



Conference Objectives

This is the first international conference where operational Vehicle 2 Grid projects are presented, discussed and above all taken out of the research area into the public domain.

The conference focuses on the added value of Electric Vehicles, Solar Energy and Smart combination of both for sustainable city development. The presented examples are shared to examine market readiness, affordability and reliability for the urban energy transition.

The conference wants to examine possibilities of the actual state of technology, innovative results and coming developments. Car manufacturers, grid operators, ICT service providers, solar energy policies, all are present and willing to contribute.

Plenary session

Dr Robert van den Hoed and Alderman Abdeluheh Choho opened the conference, welcoming participants to the University of Applied Sciences (UASA) and the city of Amsterdam. Amsterdam has ambitious objectives towards electric mobility and solar energy. Technical solutions exist, the main challenge is how to stimulate the roll-out.

Maarten Van Stiphout pointed out the role of the **European Commission** in realizing innovation and research in the field of Energy. Electric Vehicles (EV) are promising in combination with solar and V2G technology. Complex questions arise, who manages data and infrastructure? Who is responsible for charging? The Commission elaborates legislation and experiences feed into this process. **Bert Stuij** presented Dutch government innovation objectives in the energy sector. Goals are translated into activities, pilot projects and fiscal incentives for EV. EV can contribute significantly to sustainable cities. Confidence, positive behaviour & market explosion are nearing. In this process community cooperation is crucial. **Jeroen Büscher** showed the Flanders experiences in EnergyVille, using big amount of complex technologies, main message: Keep It Simple. A Business case was presented, and it needs clear and stable regulation.

Francisco Carranza from Nissan-Renault shared the vision on the future mobility. Mobility of the future contributes to sustainability, is connected, shareable and autonomous. Cities benefit of the ramp up of EV in several ways, batteries used in the electricity system as virtual power plant or as storage. Who and how will this be aggregated is a main issue. **Petra de Boer** faces the triangular challenge of reliability-affordability-sustainability. DNV-GL showed energy supply moving towards decentralised and integrated. Up-scaling pilots to large scale implementation and standardisation is required. Grid operator can facilitate this, **Jos Blom** from Alliander recognised the transition and supports various initiatives for local storage. **Martin Rapos** showed the importance of data and aggregated information for energy services, the aggregator acquires the necessary know-how.

Parallel sessions

Electricity grid for sun and mobility in 2025 (Thijs Turél, Robin Berg, Paul Codani, Sussane Bach).

The need of the electricity grid for smart electric vehicles to un-stress the electricity network with respect to storing solar over production and reducing evening energy demand from the vehicles is a main debate. Examples show this is needed, but main question is whether ICT is costs-efficient enough against infrastructure investments. In Utrecht Europe's first commercial vehicle feeding into a neighbourhood is realised. In USA market frequency services appear financially attractive. The economic potential of this service in the French market seems attractive, but regulation is a barrier.



Sustainable info-mobility (Frederic Malefant, Bart Sloep, Stijn Vandael).

Car manufacturers and the potential of EV to provide energy services, Renault-Nissan (R-N) elaborates integration of Renault-Nissan EV's in buildings, districts and the grid. Combined with bidirectional charging these cars could earn up to €1432 per year per car. Used batteries also contain value as they can be re-used for domestic storage. Main constraint seem to be regulation. Mitsubishi is active in V2X around the globe and confirms that regulation forms a barrier for implementation.

Agenda and ICT for energy management (Jurjen Helmus, Arno van Zwam, Ghanim Putrus).

This session showed the capability of ICT to visualize and allocate energy flows. UASA's researches on EV-charging in the city of Amsterdam resulting in the composition of charging profiles and time ratios (charging time divided by connection time), indicating "sweet spots" for V2X services. Further research include strategy based on "sweet spots" and city benchmarking. The City-Zen project shows households can generate revenue aggregating flexibility on different markets.

Northumbria University developed a tool showing smart charging and smart battery management can minimize or eliminate some effects of EVs on the network and extend battery life.

Operational examples, lessons learned and valuable mistakes (Peter Bach Andersen, Frank Wolter, Daniel Freund, Nanda Piersma).

The Nikola project showed the system wide services that EV could provide and their value proposition in Denmark. The V2G experiences in Berlin date back to 2009, EVs provide valuable support on the grid with the right degree and distribution of control, it will however, be a step by step approach. Innoz sets the user in the centre, e-mobility will be an essential part of an integrated and smart grid in a near future matching generation and varied consume. The station of the future will be a multimodal green hub. AUAS presents an energy autonomy on neighbourhood level simulated. Solar panels cover energy consumption in summer. More simulations backed up by real demonstrations is highly needed.

Energy rules or rules for energy: The business case challenge (Gerard van Baar)

During this session we discussed regulatory issues and possible business models concerning V2G technology.

- **Annelies Huygen** proposed three policy measures contributing to business models for V2G: enable small consumers to sell flexibility to relevant markets, enable small consumers to provide services for the DSO/TSO & allow experiments sharing energy systems.
- **Jacco van der Burg** present different business models for V2G and Cofely's ambitions to develop a scalable V2G solution with a feasible business case. They work towards selecting a suitable business case that will be tested in a pilot project in July.
- **Dirk Jan van Swaay** from ING provides a bankers view on V2G. From a commercial bank's point of view V2G is about arbitrage to grid. But the spread of electricity prices is far too small to make it bankable. Therefore financing V2G assets for the retail market is not an option.

Discussion

For the discussion the City of Amsterdam, Ministry of Economic Affairs, Renault and LomboXnet join the stage. The Ministry, and their European counterparts, know about the policy measures proposed by Annelies. All countries have incorporated the EU policy towards more sustainable energy, but nothing has been explicitly said on how. That makes the process bothersome and lengthy with lots

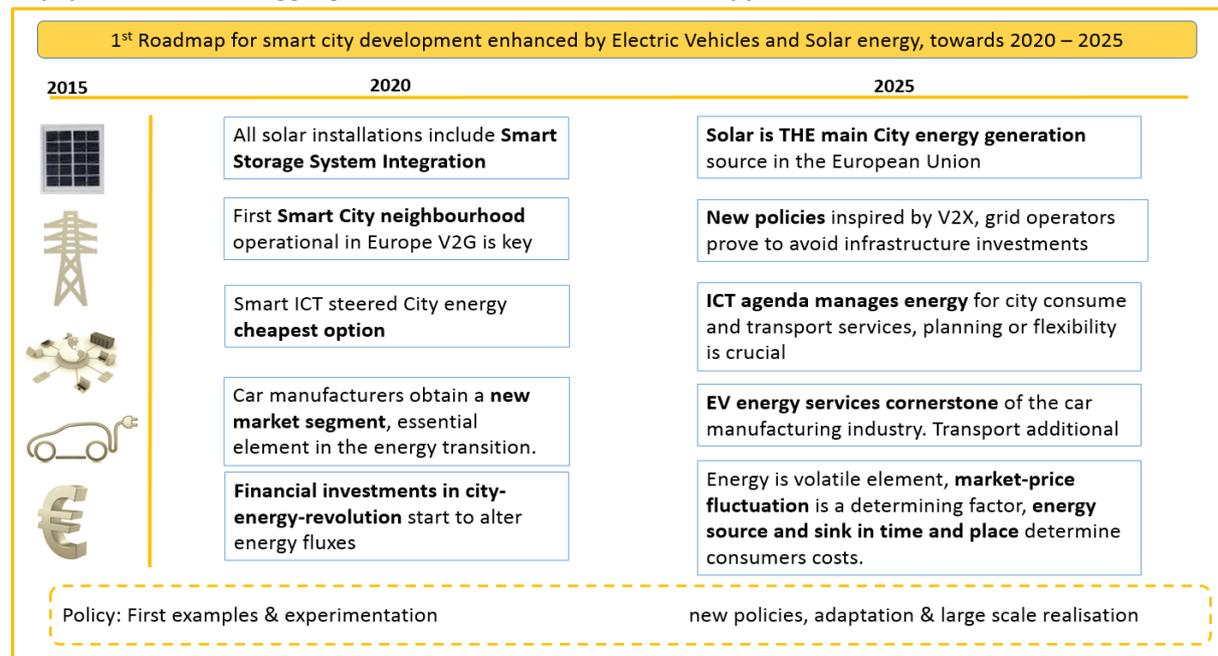


of 'what if' questions to be answered. It will change. It will also take time. Meanwhile this won't help to convince financial parties to put money on the table. Corporates like Renault and LomboXnet are convinced that at the end V2G with future business models will survive. In the meantime they are supported by local governments like Amsterdam who want to move on with V2G and prove the added value for their city. All agree that conferences like these are an essential get-together to exchange the latest experiences.

Conclusions

Solar powered ICT & Electric Vehicles will contribute in various dimensions to a clean and financially sound development of the city environment. Improving services and adding value to:

1) the electricity grid 2) reduced energy transport 3) buy low sell high price 4) reliable asset in unbalance market 5) Backup during black out situations. This market will eventually explode, the key question is who aggregates what and when this will happen.



Large scale demonstration projects are highly needed for showing possibilities, convincing general public, behaviour & privacy matters, which need to be clear. Sound energy rules and pricing (including grid) & taxation partly based on offer and demand need to be introduced.

During the **coming 5-10 years the electric vehicle accompanied by ICT enters public life**, energy production, mobility planning and information tools will become inextricably linked. **City planning** becomes more **interlinked with the energy and ICT** domains in order to keep pace with evolving city dynamics. **The Solar & Electrical mobility revolution conference in Amsterdam in 2015 has gathered the European V2G experts and opened a new debate, which will continue to co-operate in the near future both in projects and as independent expert group in the V2X domain.**