



# Chair's Introduction

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**GEOTAB**<sup>®</sup>  
management by measurement

# Learnings to-date from Real World V2G Projects

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## Reducing Emissions From Transport



Helping clients to assess, evaluate, implement and deliver low emission vehicle and associated infrastructure strategies

# What is V2G?

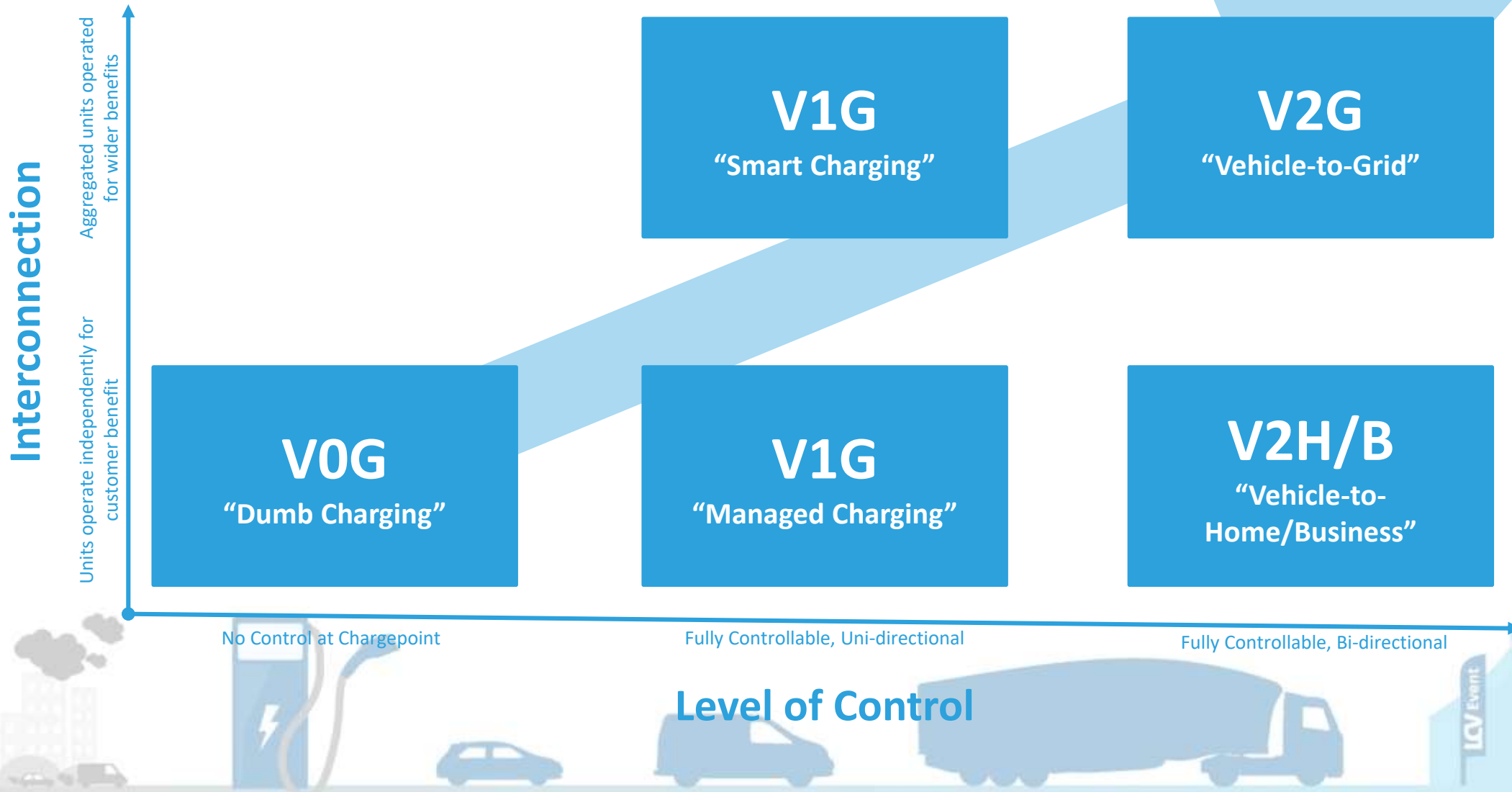
*(This is the techy bit...)*



# Learnings to-date from Real World V2G Projects

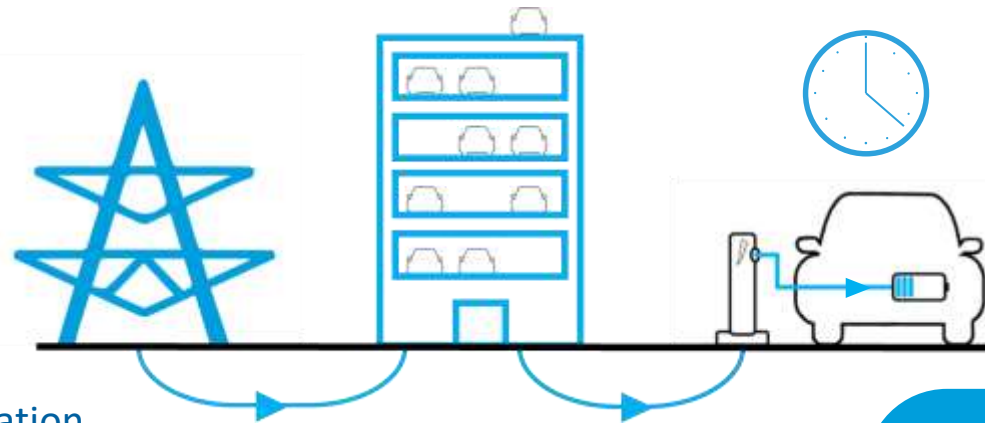


## Levels of V2G



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### 'Smart Charging' (V1G)



#### What it does:

- Time of use (TOU) tariff optimisation
- Peak demand shaving
- Network constraint management
- Simple renewable optimisation

#### How to get it:

- Already commercially available
- Typically £3-400 more expensive than 'dumb'
- Requires connectivity to enable

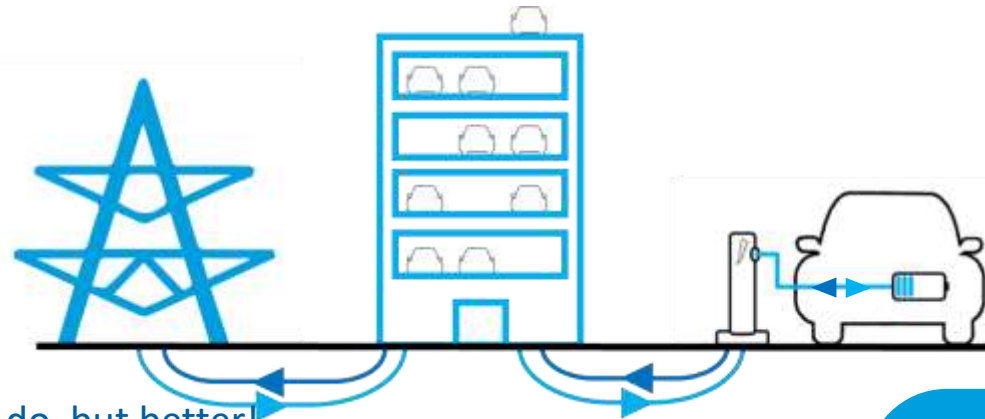
#### 'Smart' Charging:

*The ability for electric vehicle supply equipment (EVSE) to control the timing of charging and the power output level in response to a user-defined input or signal. However, energy flow is single directional (EVSE to vehicle).*



## Levels of V2G

### ‘Vehicle-to-Grid’ (V2G)



#### What it does:

- Everything ‘Smart’ charging can do, but better!
- Off-set building demand
- Provide 3<sup>rd</sup> party flexibility services

#### How to get it:

- Mostly R&D with limited commercial availability
- Widely available commercial units expected from 2020/2021
- Additional network challenges for installing as counts as a generator

#### Vehicle-to-Grid (V2G):

*A system whereby plug-in electric vehicles, when connected to electric vehicle supply equipment (EVSE), can provide bi-directional flows of energy.*

# V2G – The Journey so far...

*(Get ready for another origin story...)*





# Learnings to-date from Real World V2G Projects



## The Path to V2G

EU project starts, demonstrating V2G as part of a smart city



Tohoku Earthquake & Fukushima Nuclear Crisis



Project ITHECA installs prototype unit at Aston University



Further EU demonstrators investigating smart city energy management systems including V2G



20 V2G projects, consisting of:  
8 Feasibilities  
4 Collaborative R&D  
8 Demonstrators



1997

2011

2016

2018

2010

2012

2017

Now



Release of the first Nissan LEAF and start of commercially available EV's



Launch of Nissan LEAF-to-Home Unit



Nissan/Enel launch first commercial V2G hub in Denmark



Project EFES installs first domestic V2G unit in UK (prototype)



## Our Speakers...

- **Dr Marco Landi (Innovate UK):** Innovate UK V2G Programme: One Year On
- **Hugo Niesing (Resourcefully):** CleanMobilEnergy – Demonstrating the Answer to the City Transition Challenge, Encouraging Local Energy & Mobility Self-Sufficiency
- **Tom Pakenham (Kaluzza/OVO Energy):** The World's Largest Domestic V2G Project: A Year On
- **Simon Daniel (Moixa Group):** True Value of Fleet Management of Fast-Response Assets like Battery Storage and Vehicle-to-Grid (V2G) Technology
- **Mike Potter (CrowdCharge):** Innovating to V2G... And the Human Factor



# Thank you for listening

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