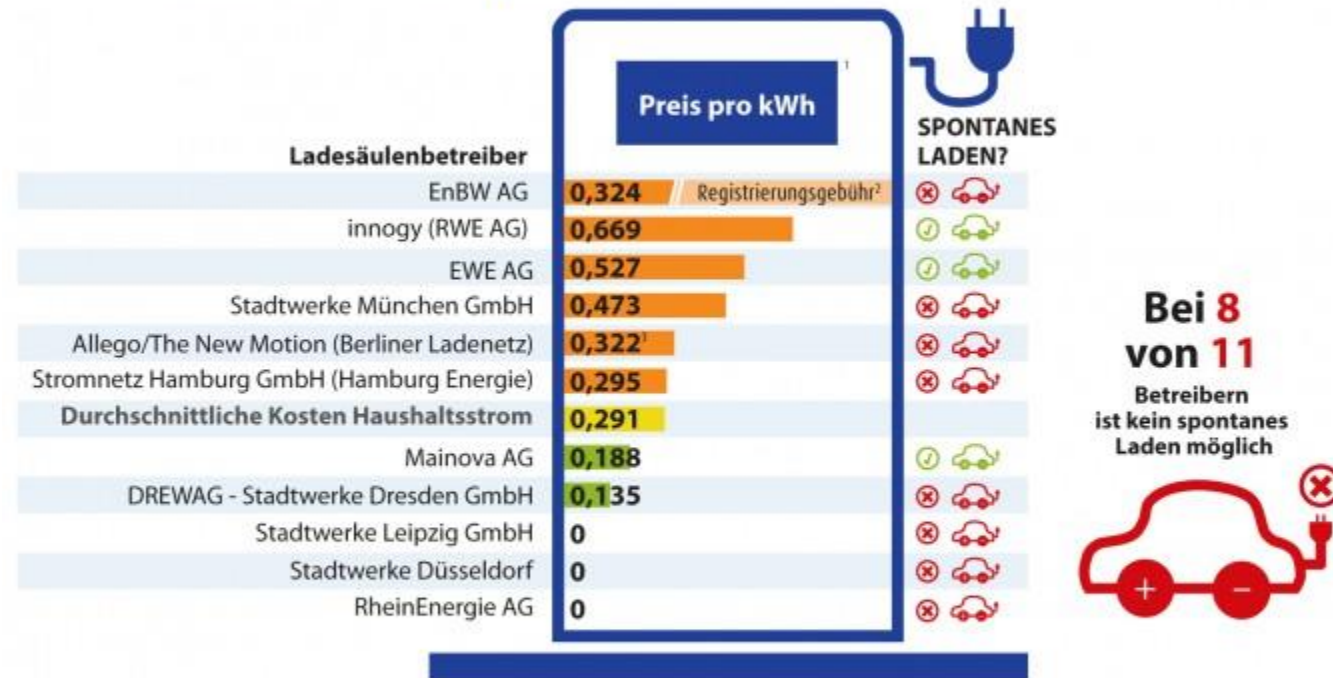
Why blockchain:

- Decentralized but homogenous
- Integrated
- Tamper proof

Assumptions:

- Scalability issues can be solved: if the consensus is too restrictive (e.g. too many participants have to approve) one transaction approval may take several minutes (use: Relaxed consensus parameters or event IOTA)
- Charging station displays: most of the CS have displays and are able to host the required software.
- Smartphone devices & connectivity: most of the customers have a smartphone with a camera and mobile internet connection (if not: communication via phone numbers + magic numbers, or buy ad-hoc private wifi bandwidth in urban locations as part of the service – possible with blockchain)
- There is no implicit trust between all participants and provided services there could be theoretically fake stations, fake users and fake consortium partners
- Blockchain does not really need to store contents of the transaction, it only needs to store approvals and acknowledges of all relevant participant on a transaction

Ladesäulen-Check Deutschland: Stromtankstellen kompliziert und oft teuer



¹ Berechnungsgrundlage: Kosten (in EUR) pro kWh für eine Tankfüllung für 100 km mit einem Nissan Leaf (ca. 16 kWh), AC-1 (bei 7,4 kW);
Tarife ohne Vertragsbindung
² einmalige Registrierungsgebühr von 20,00 Euro
³ inklusive anteiliger Transaktionskosten

Alle Daten: Untersuchung des Recherche- und Marktforschungsunternehmens statista auf den Webseiten der Ladeinfrastrukturbetreiber, Stand Mitte 2017

Quelle: LichtBlick SE