

beyond: Earning money with your EV on the Intraday market

**Experience from commercialisation of Vehicle-to-Grid and
Smart Charging**

July 5th, Cologne

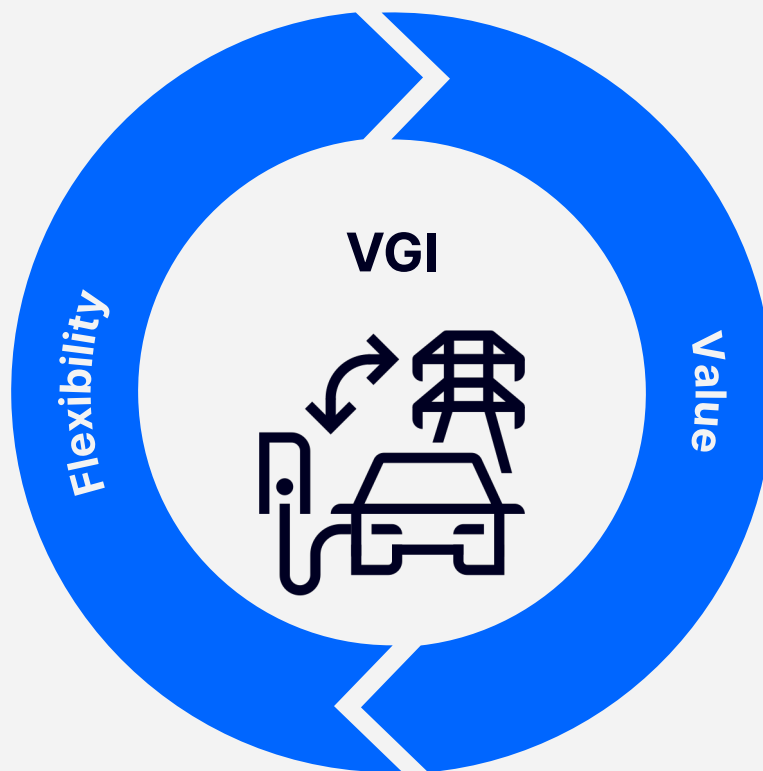
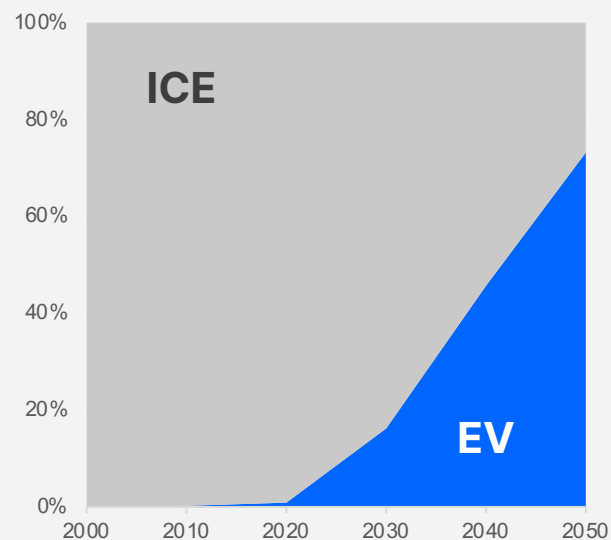
Dr.-Ing. Julian Rominger



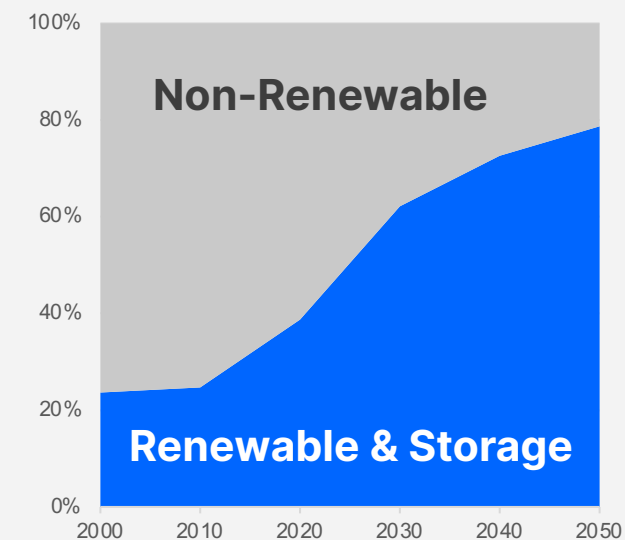
The Mobility House: zero zero – zero emissions, zero cost

Vehicle Grid Integration Principle - VGI

Global Electric Vehicles



Global installed electric capacity





2nd-Life stationary storages with OEMs



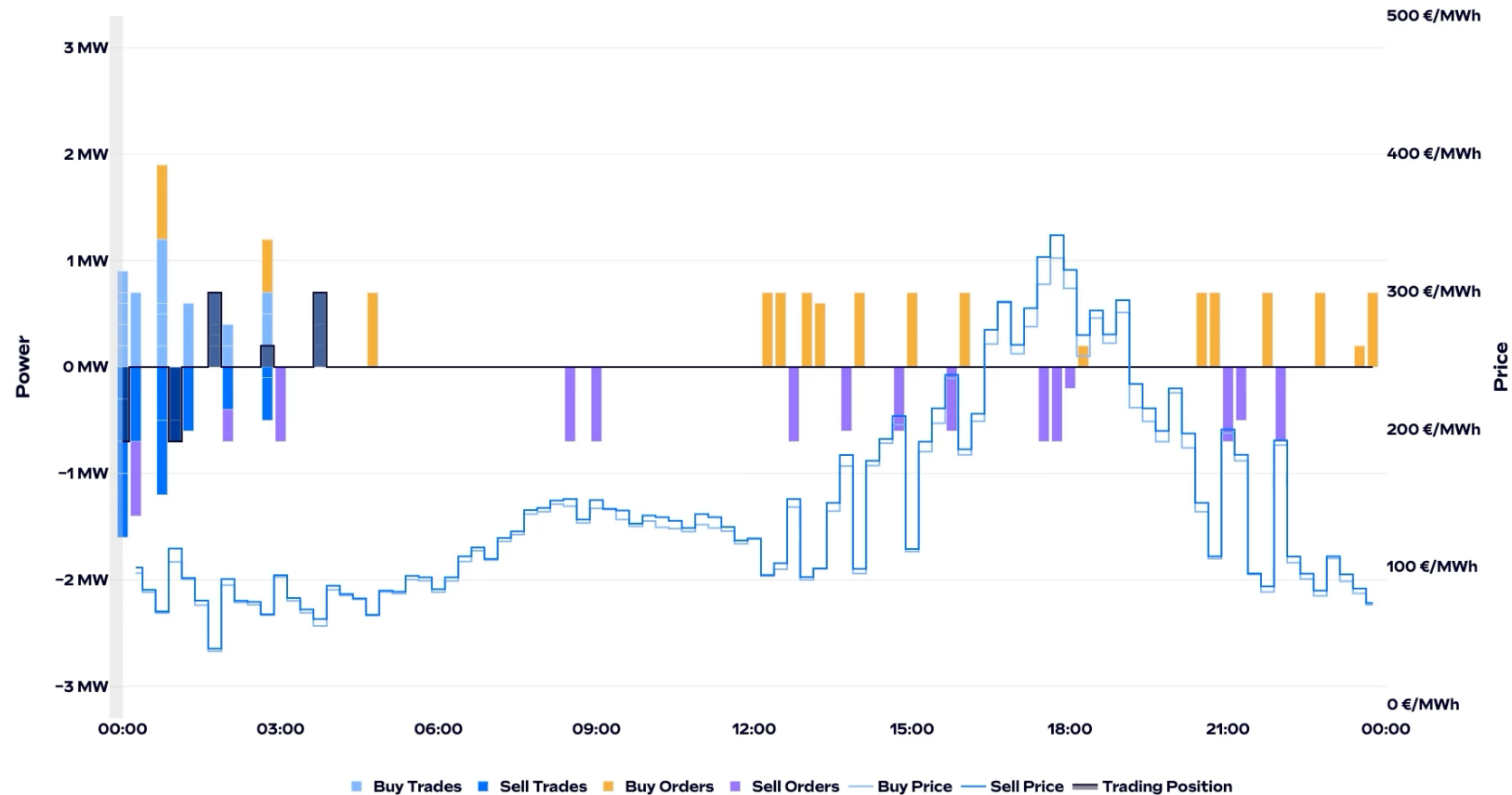
Flexibility Monetization Examples

- > **LOCATION:** Germany, Netherlands and France
- > **STORAGE PARAMETERS:** around 100 MW
- > **BATTERIES:** zero-life (spare parts), 1st- and 2nd-life
- > **APPLICATION:** control reserve (FCR, aFRR), trading on short-term markets, capacity markets, behind-the-meter applications
- > **TMH SERVICES:** Development | operation | control | commercialization



Fully automated Intraday algo trading (on top of FCR)

Exemplary trading day video



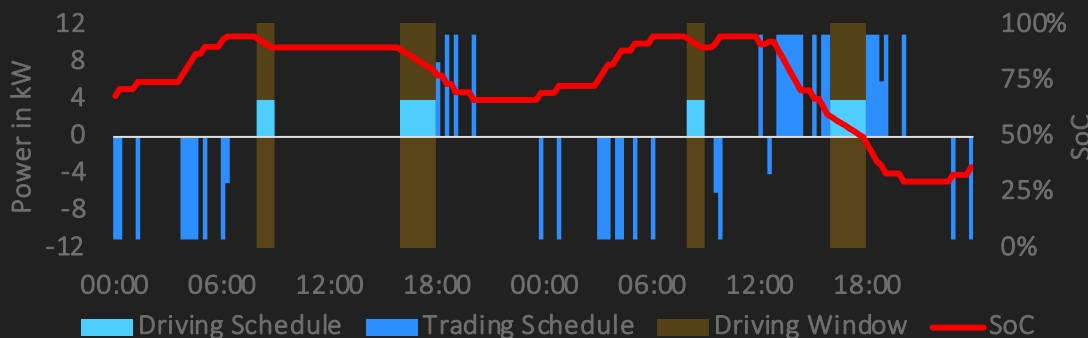


Field Study: Vehicle-Grid-Integration

Simulation of EV fleet with stationary storage



- > **Fleet:** 18 AUDI e-tron batteries (je 73 kWh capacity)
- > **Use case:** Trading of flexibility on short-term electricity markets from March to June 2022
- > **Assumptions:** Predicted driving pattern¹ and charger connection²
- > **Limits:**
 - 38 full cycle equivalents (V2G) per year
 - Soc limited to range 30 % - 95 %



V1G

- Value creation: **773 €/EV/a**
- Cost reduction 50%

V2G

- Value creation: **1.560 €/EV/a**
- Charging cost at 0 €/a

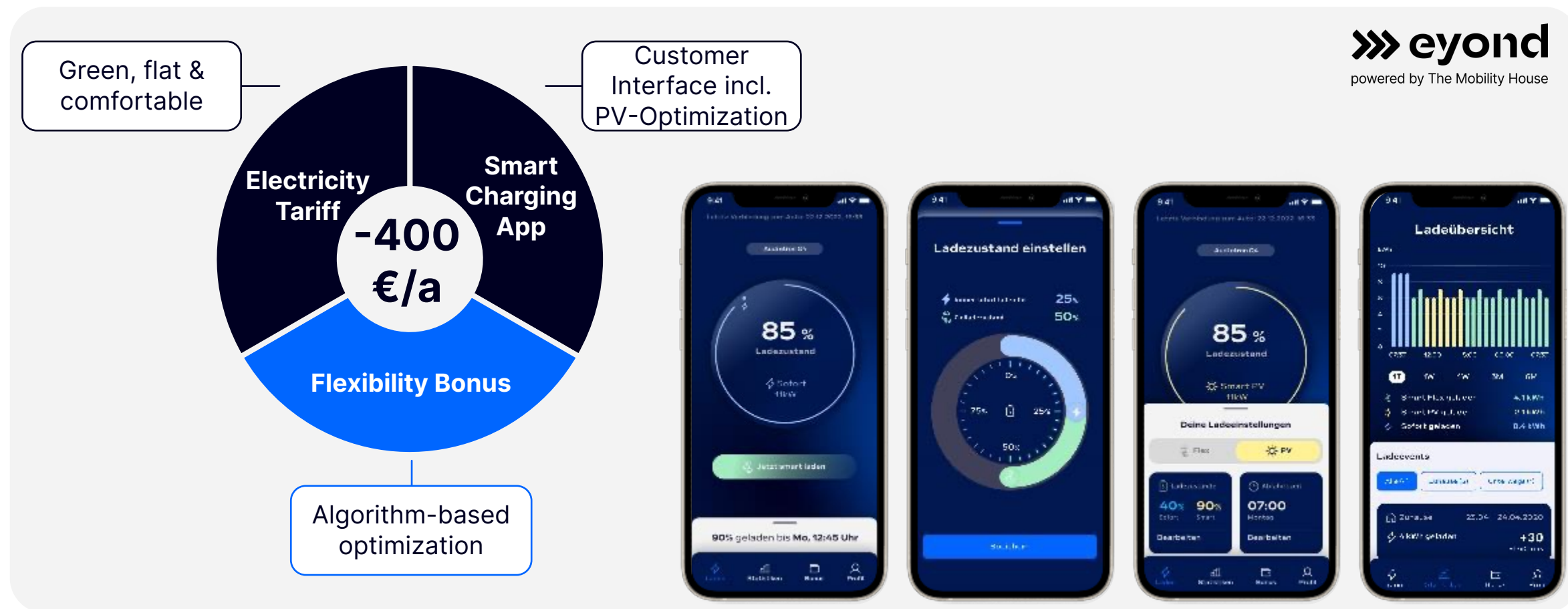
¹ 18,225 km/a and 20 kWh/100km ² 84% of time connected to charger

TMH Technology Portfolio commercializes EVs, fleets and stationary storages



Unidirectional charging already achieves 400 EUR energy/grid savings per year

Smart charging energy tariff eyond®



Maximum VGI value requires continuous optimization of multiple dynamic parameters

Portfolio Optimization

EV Data

- Plug-in availability
- Energy need
- Charging power
- State-of-charge

→ Flex Polygon

Live Dashboard

