



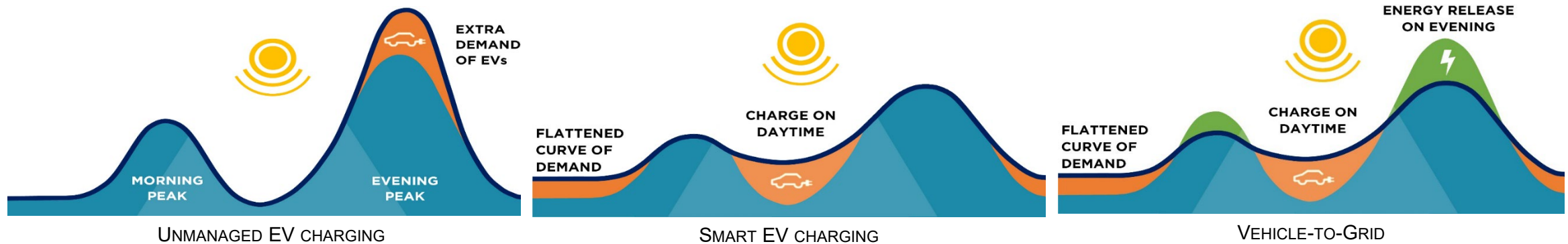
Managing grid integration of electric vehicles

GEF Global Programme to Support Countries with the Shift to Electric Mobility

15 March 2022

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IREC-Task 43 Operating Agents

Vehicle Grid Integration

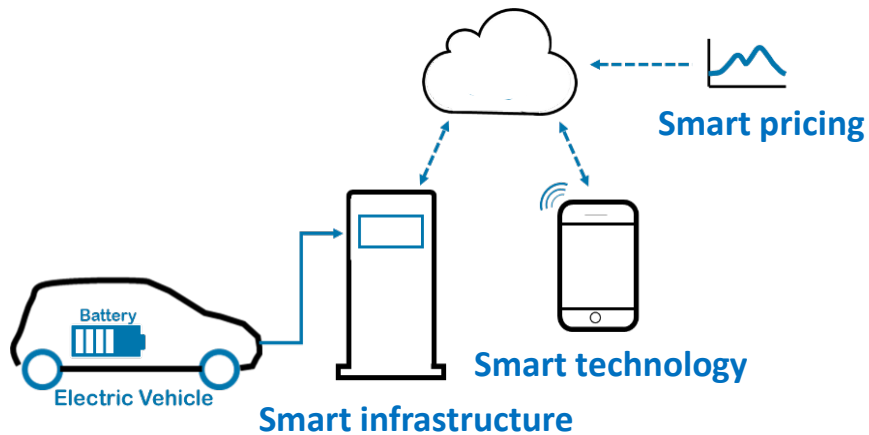


Smart Charging is crucial, Vehicle-to-Grid powerful

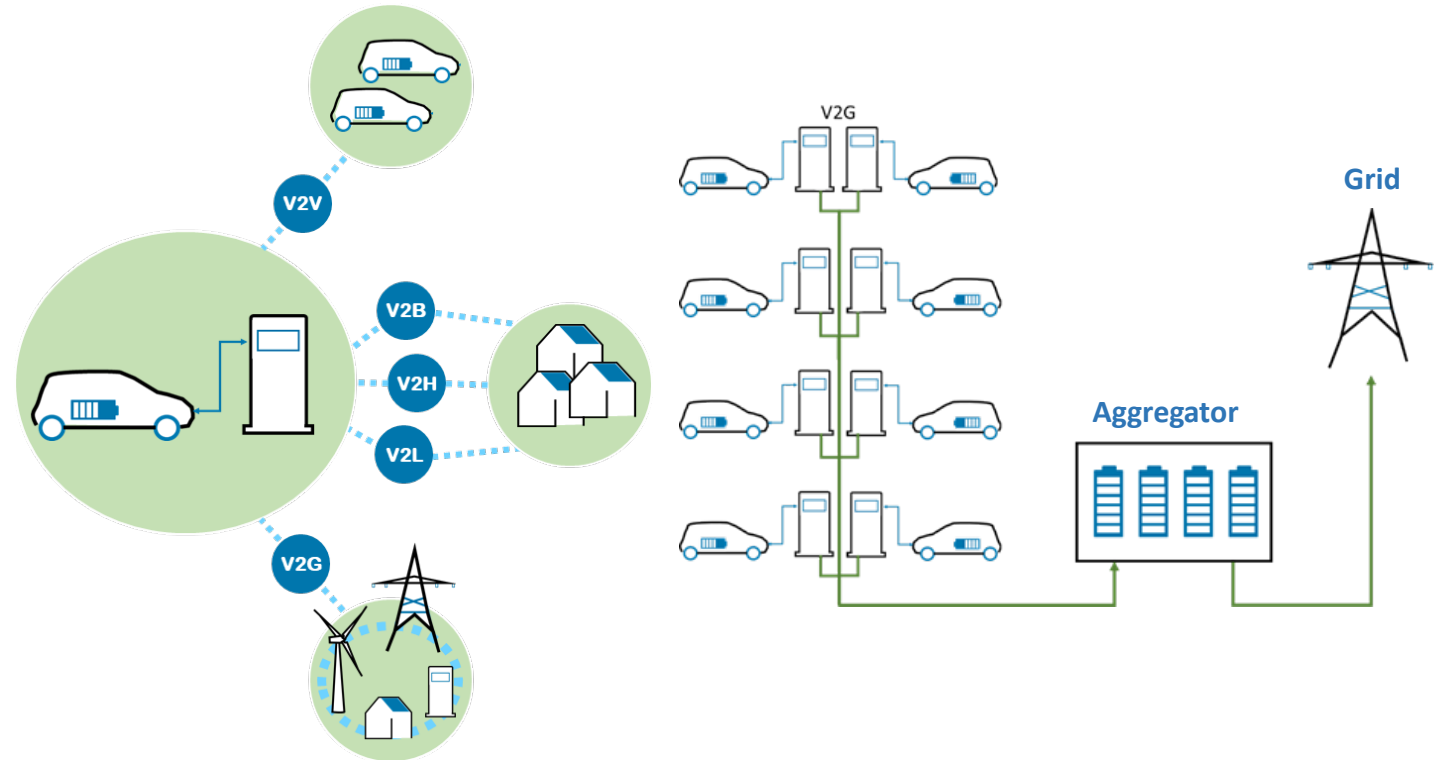
- ✓ EVs act as **controllable loads**, to smooth demand peaks
- ✓ EVs can act as **distributed storage**, providing energy back to the Grid
- ✓ EV drivers earn **rewards** in exchange for grid services

Vehicle Grid Integration – How?

Smart Charging is crucial



Vehicle to Grid is powerful



Smart infrastructure – public or semi-public



Urban without private parking

Public charging and parking

Semi-public charging (supermarkets, hotels, etc.)

Multi-unit dwellings (rented)

Rural areas without private parking

Public charging and parking

Highways

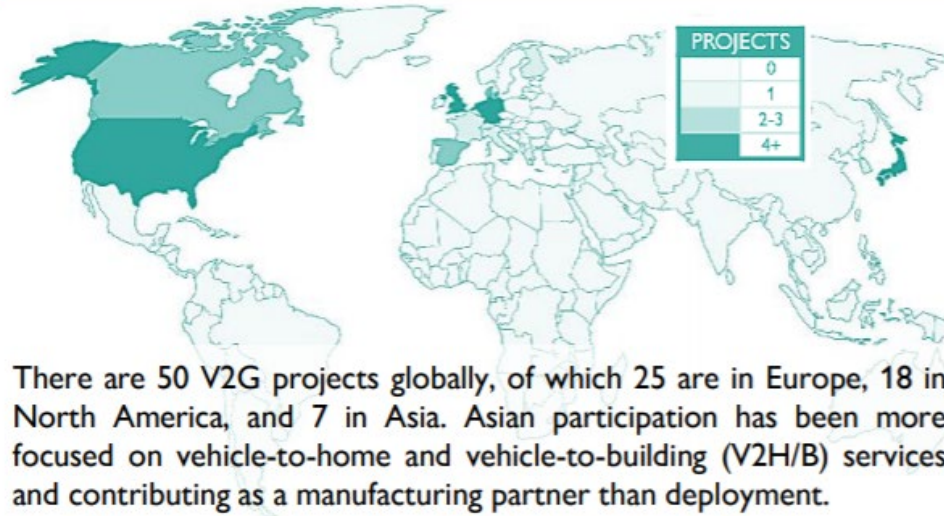
Main highways (core TEN-T network)

Medium-size city connections (comprehensive TEN-T network)

Logistics/depot charging

Vehicle to Grid

HALF OF PROJECTS ARE IN EUROPE

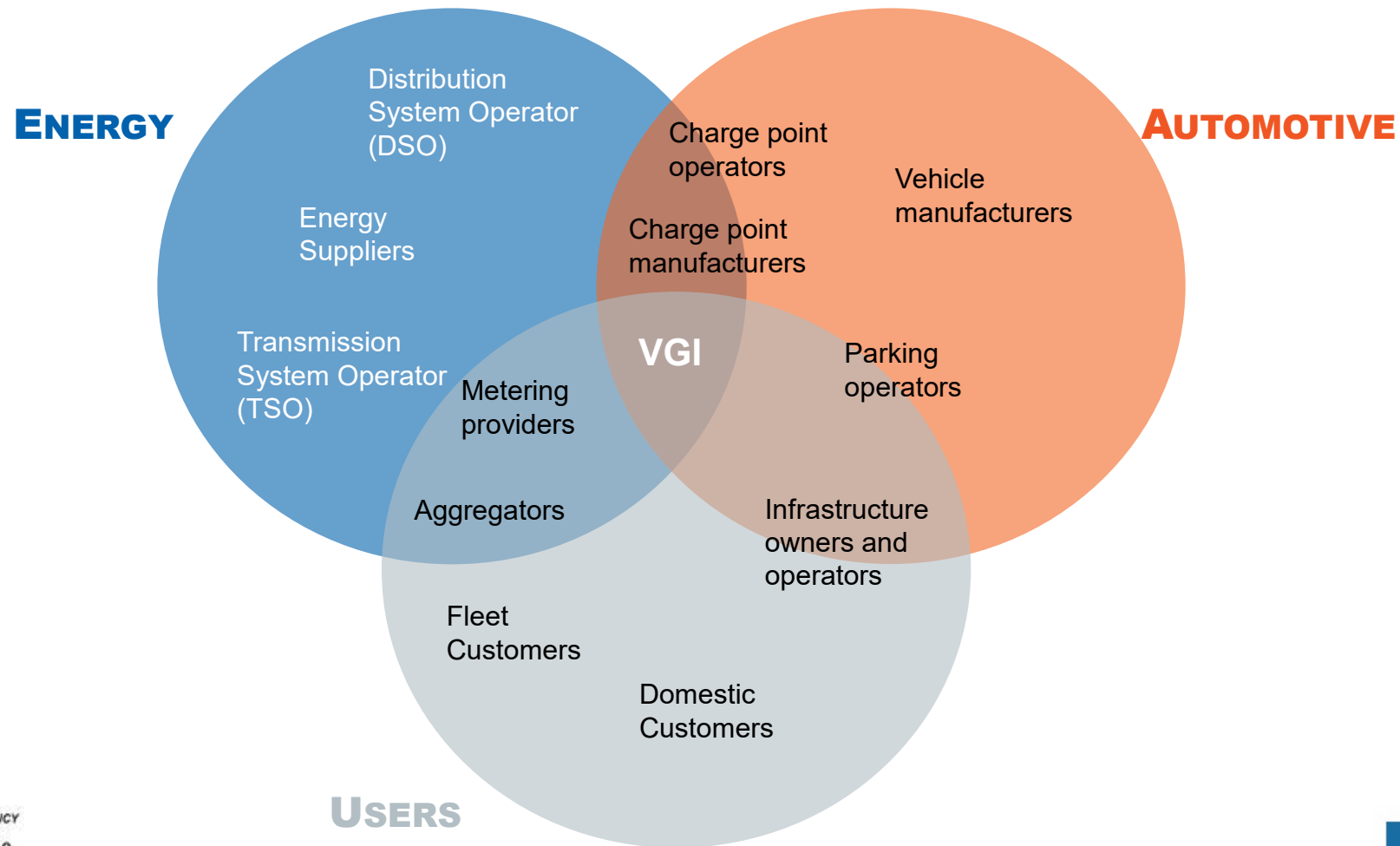


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Vehicle Grid Integration – Stakeholders and actors

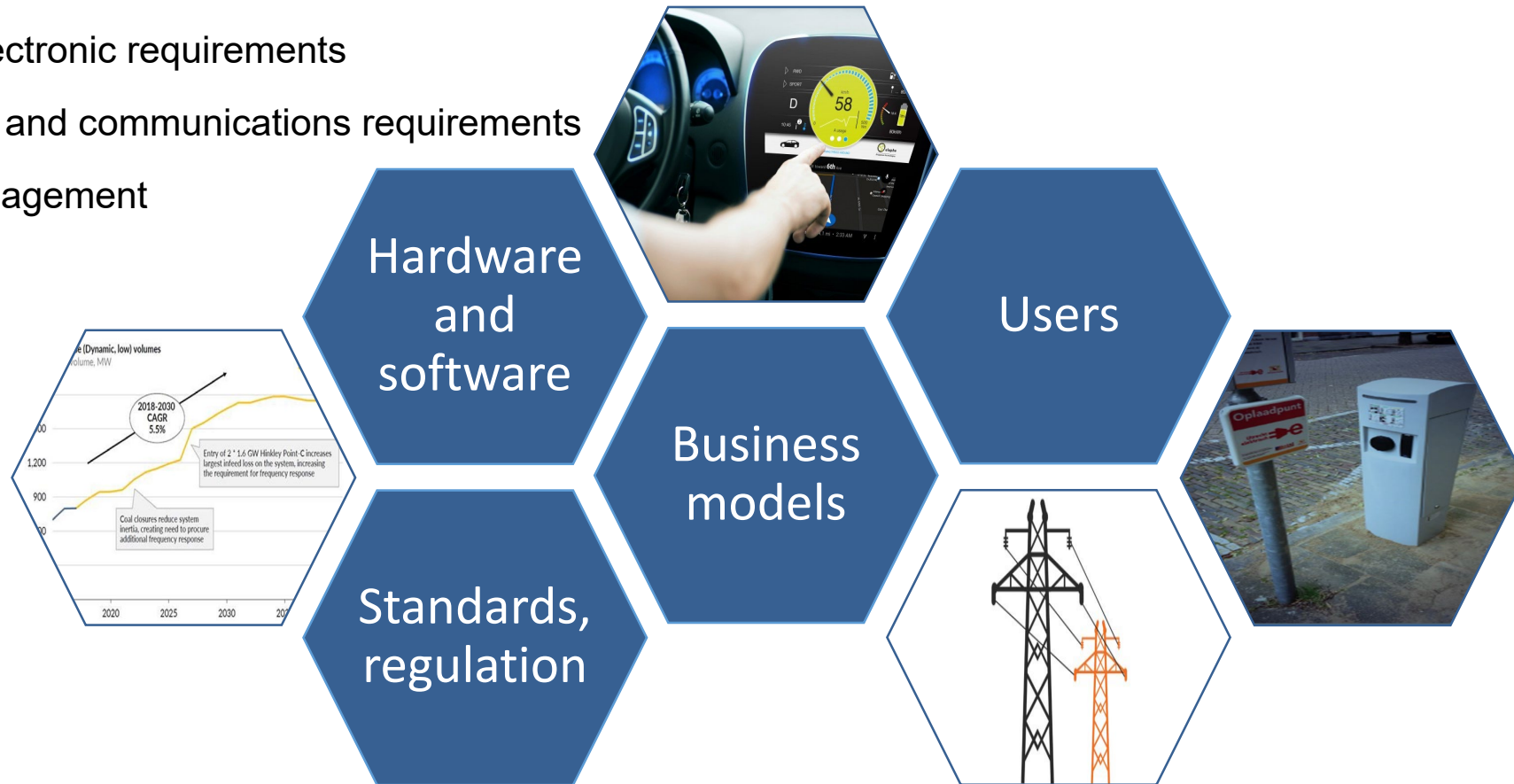


Vehicle Grid Integration

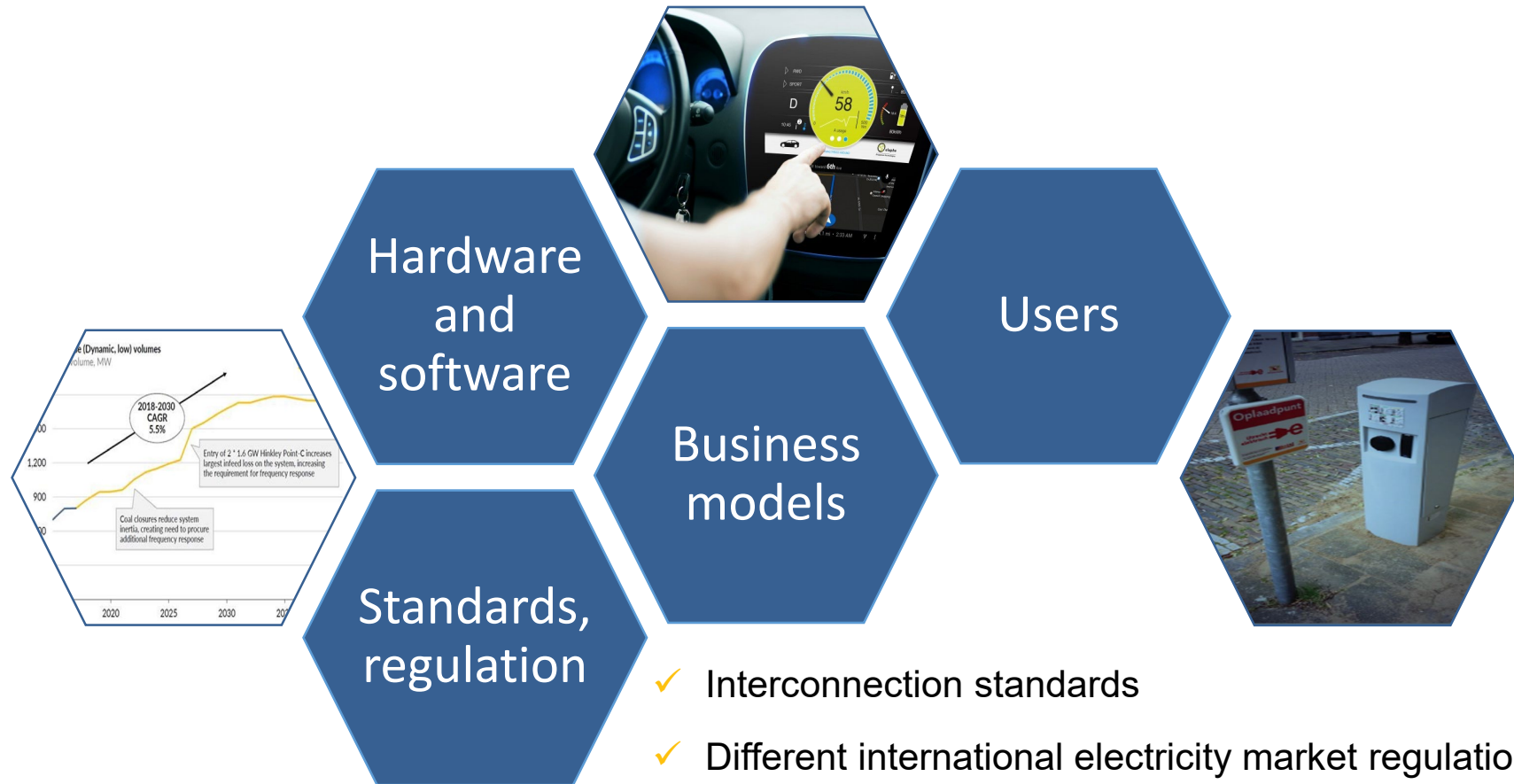


Vehicle Grid Integration

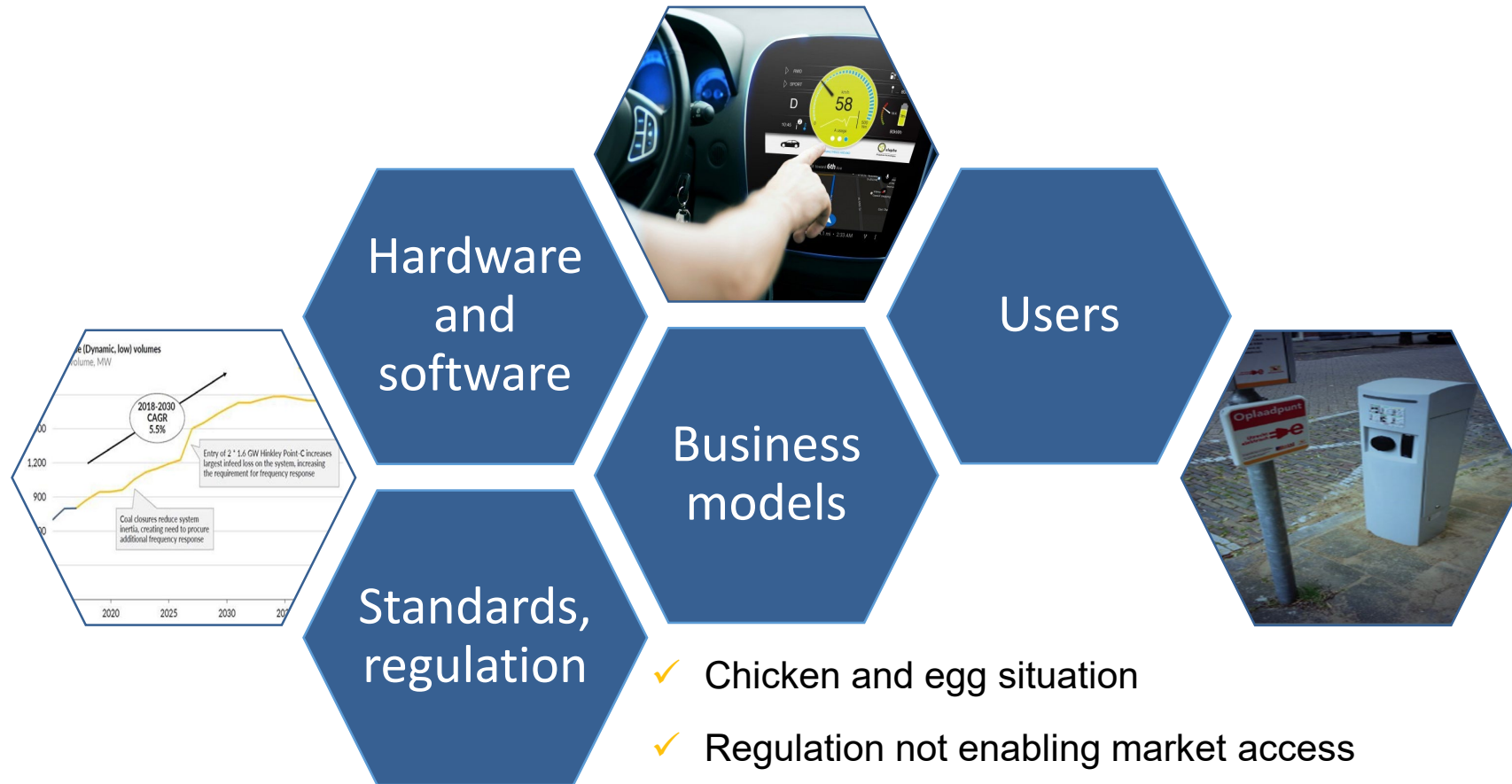
- ✓ Power electronic requirements
- ✓ Protocols and communications requirements
- ✓ Data management



Vehicle Grid Integration



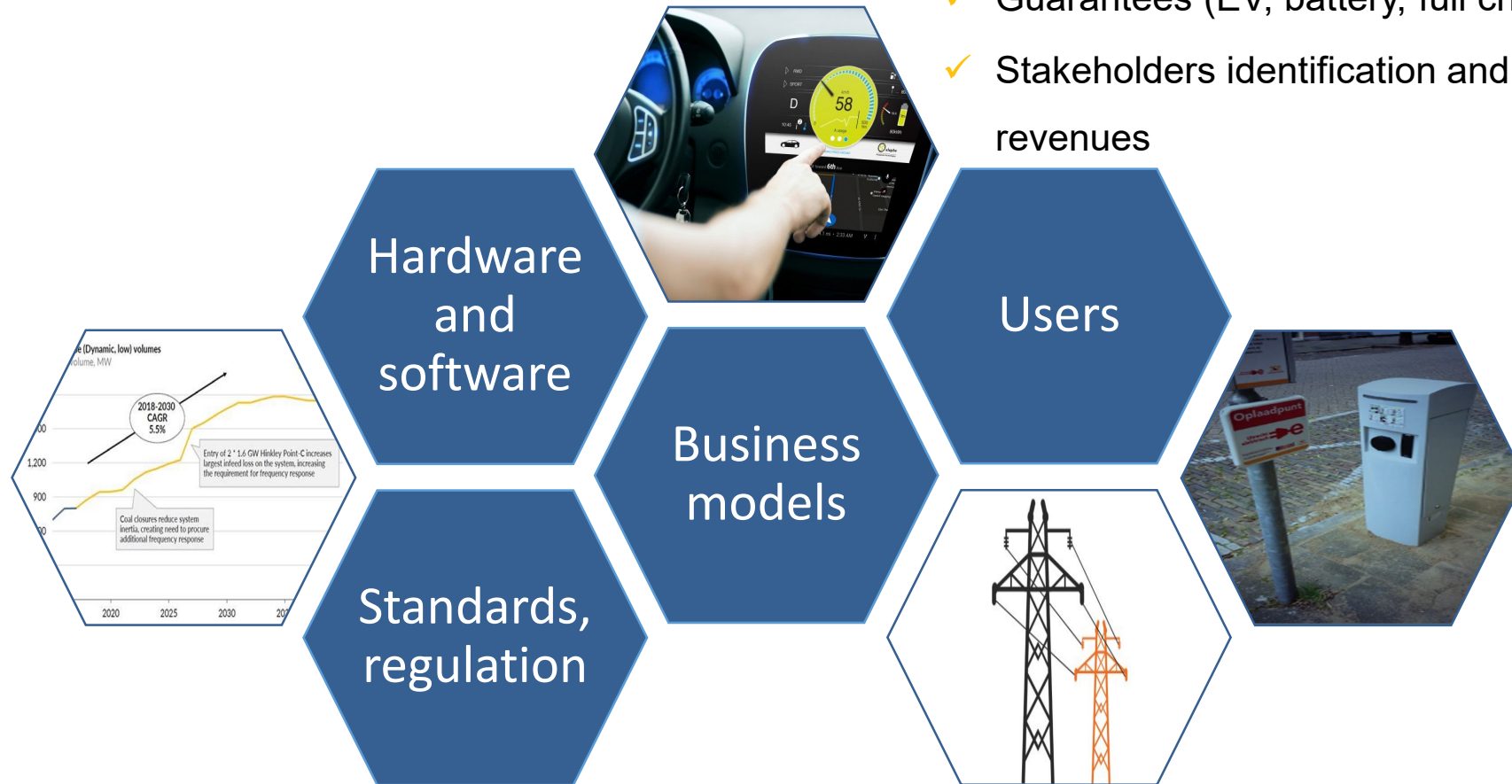
Vehicle Grid Integration



- ✓ Chicken and egg situation
- ✓ Regulation not enabling market access
- ✓ Lack of coordination between stakeholders
- ✓ Unclear roles in the business model

Vehicle Grid Integration

- ✓ TCO should be clearly decreased
- ✓ Guarantees (EV, battery, full charge, ...)
- ✓ Stakeholders identification and clarity on costs and revenues



Vehicle Grid Integration – policy recommendations

Strategies	Policy recommendations
EV as DER	Enable the aggregation of EVs and the participation in energy markets and flexibility services.
Building pre-equipment	New or renovated buildings should be prepared, all parking slots cabled. Local authorities or should support the cabling for residential and office buildings in all parking slots.
Smart charge pricing	Smart tariff design means pricing both energy and network services to serve EV customers. Adopt and apply dedicated tariff structures for EV charging and require time-varying tariffs.
Smart charging technology	Deployment of smart infrastructure, setting criteria to fund charging infrastructure deployment based on minimum smart management requirements.

Thank you very much for your attention

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