

How to create a win-win solution for both EV drivers & power sector?

# Electric Vehicles as DERs

Online  
30<sup>th</sup> of June, 2022



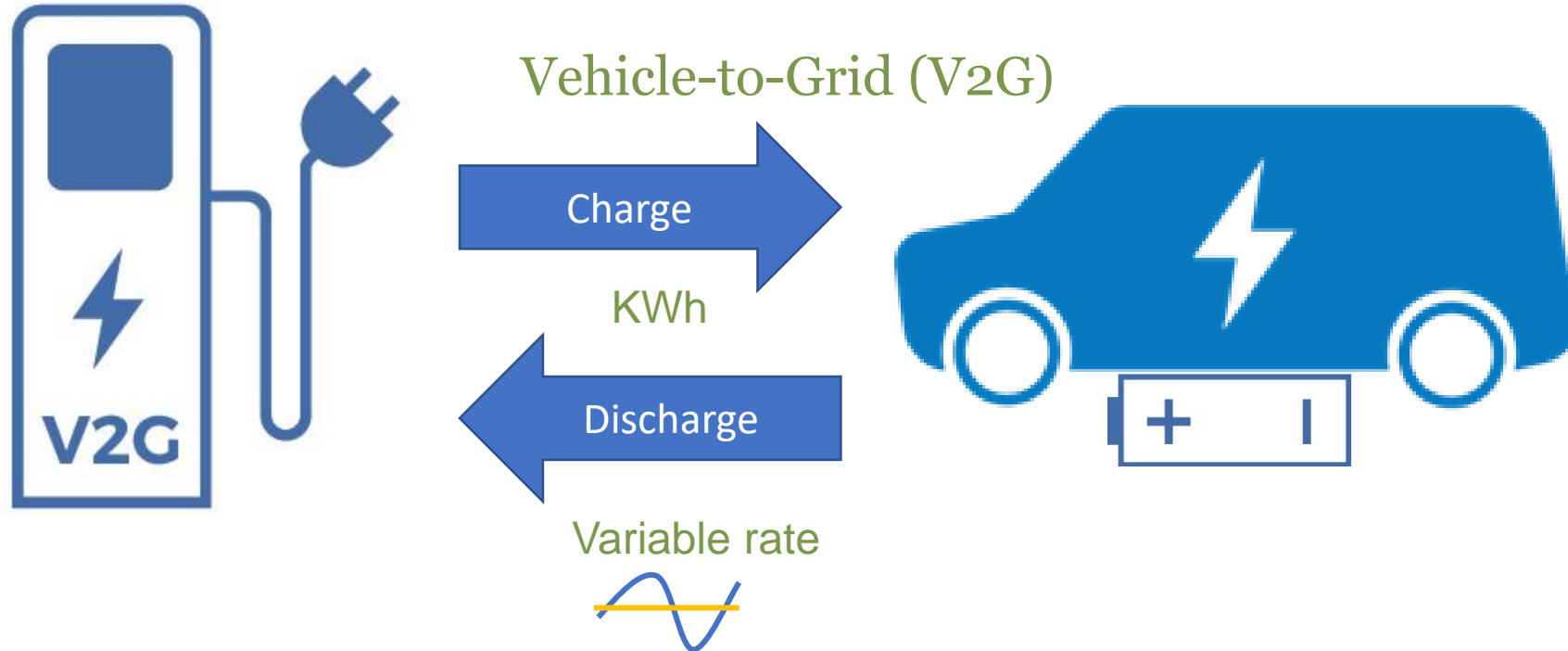


## 4 considerations

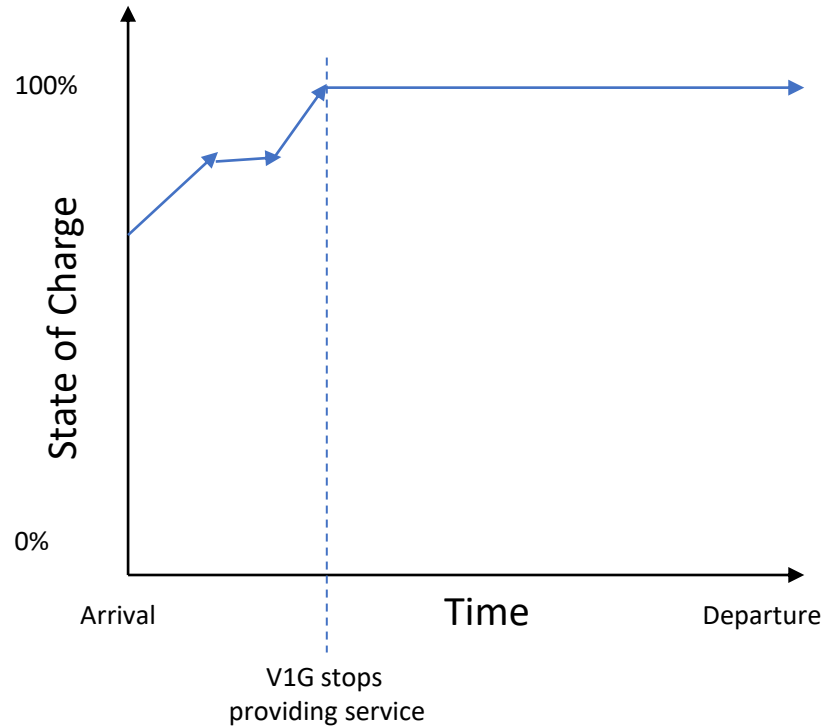
- Setting the scene

# Electric Vehicles are Distributed Energy Resources

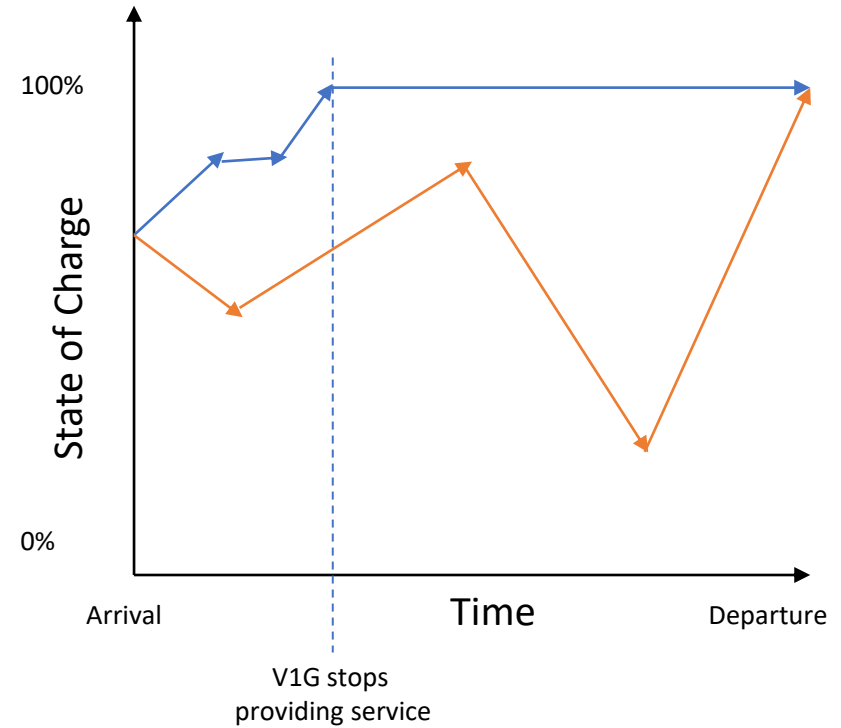
- They should be considered just like any other DER



# V2G yields much more than V1G



→ V1G: Unidirectionnal



→ V2G: Bidirectionnal



# A flood of batteries is expected by 2030



- >2TWh of batteries per year
  - >120 gigafactories
  - >80% for automotive
- will end up in
  - Garages,
  - Parkings,
  - Streets,
  - Depots
- Over 90% of the time
- Soon more capacity than pumped hydro storage

# EUROPEAN GREEN DEAL

## REACHING OUR 2030 CLIMATE TARGETS



#EUGreenDeal



# European Green Deal and V2G

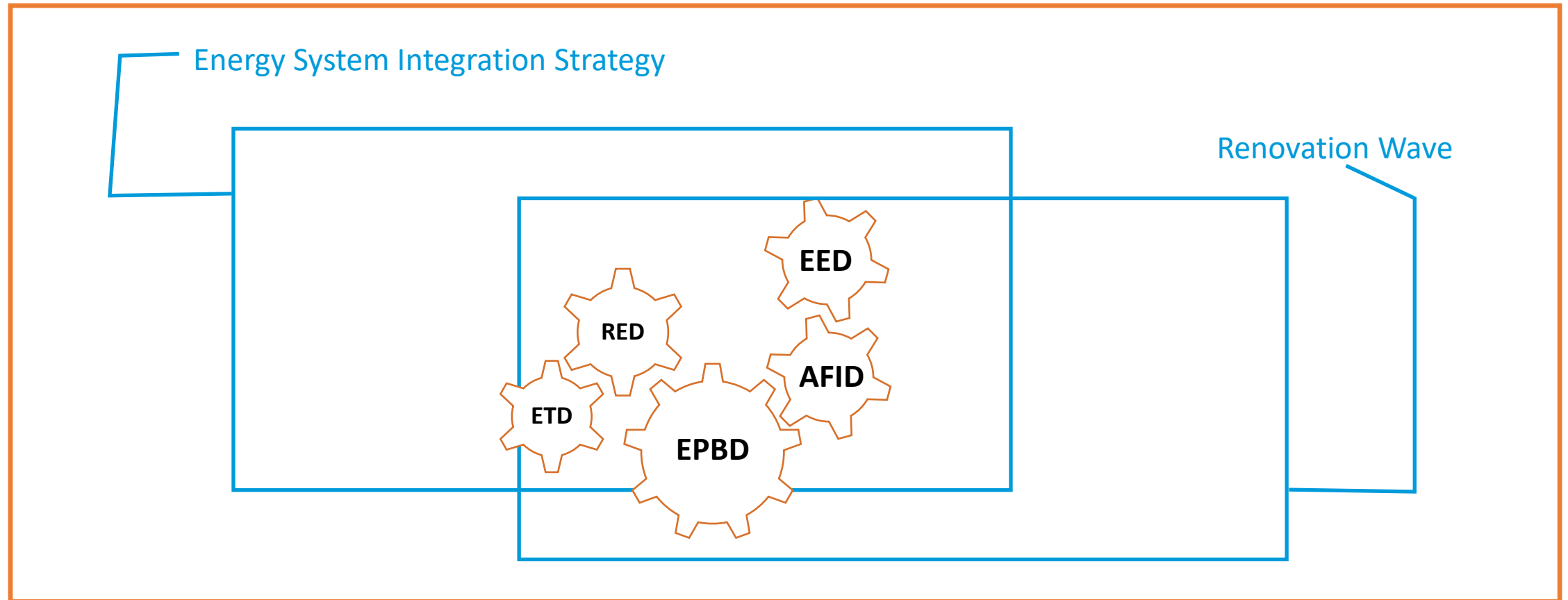


## Rôle of V2G in its implementation

- Fit for 55 package
- RePowerEU

# Fit for 55 should integrate EVs & power system

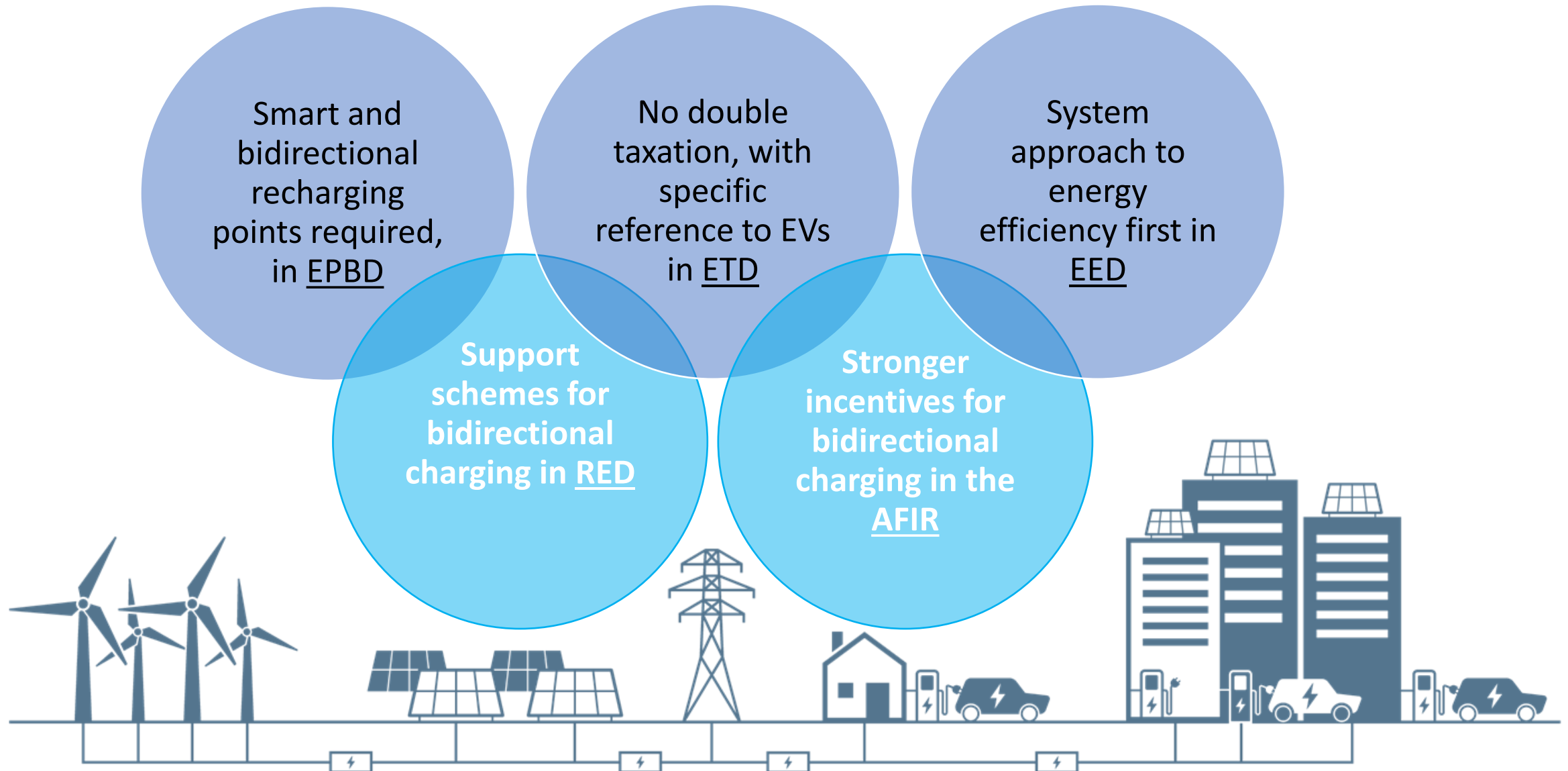
Empowering end-users to achieve **system efficiency**



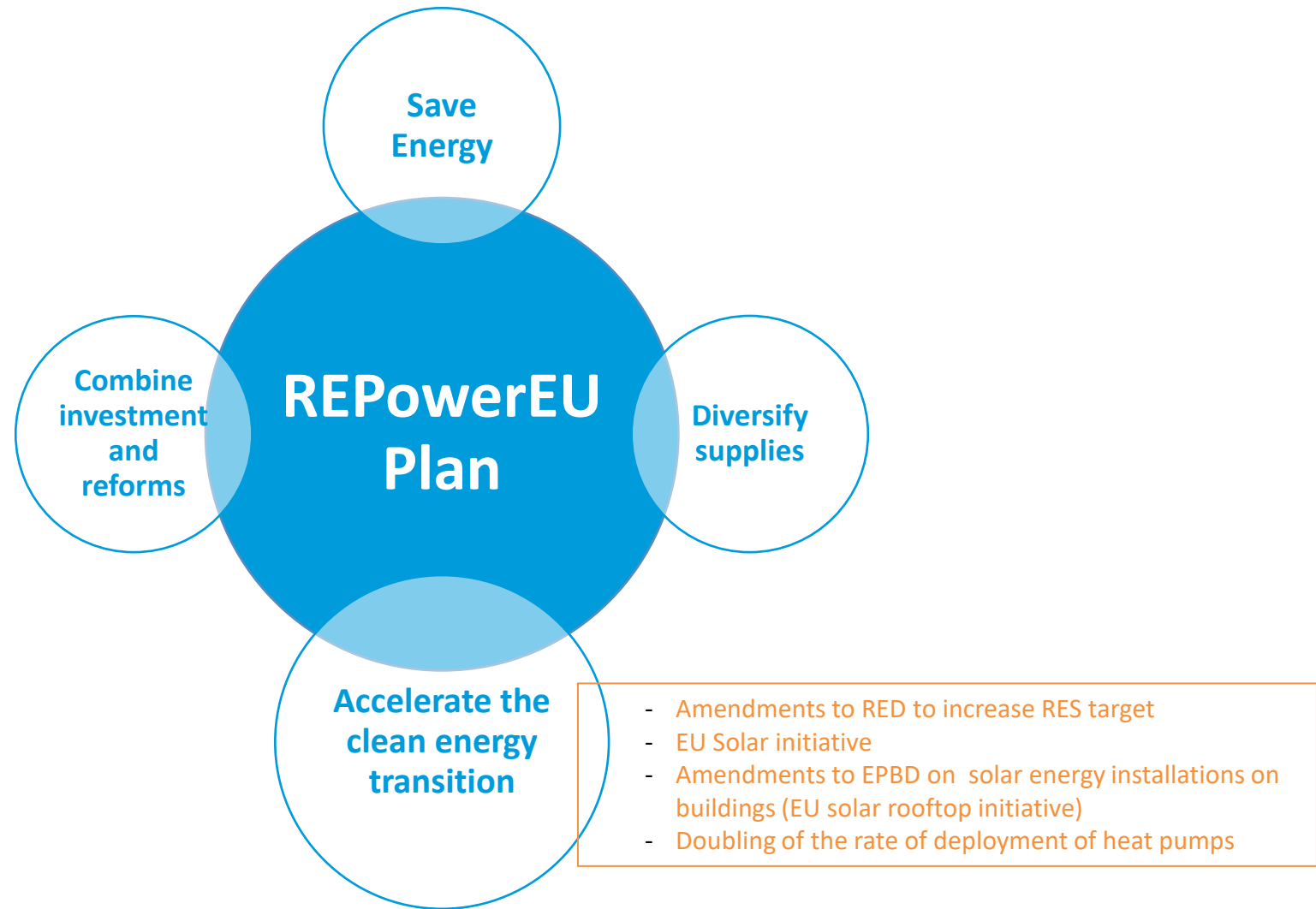
Implementation of the Electricity Market Design



# Smart charging is well considered in EPBD, RED, AFIR, ETD



# Acceleration in face of the energy crisis



# Implications of the REPower EU plan for V1G/V2X

## Commission's plan

Big push on **solar** with ambitious targets for PVs on buildings (new article in the EPBD)

Focus on **storage solutions**

Willingness for more energy efficiency in the transport sector but **no mention of smart and bidirectional charging**

## Opportunity

Renewables integration

'battery on wheels'

System Efficiency

Linking V2G and renewables

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graph LR; A[Commission's plan] -- "Renewables integration" --> B(Linking V2G and renewables); C[Commission's plan] -- "'battery on wheels'" --> B; D[Commission's plan] -- "System Efficiency" --> B;
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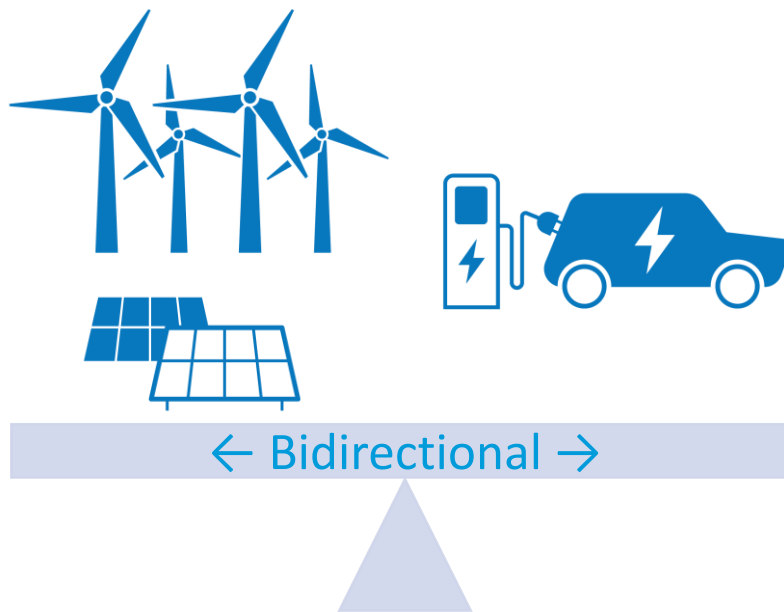
## Unlocking flexibility

- Making sure EV drivers can reap the benefits of V2G
- Increasing renewable integration with V2G



# Win-win-win-win benefits of bidirectional charging

Benefits for the grid :  
**Electric vehicles are a buffer for power variability**

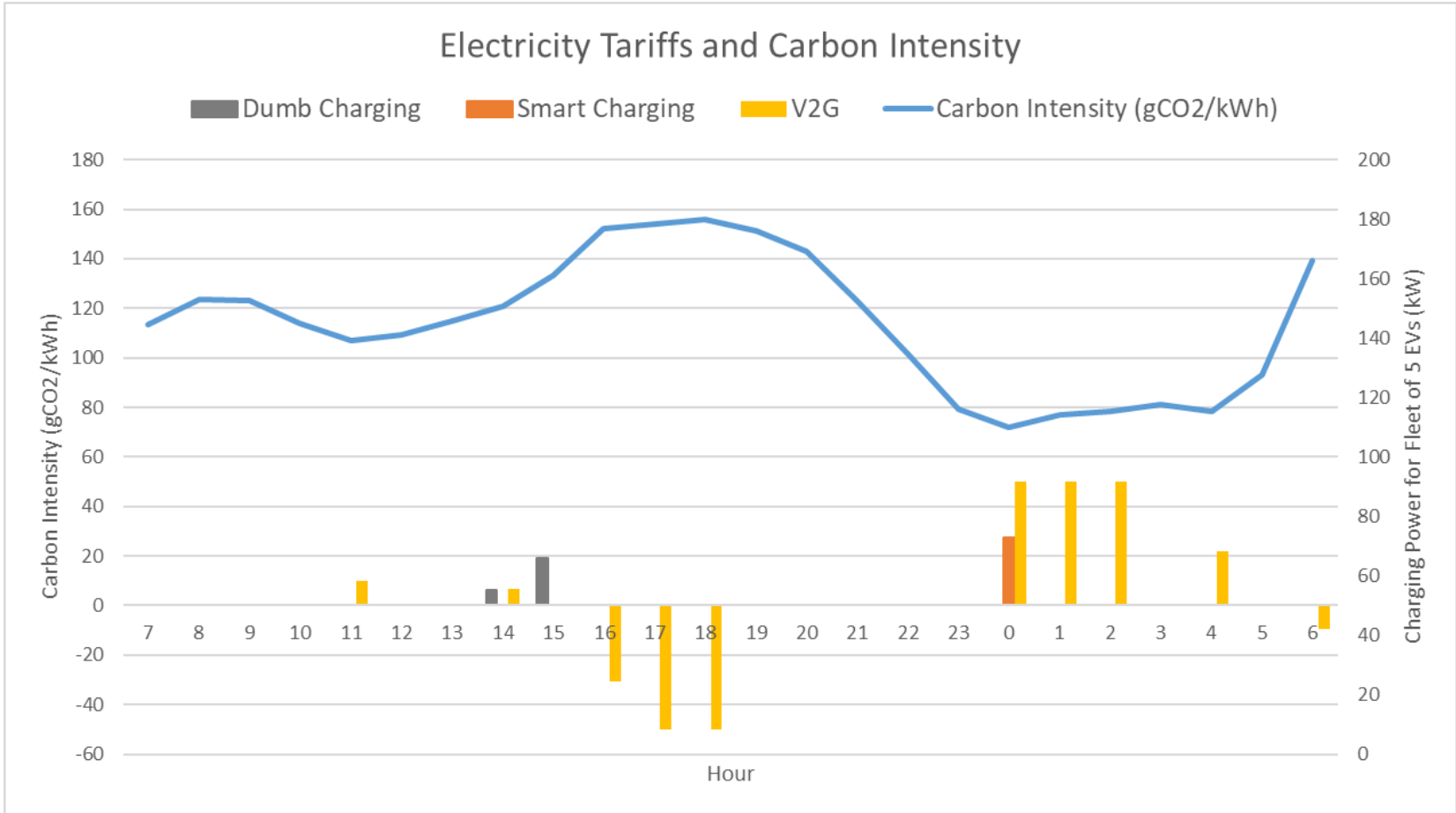


Benefits for the power system :  
**Carbon savings**

Benefits for EVs :  
**driving on decarbonised energy**

Benefits for consumers :  
**Revenues and savings**

# Example of V2G for CO<sub>2</sub> Optimization



- The dumb charging scenario yields charging when carbon emissions are high
- The smart charging scenario reduces carbon emissions by charging at lowest carbon intensity
- The V2G scenario discharges when carbon intensity is high and charges when it is lowest, generating a net negative carbon effect



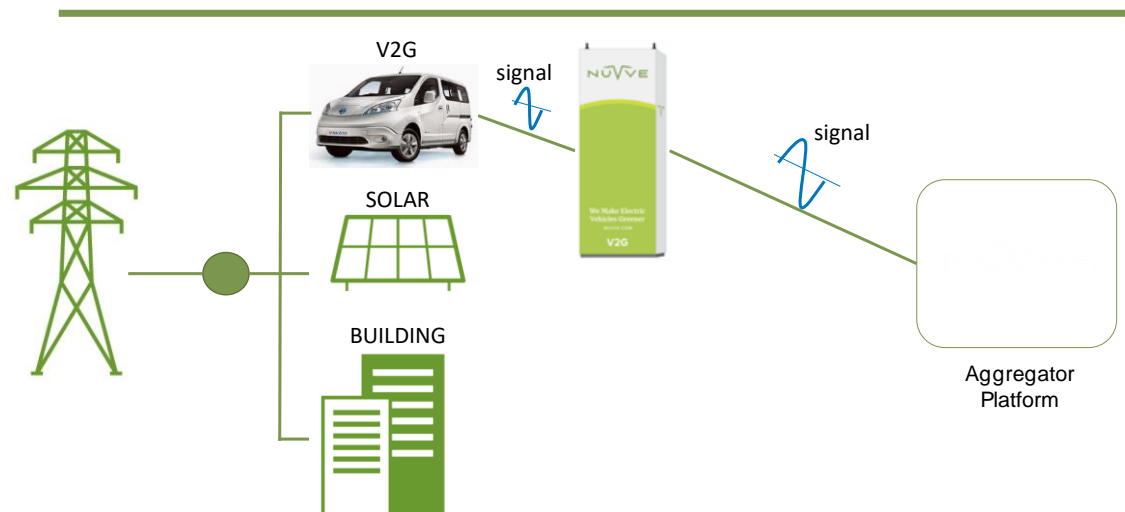
Source : Imperial College London

# Example of V2G-Solar symbiosis

- Barcelona – Time of Use and solar optimization

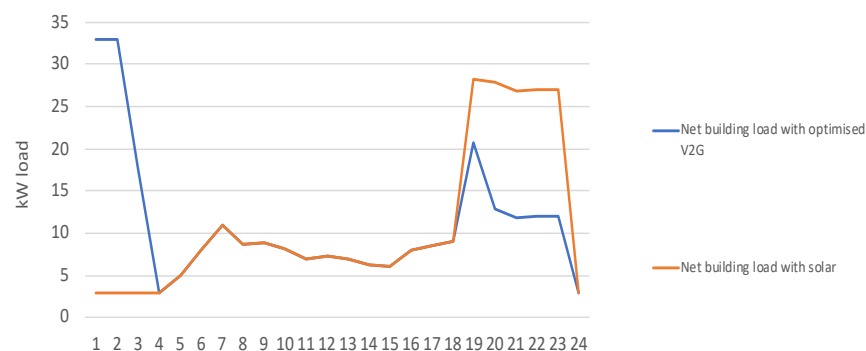


## V2G Architecture for Molins de Rei



- Moving Load to lower cost periods
- Charging can be optimized for solar
- Peak shaving

WINTER Building and V2G load optimisation 3 vehicles



# Set targets for bidirectional charging

## Why?



## How?

- Need to have numbered targets to give clear signal and further incentives to V2G
- For cost to go down the learning curve, volumes are needed
- All buildings with long stay parking or garage, need to be equipped with bidirectional capabilities where there is on-site renewable generation to increase local system efficiency
- Link renewable energy/peak demand with bidirectional charging
- At least 50% of the peak solar rooftop capacity installed on a building should be absorbable by Electric Vehicles in the parking
- Bidirectional charging would count double into reaching the target because they can shift solar in time and provide services



All EVs should be offered an option to  
unleash **their full flexibility** by 2030



An isometric illustration of a sustainable city. In the center, a semi-transparent grey box contains the text "Thank you" in orange. The background features a blue building, a wind turbine, solar panels, a house with solar panels on its roof, a bicycle, a car, and a charging station. A person is standing on the left holding a smartphone, and another person is on the right charging a car. The scene is set against a blue sky with clouds and a blue ground area.

**Thank you**

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