

A V2G-Repository: 18 European Vehicle2Grid-projects

S.no	Projects	Partners	About the project	Project Characteristics (Unique Selling Point)/Keywords	Location (V2G location)	Aggregator	Energy Market/Trading	Incentives/Business models	Scale (Number of V2G chargers, EVs, boundary conditions)	Running time of the project	V2G hardware providers (CPP)	Charging Point Operator/owner (CPO)	Charging standard/Protocol	Subsidies	Operational environments (Type)
Last updated : 12.02.2018															
1	NewMotion V2G project	Mitsubishi motors, Enel, NewMotion, Nuvee and TenneT	High-end smart technology optimizes use of renewable energy. NewMotion, one of Europe's biggest providers of smart charging solutions for electric driving - announces the implementation of a bi-directional charging pilot, also known as 'Vehicle to Grid' (V2G). With V2G-technology, peak demand on the electricity grid can be better balanced, by allowing electric vehicles to not just take power from the grid, but also return it to the network. NewMotion joins forces with Mitsubishi, and grid operator TenneT using V2G chargers from Enel and grid services and technology from Nuvee. The pilot features the popular Mitsubishi Outlander PHEV.	Electric vehicle as energy buffer. Stability by maintaining supply-demand dynamics, based on request from Grid System Operator	Amsterdam	NewMotion/Nuvee	Frequency regulation services	Not known	10 EV drivers	Announced 2017 October	Enel	New motion	CHAdeMO	Not known	Vehicle-to-Business (V2B)
2	Amsterdam Vehicle2Grid	Alliander, Hogeschool van Amsterdam, Amsterdam Smart City, Engie, Mitsubishi motors	Vehicle-to-grid (V2G) technology enables electric cars to be used as (temporary) batteries, for example to power households. The supply of solar power is growing rapidly. That is a great news as our daily energy demand is increasing too. We could however benefit even more from this growing supply if we would be able to store the generated electricity in times of overproduction. Electric Vehicles offer great storage potential. Additionally, by combining multiple batteries, accumulated capacity can become large enough to effectively prevent unbalance in the electricity grid. In the demo environment in Amsterdam, several bi-directional chargers, needed to charge and discharge the batteries, will be installed to be tested by Alliander.	Solar and V2G combination to store and supply electricity as and when required. Energy buffer solutions and societal issues are explored in this project.	Lochem	Not appointed	Investigated different markets: among others frequency imbalance Market/Energy Storage	For the pilot: user receives a financial compensation. Integration of local/household renewable energy.	2 households in Lochem, Gelderland	until end of 2017	Endesa/MagnumCap	Engie	CHAdeMO	Not known	V2H
3	SEEV4-City	13 partners from 5 cities across Europe (Amsterdam Arena, HVA, LINN, CENEX, AVERE, POLIS, Municipality of Amsterdam, Leicester, OSLO Kommune, EB Energy, KU LEUVEN	The main aim of SEEV4-City is to develop the concept 'Vehicle4Energy' services into sustainable (commercially and socially viable) business models to integrate EVs and renewable energy in a Sustainable Urban Mobility and Energy Plan (SUMEP). * (The implementation of Smart Charging (where the timing of EV charging is controlled to benefit network operation), V2G (where EVs are used as energy stores, enabling a better balance to be achieved between energy supply and demand) and the other 'ancillary' services they can provide are collectively known as 'Vehicle4Energy Services' or V4ES).	NSR Smart charging and V2G concept Operational environments: V2H, V2S, V2N and V2B Reduction in 150 tons of CO2 emissions/annum 25% increase in Energy Autonomy Avoid potential grid investments up to 100M Euros in 10 years	Amsterdam Arena, Amsterdam city, Loughborough, Oslo, Kottrijk, Leicester	Work in progress	Work in progress	Not known	6 operational pilots, 6 countries (50+ EVs); In the Netherlands: Amsterdam (52 Charging poles, smart charging enabled, no V2G yet); Amsterdam Arena (2 V2G units is being installed)	2016-2019	(For Amsterdam Arena -Magnum Cap)	Not known	CHAdeMO	Not known	Vehicle-to-Home (V2H), Vehicle-to-Street (V2S), Vehicle-to-Neighbourhood (V2N) and Vehicle-to-Business (V2B)
4	SMART Solar Charging, Utrecht, NL	Utrecht Sustainability Institute, LombokNet, Hogeschool Utrecht, Universiteit Utrecht, Last Mile Solutions, We Drive Solar, New Solar, Vidyn, Jedlix, Steclin, ElaadNL	To develop a sustainable energy system: storing local solar energy in (shared) EV batteries, and supplying to the grid at a later moment.	Bi-directional/compact charger (AC) Solar charging Car sharing. Upscaling to 20 stations	Lombok, Houten, Utrecht Science park: De Uithof, Utrecht Central Station Area and Driebergen-Zaist	Jedlix, others to be added in the next phase of the project	Imbalance market, Local grid congestion	Shared vehicles	V2G charging stations in 5 different regions in Utrecht and 70 additional community shared EVs	Ongoing	General Electric and Last Mile Solutions	LombokNet	Goal of the project is to develop a standard for AC V2G (15118)	EFRO	Vehicle-to-X (V2X)
5	Solar-powered bidirectional EV charging station	Delft University of Technology, Delft Power Research Electronics, Delft Last Mile Solutions, Rotterdam. Supported by Nissan, ABB, UT Austin	A first of its kind integrated EV charger that is directly powered by PV panels has been developed. The charger enables direct DC charging of EV from PV without converting to AC. The charger is bidirectional, so energy from the EV battery can also be fed to the grid, via vehicle to grid (V2G). The charger can realize four power flows: EV -> PV, EV -> Grid, Grid -> EV, PV -> Grid. The 10kW modules are modularly built and can be paralleled for fast charging. The charger is based on silicon carbide and quasi-resonant technology which results in high efficiency and high power density. The integrated EV-PV solution has a lower component count, increased reliability, smaller size and lower cost than using separate EV charger and PV inverter. The charger is compatible with the CHAdeMO and CCS/Combo charging standard and is designed for implementing smart charging.	Integrated EV-PV charger, Smart charging algorithm based on EV user, energy prices, PV forecast, multiplexing and distribution network constraints	TU Delft, PRE	Not applicable	Smart charging algorithm based on EV user, energy prices, PV forecast, multiplexing and distribution network constraints	Not applicable	Demo with 1 V2G charging station with solar roof (parking area) and Nissan Leaf EV was done in Delft University of Technology in June 2017. 10kW solar powered bidirectional EV charger commercially available via PRE	Completed	PRE	Last mile solutions	CHAdeMO and CCS/COMBO	TKI Urban Energy	Vehicle-to-Grid (V2G) with possibility for V2H, V2B
6	Grid motion	Groupe PSA, Direct Energie, Enel, Nuvee, Proxiseve and the Technical University of Denmark	The aim of the project is to evaluate possible savings achieved by real-life electric vehicle (EV) users through the implementation of smart charging and discharging strategies (V2G) for EVs.	Shifting charging times from periods when electricity prices are higher to periods when electricity prices are lower.	France	Direct Energie	Grid balancing services	Not known	2 year demo pilot project 50 smart charging cars 15 (B2B) V2G enabled cars	2017-2019	Enel	Nuvee	CHAdeMO and CCS	Not known	Vehicle-to-Business (V2B) and Vehicle-to-Neighbourhood (V2N)
7	Farker	Nissan, NUVEE, Frederiksberg Forsyning, Mitsubishi Motors, Mitsubishi Corporation, PSA (ID, ENEL, Inero and DTU Electrical Engineering (PowerLabDK)	The objective of this project is to validate electric vehicles as part of an operational vehicle fleet that can support the power grid by becoming a vertically integrated resource, providing seamless support (i.e. V2G) to the power grid both locally and system-wide.	Experimental validation across several series-produced V2G enabled EV models and brands. Access to the world's first commercial V2G hub of EVs providing FCR.	Denmark	NUVEE	Frequency Containment Reserves (FCR) in commercial pilot, several other services tested at DTU	FCR Availability payment	7 V2G enabled Electric cars 6 Charging stations + data access to 20+ V2G vehicles in the field	2016-2018	Enel (subcontractor Magnum Cap)	Maintained by MagnumCap and NUVEE	CHAdeMO	Research supported by EUDP - no subsidies for commercial pilot although operating under temporarily relaxed market terms	Vehicle-to-X (V2X)
8	Integrated Transport and Smart Energy Solutions (ITSES)	Costain Limited and CENEX	Projects sets out to find new technical solutions and business models for integrating Vehicle-to-Grid (V2G) with two urban systems: energy and transport.	Not known	Rail stations of Old Oak Common and Park Royal, London, United Kingdom	Not known	Not known	Not known	2 pilot sites - rail stations in London for V2G application	2015-2017 (August)	Not known	Not known	Not known	Not known	Vehicle-to-Business (V2B)
9	Intelligent Transport, Heating and Control Agent (ITHECA), UK	Cofely, CENEX, European Bioenergy Research Institute (EBRI), Open Energy	ITHECA aims to collaborate transport, frequency response services, energy storage and district heat solutions to establish the potential of Vehicle-to-Grid (V2G) to maximise a combined heat and power (CHP) plant.	Integrated energy system (Heat, power and V2G)	European Bioenergy Research Institute (EBRI) at Aston University, United Kingdom	Not known	Frequency response services, energy storage and district heat solutions	Not known	1 Pilot, 1 Nissan Leaf EV, 1 V2G unit	2015-2017 (Currently active)	Not known	Not known	Not known	Not known	Vehicle-to-Business (V2B)
10	SHAR-Q	ATOS Spain, bAvenir, UBIMET, ENERCOULTIM, EEE, Beaque Energy Cluster, RWTH Aachen, ICCS, HEDNO, Energie Gussing, ATOS CZ relevant to V2G HEDNO and ICCS	Storage capacity over virtual neighbourhood of energy ecosystem: The SHAR-Q project aims to establish an interoperability network that connects the capacities of the neighbourhood and wide regional RES+HEE ecosystems into a collaboration framework, that mitigates the requirement on the overall EES capacities thanks to the shared capacities among the participating actors. Note: Adaptive charging of e-vehicles (EVS) and V2G services.	Interoperability to boost the exchange of information between energy batteries from vehicle to power the grid and balance it.	Greece	None	None	Focus of the project is on the development of the interoperability adapters, business models for V2G are not explored. Sustainability comes from the use of any battery device to help in network balancing	4 in Meltimi Greece	2016-2019	Not known	HEDNO	Not known	Not known	Vehicle-to-Neighbourhood (V2N)
11	Denmark V2G	Nissan, Enel, Nuvee, Frederiksberg Forsyning and Energinet.dk	World's first fully commercial vehicle-to-grid hub in Denmark	Not known	Copenhagen, Denmark	Nuvee	Frequency regulation services	Not known	10 V2G units, 10 e-NV200s	2016-present	Enel	Not known	CHAdeMO	Not known	Vehicle-to-Business (V2B)
12	Genoa pilot	Enel, Nissan, Italian Institute of Technology (IIT)	The first corporate electric car sharing pilot project with V2G (Vehicle to Grid) charging infrastructure in Italy, a system that could allow electric cars to discharge power to the network and contribute to its stability.	It is a combination of corporate car sharing, EV and V2G. The project uses the only vehicle ready for bidirectional energy exchange, Nissan Leaf.	Italian Institute of Technology, Italy	IIT	No market trading, energy exchange only under IIT internal grid	Due to the fact that it is an internal energy exchange ecosystem, there is no business model at the moment. Only in a second phase, car sharing software will be able to allocate cost of service per each single IIT department.	IIT headquarters in Genoa 2 Nissan LEAF EVs; 2 V2G units	2017 (May) (still in operation)	Enel	Italian Institute of Technology	CHAdeMO	ENEL: V2G units NISSAN: 2 Leaf + corporate device IIT: location, car sharing management, reporting results	Vehicle-to-Business (V2B)
13	Sunlight pilot (as part of mySMARTLife project)	Helen, Virta and Nissan	The vehicle-to-grid (V2G) charging point complements an existing solar power plant and a stationary energy storage, and enables using EVs as energy storages and to stabilize the electricity grid. A public bidirectional electric vehicle charging point is being installed in Helsinki, Finland.	Not known	Helsinki, Finland.	Virta	Frequency imbalance market	Not known	1 public charging V2G unit	2017- present	Helen	Virta	Not known	Not known	Vehicle-to-Neighbourhood (V2N)
14	CityZen Smart City	Alliander, NewMotion, Enervalis, MagnumCap	9 DC V2G chargers will be installed starting December 2017, both in the public domain and at corporate locations. The charging sessions will be operated using varied algorithms, in order to test the value of V2G for grid congestion, power quality, imbalance and energy trading and others.	A social research is part of the project, focusing on the appreciation of the technology by the users.	Amsterdam, the Netherlands	Enervalis	Grid congestion and balancing	To be investigated	3 corporate and 6 public charging units	2014-2019	MagnumCap	NewMotion	OCPP	Not applicable	V2C; V2B
16	Net-Form	Encraft, Solihull Metropolitan Borough Council, Costain PLC, Aston University and Western Power Distribution (WPD) and CENEX	The project seeks to assess the feasibility of turning a car park into a MW-scale battery to provide power on demand to the electricity grid. The project will develop secure, dynamic data management platform that collects, aggregates and optimises energy collected by large populations of grid-connected electric vehicle batteries at a single location.	Not known	HS2 station, Birmingham, UK	Not known	Not known	Not known	Not known	1 year project	Not known	Not known	Not known	Not known	Vehicle-to-Business (V2B)
17	UK Vehicle-2-Grid (V2G)	Nissan, Enel	First ever vehicle-to-grid (V2G) trial in the UK	Not known	Multiple locations in UK (mostly in London)	Not known	Feed-in tariff	Not known	100 V2G units; several Nissan LEAF and e-NV200 electric vans	2016-present	Enel	Not known	CHAdeMO	NA	Vehicle-to-Business (V2B) Vehicle-to-Neighbourhood (V2N)
18	GrowSmarter	20+ academic and industry partners	GrowSmarter brings together cities and industry to integrate and demonstrate '12 smart city solutions' in energy, infrastructure and transport, to provide other cities with valuable insights on how they work in practice and opportunities for replication. The idea is to create a ready market for these smart solutions to support growth and the transition to a smart, sustainable Europe.	The six V2X chargers will be installed in an Endesa Building with Distributed Energy Resources (DER) including a PV Plant, a storage system, chargers (normal, fast and V2X) and a Demand Management System (DMS).	Barcelona, Spain	Not known	Time shift, Power balancing and Power quality support	Not known	6 V2G units; aggregated power of 60kW	January 2015 - 31 December 2019.	Endesa	Not known	CHAdeMO	Not known	Vehicle-to-Business (V2B)
<p>Legend</p> <p>Not known Information is not known</p> <p>Disclaimer: The information contained in this V2G overview is for general information only and is collected from the respective project websites through secondary research. Where available, external websites have been referred to, in order to obtain related information. Given that project websites differ in accuracy and updating frequency, and may not contain information regarding the actual status, the overview cannot guarantee the accuracy or completeness of the descriptions. Furthermore, the list is not exhaustive. Any suggestions for additions, deletions, or modifications to the contents of the overview are welcome and will be handled by the Amsterdam University of Applied Sciences (contact: Ramesh Prateek, r.p.raju.arnumugam@hu.nl).</p> <p>Acknowledgement: (This research was supported as part of SEEV4-City, an Interreg project supported by the North Sea Programme of the European Regional Development Fund of the European Union.)</p>															