

# FINDING THE RIGHT FIT FOR VEHICLE-TO-GRID



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**Senior Research Associate**

# AGENDA

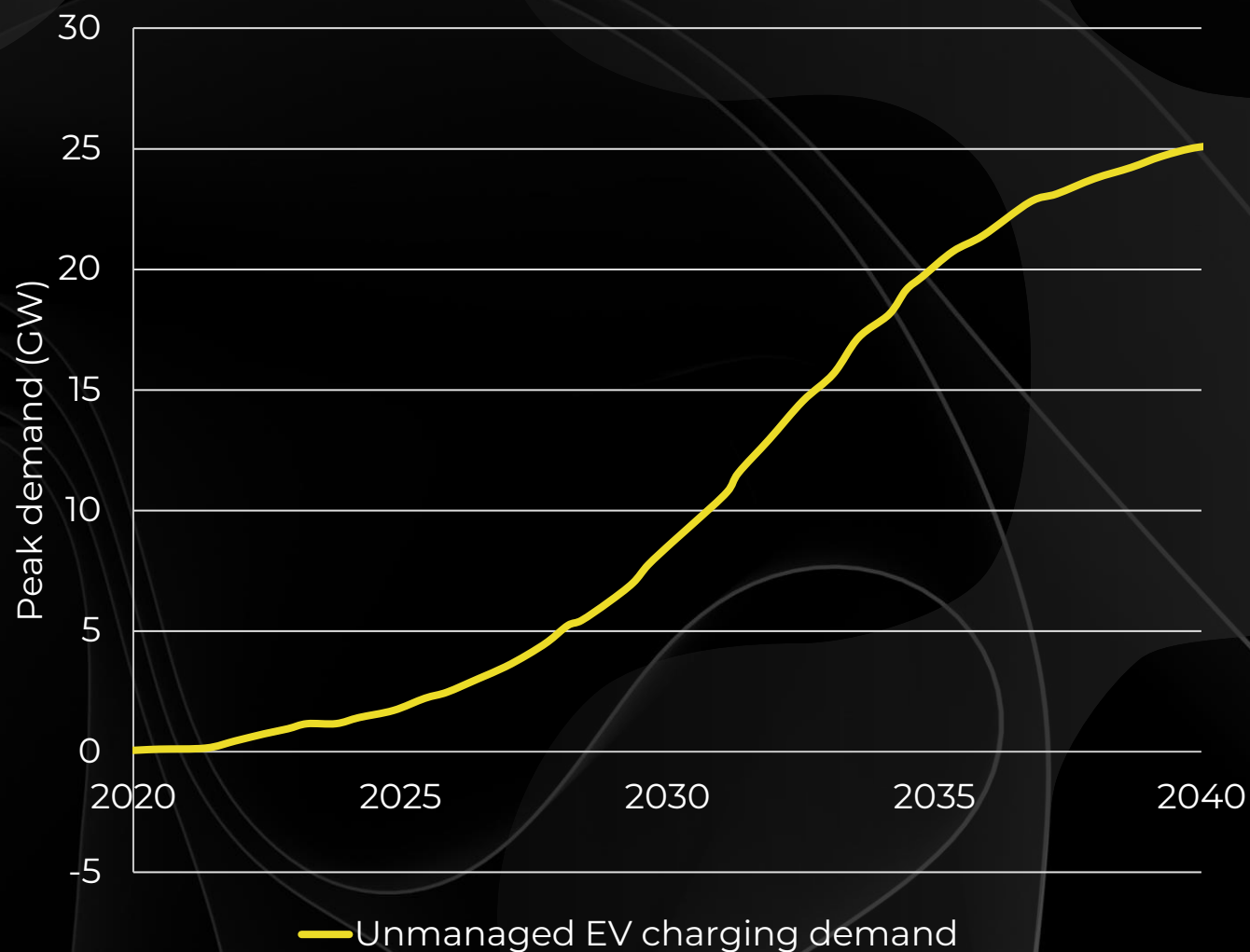
The role of V2G in the future power grid

Key applications and services for V2G

Challenges limiting mass adoption

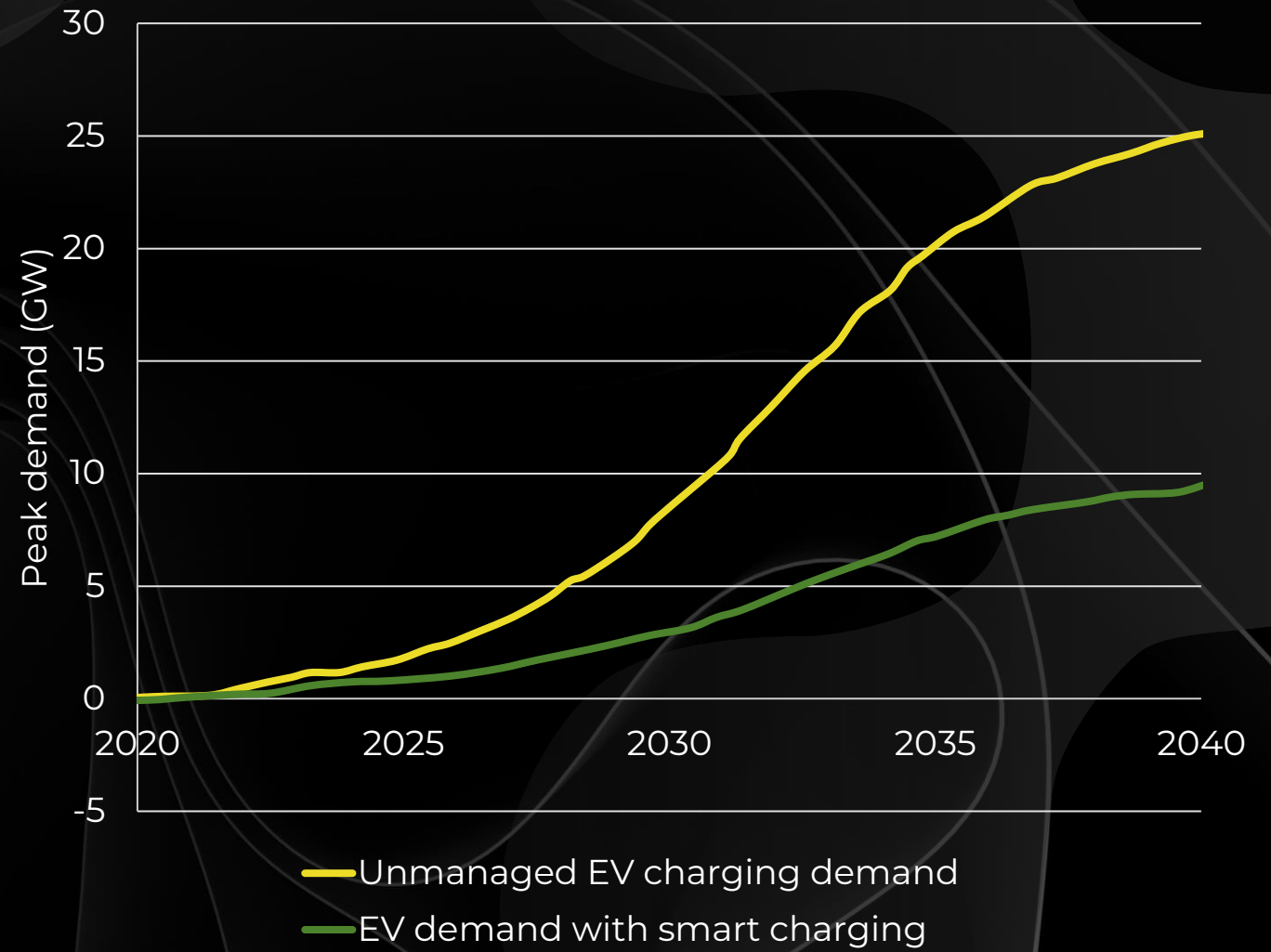
# EV CHARGING AND PEAK DEMAND

National Grid Electric Vehicle Charging Peak  
Comparison during One Day in Winter



# EV CHARGING AND PEAK DEMAND

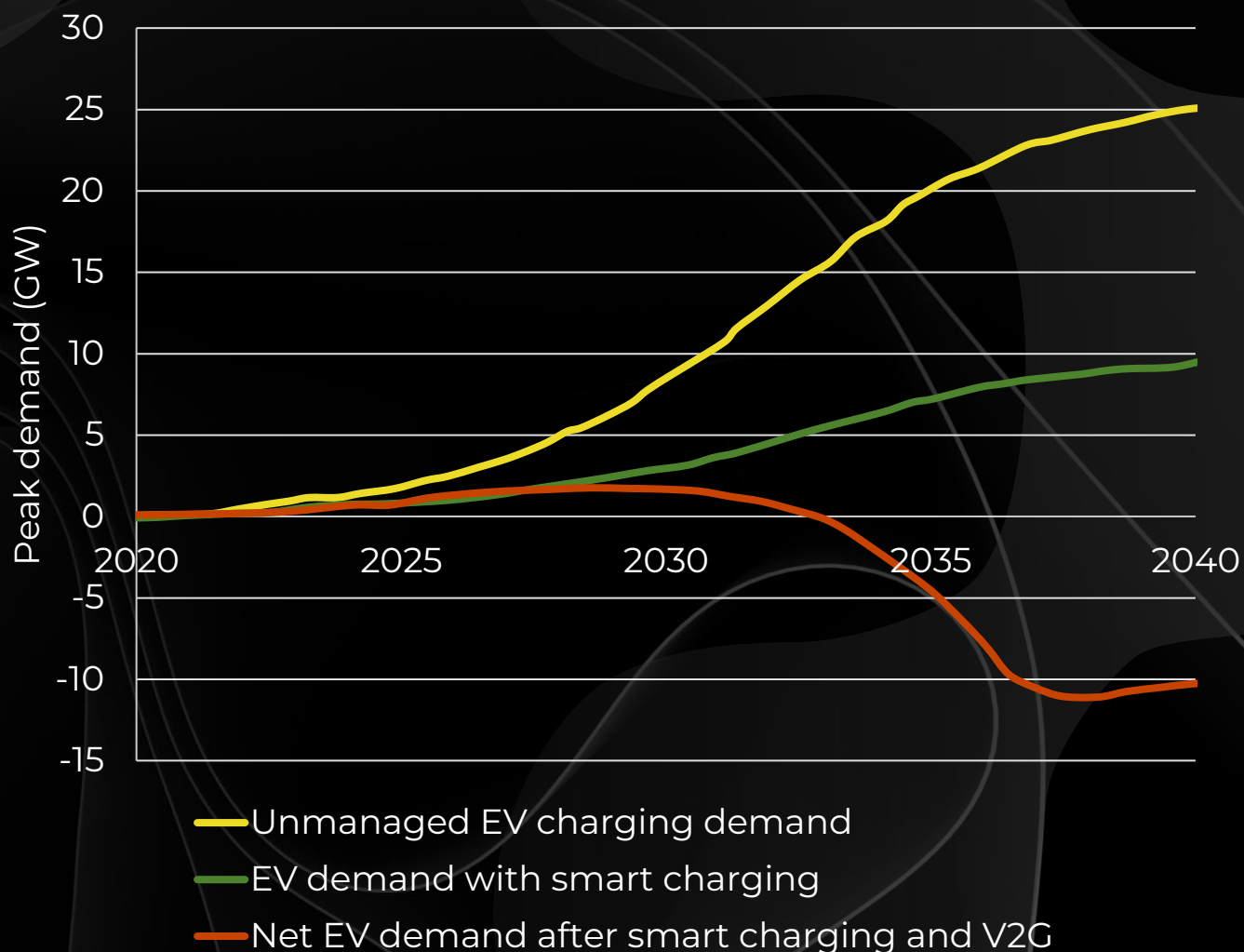
National Grid Electric Vehicle Charging Peak  
Comparison during One Day in Winter



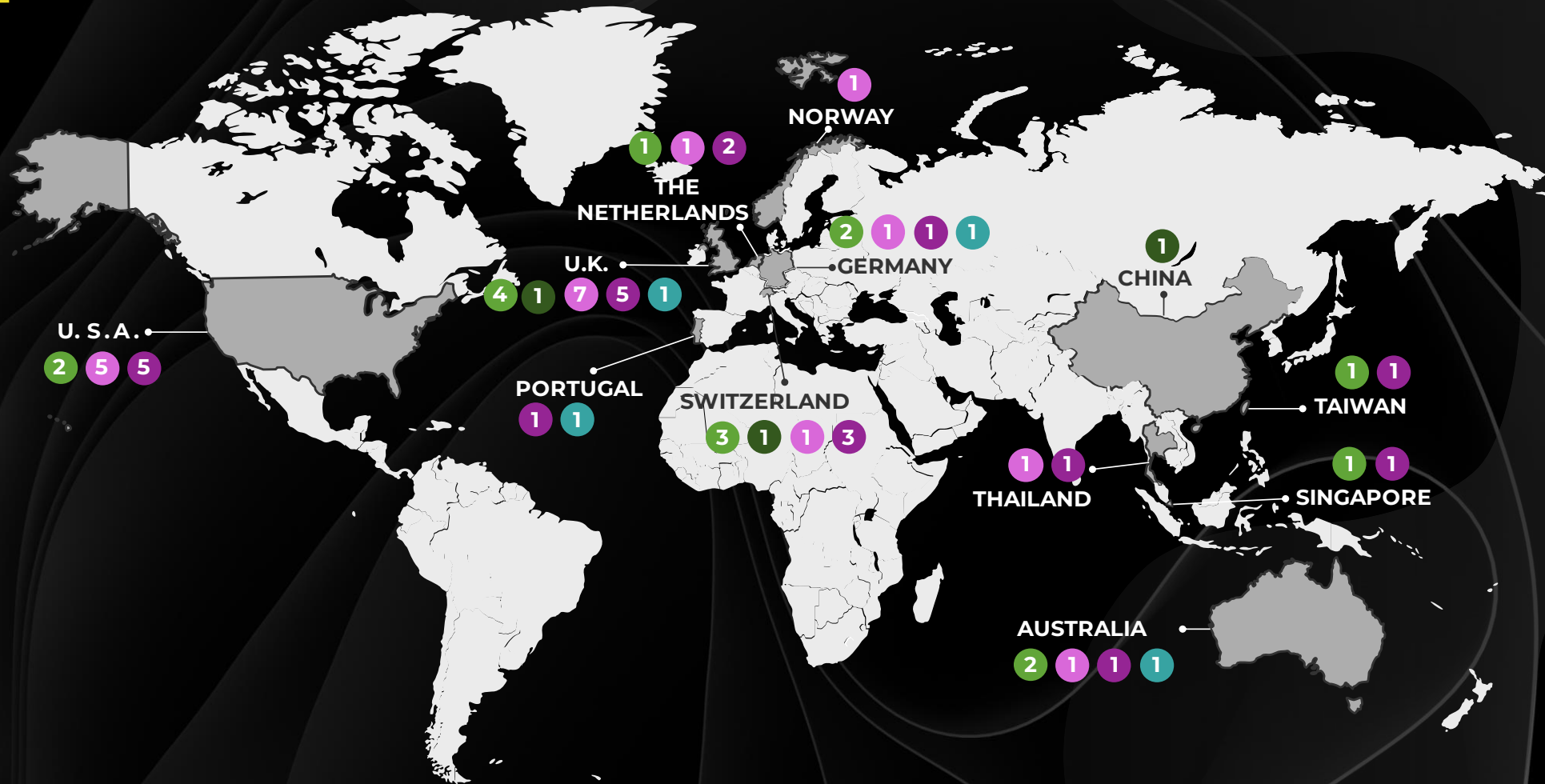
# EV CHARGING AND PEAK DEMAND

Smart charging is key, but V2G could provide additional capacity that could help meet peak demand

National Grid Electric Vehicle Charging Peak Comparison during One Day in Winter



# V2G GAINING MOMENTUM



## SERVICE LEGEND:

● Freq. regulation ● Emergency backup ● Demand charge reduction ● Congestion management ● Energy arbitrage

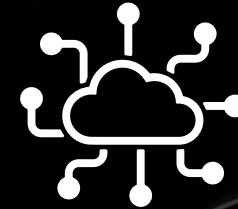
# PARTNERSHIPS TYPICALLY CONSIST OF 4 KEY COMPONENTS



Utility



Hardware  
OEM



Charging software  
developer



Automaker



# QUESTIONS TO ASSESS IMPACT AND OPPORTUNITIES

**1**

**Which type of vehicle owners?**

**2**

**Which factors define a good fit for V2G?**

**3**

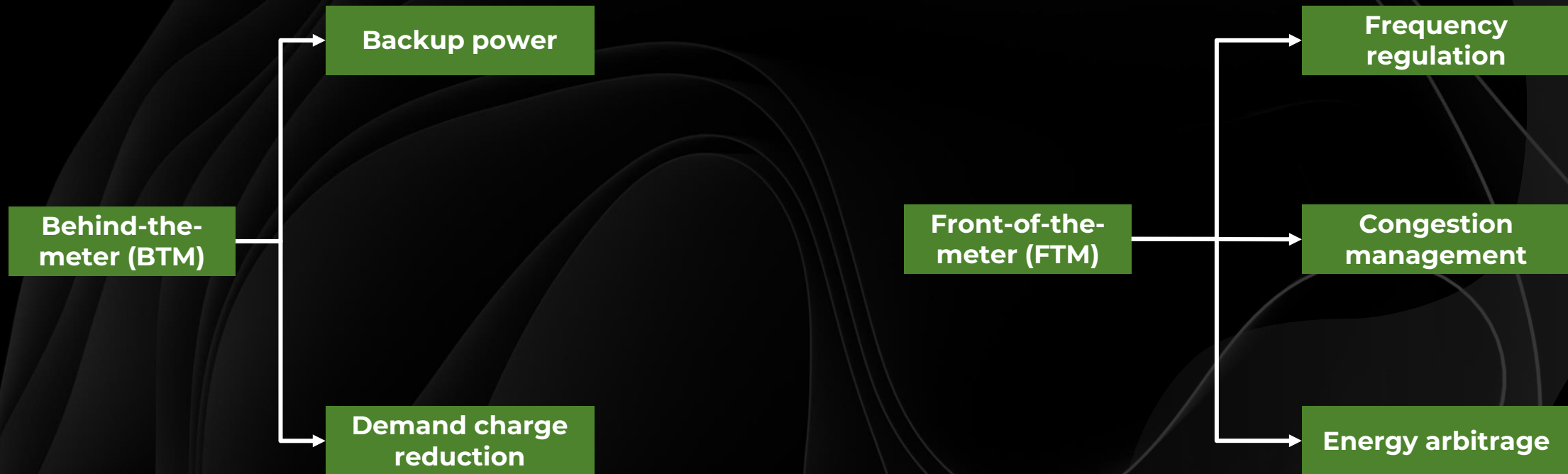
**What are the main barriers hindering adoption?**



# MULTIPLE TYPES OF EVS TRANSLATES INTO MULTIPLE OPPORTUNITIES



# V2G CAN UNLOCK FTM AND BTM SERVICES



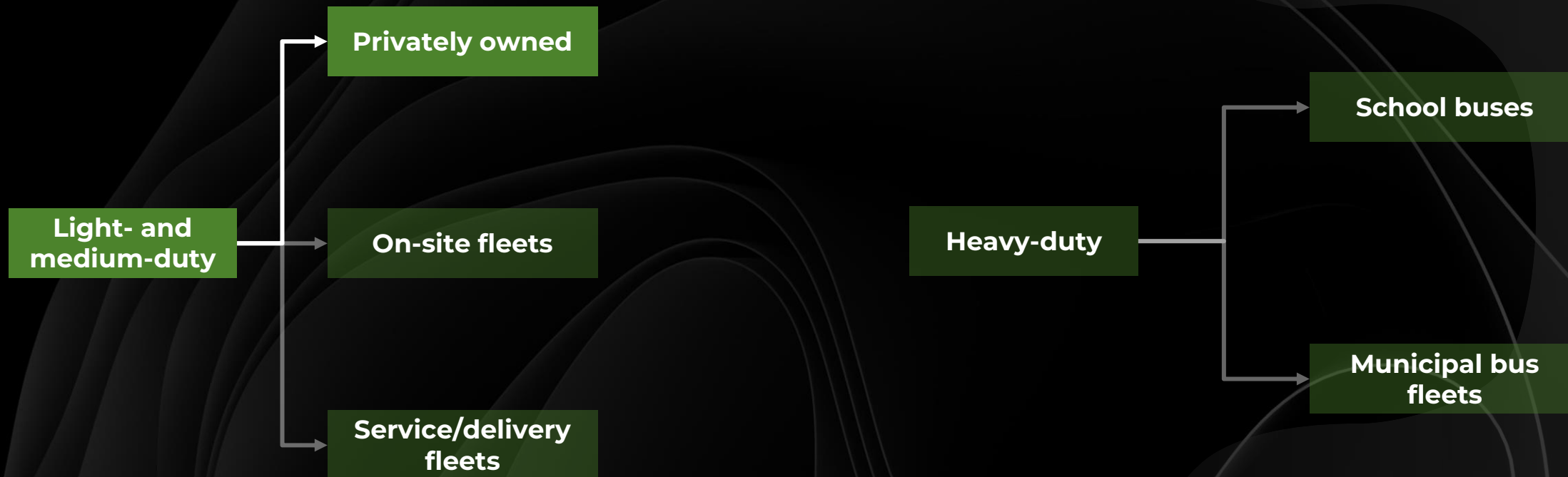
# SCORING V2G DRIVERS AND BARRIERS

## DRIVERS



## BARRIERS





# CHARGING AT HOME

## Service

## V2G Fit

Frequency regulation



Backup power



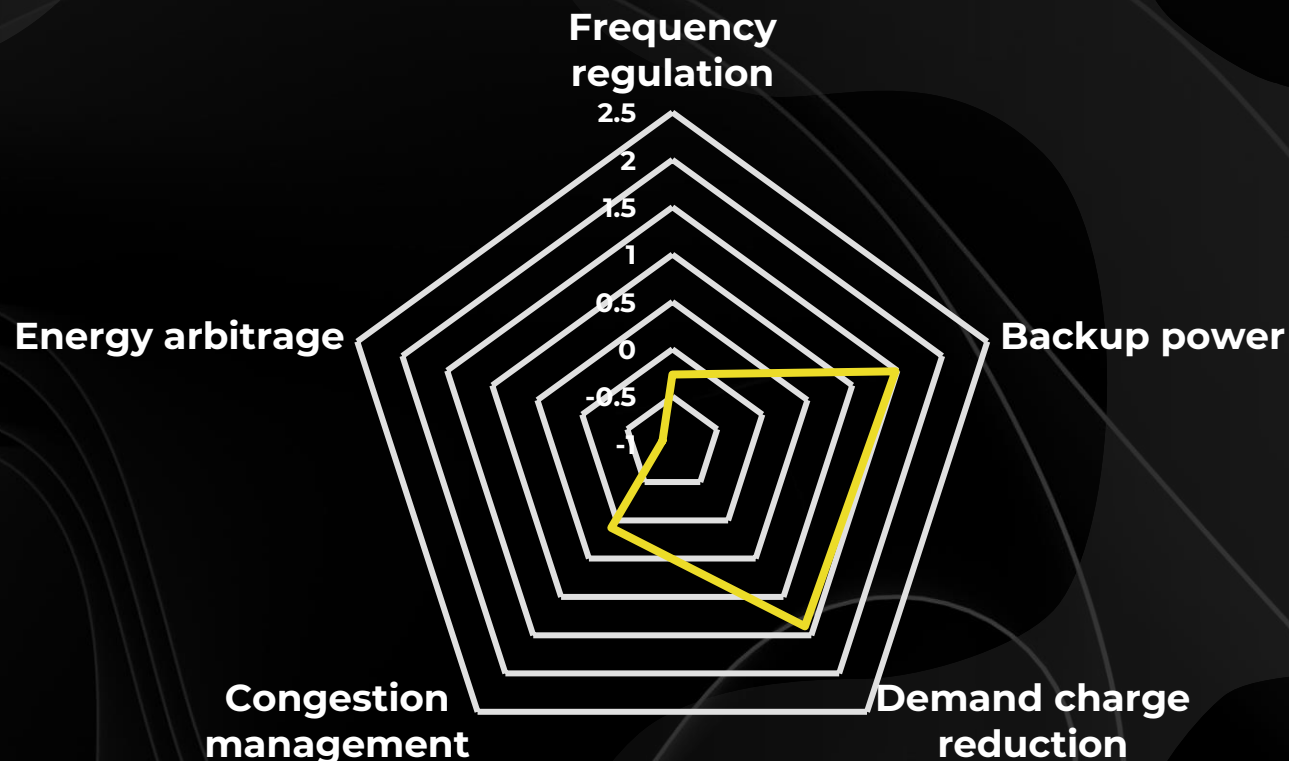
Demand charge reduction



Congestion management



Energy arbitrage



# CHARGING AT HOME

## Service

## V2G Fit

Frequency regulation



Backup power



Demand charge reduction



Congestion management



Energy arbitrage



wallbox 

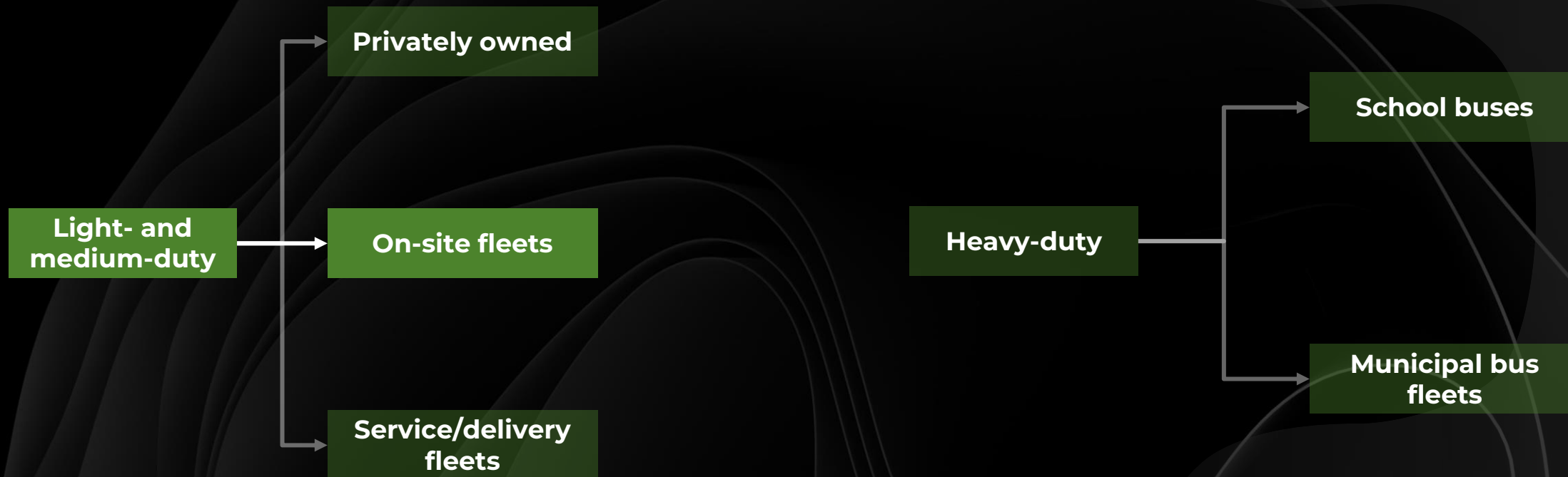


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# ON-SITE FLEETS

## Service

Frequency  
regulation

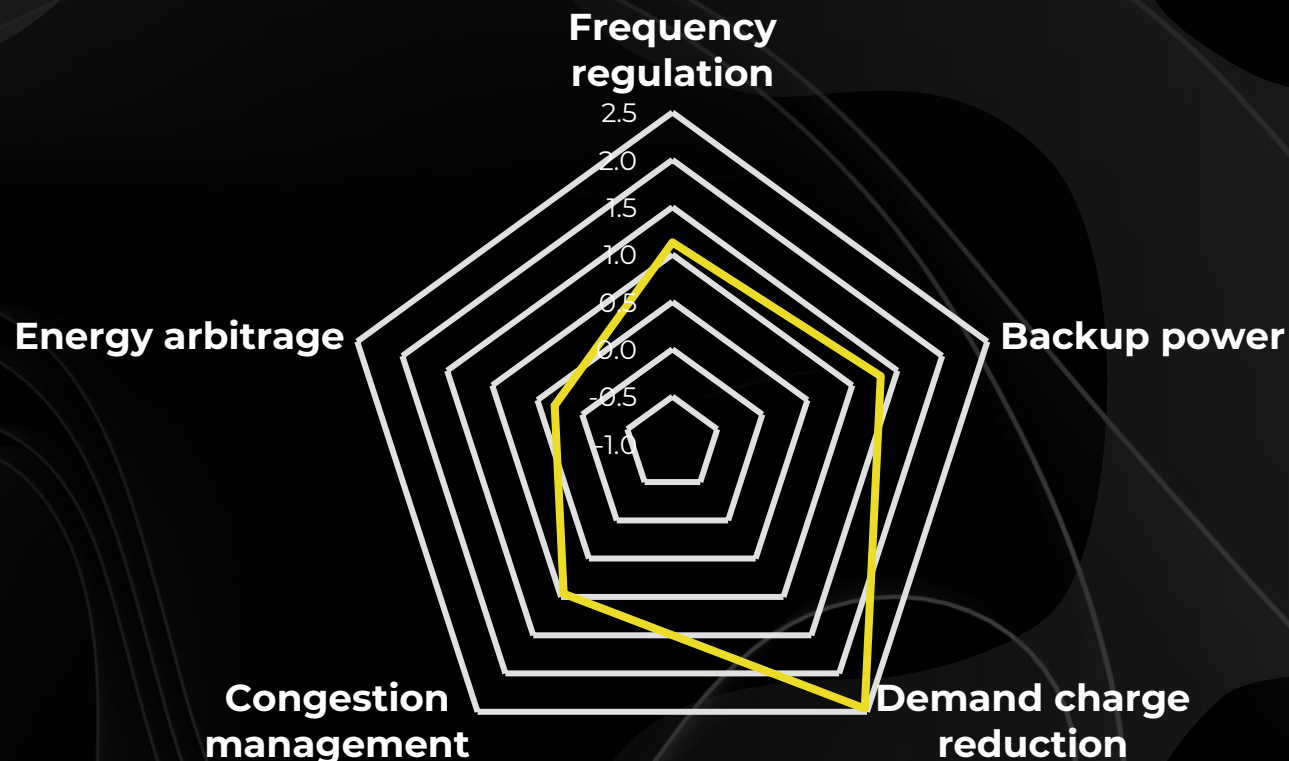
Backup power

Demand charge  
reduction

Congestion  
management

Energy arbitrage

## V2G Fit



# ON-SITE FLEETS

## Service

Frequency regulation

Backup power

Demand charge reduction

Congestion management

Energy arbitrage

## V2G Fit



# MULTIPLE TYPES OF EVS TRANSLATES INTO MULTIPLE OPPORTUNITIES



# SCHOOL BUSES

## Service

Frequency  
regulation

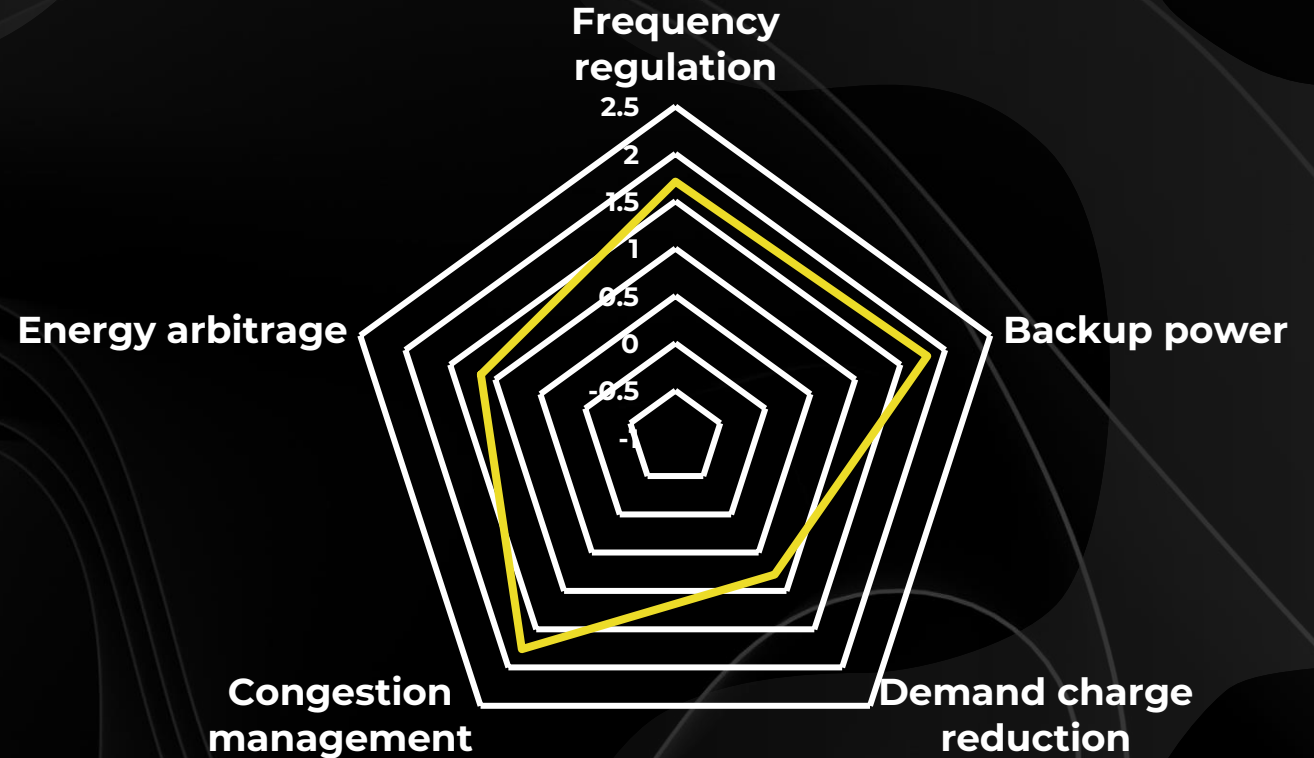
Backup power

Demand charge  
reduction

Congestion  
management

Energy arbitrage

## V2G Fit



# SCHOOL BUSES

## Service

Frequency  
regulation

Backup power

Demand charge  
reduction

Congestion  
management

Energy arbitrage

## V2G Fit



BORGWARNER



*Pacific Gas and  
Electric Company*



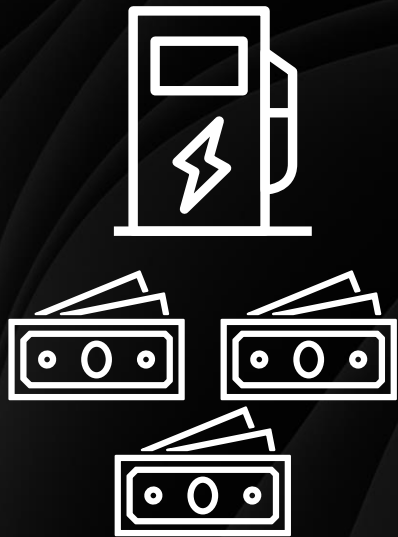
NUVE



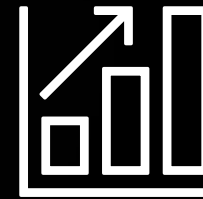
LION ELECTRIC

# HARDWARE COSTS AND MARKET REGULATIONS LIMIT MASS ADOPTION

## Costs



## Regulations



Market access



Interconnection  
approval

# KEY TAKEAWAYS

1

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## Partnerships are key to success

Understand charge and discharge parameters

Prevent voiding battery warranties

Access new data

2

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## Regulations are the main obstacle

In the U.S., the FERC 2222 Order aims to lift barriers for DER market participation

In Europe, flexibility markets are growing in popularity

3

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## Smart charging programs are a valuable way to begin collecting data

Understand how people engage with charging in residential and commercial settings





# THANK YOU

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