Vehicle2Grid
the Solar & Electrical mobility revolution conference 2015

Energy policy for the urban transition in the Netherlands

Amsterdam, March 2015

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Energy policy for the urban transition in NL

• Ambitions and policy

• Translation into activities

• Decentral energy options ⇔ electric vehicles

• Cities as innovation centers
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Public private partnerships ("Topsectors" from 2011)
National energy agreement 2013

About 40 signatures: employers’ associations, unions, local & regional authorities, NGO’s, NL government.

- Renewable energy generation: 14% (2020), 16% (2023);
- Conservation of energy: 100 PJ/yr (2020), 230 PJ/yr (2030);
- Closing older coal fired power plants;
- 3,450 MW additional offshore wind;
- 15,000 jobs; integration in curricula of schools & universities.
Government e-mobility objectives

- 200,000 e-cars (FEV & PHEV) in 2020;
- 1,000,000 e-cars in 2025;
- Nationwide network of charging points;
- Growing sector of EV related products & services.
Smart grids ambitions: from R&D $\rightarrow$ RD&D $\rightarrow$ larger scale
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Translation into activities: smart grids

• Innovation Program Intelligent Networks (IPIN 2012-2015)
  - Real life pilots (12);
  - Focus on aspects:
    standards, end user as stakeholder, regulation, new services & products.


• TKI Switch2SmartGrids (TKI S2SG, part of Topsector Energy)
  - Continuing the IPIN aspects;
  - Standards & frameworks;
  - Interconnection of smart grids & larger scales;
  - Cyber security;
  - Smart cables & smart distribution stations.

Projects: [http://tki-switch2smartgrids.nl/projecten/](http://tki-switch2smartgrids.nl/projecten/).
Translation into activities: electric vehicles

- Support roll out of charging infrastructure;
- “Green Deal” public infrastructure;
- Fiscal incentives;
- Subsidy scheme for low emission taxis & vans;
- Stimulating business development;
- Dissemination of knowledge;
- Living labs, networks;
- Monitoring of EV development.
Charging points

Development in the number of charging points in the Netherlands - excluding private charging points -

- 31-12-2014: 28,000 private charging points
Project in a “PV dense” district: Smart Storage

Smart Storage in Etten-Leur

Many of the houses in the De Keen neighbourhood of Etten-Leur are fitted with solar panels. This makes De Keen the perfect neighbourhood for conducting an energy storage pilot.

In the summer of 2012, Enexis placed a Smart Storage Unit here containing batteries that can store the sustainably generated energy. When that energy is needed, the batteries discharge. With this demo project in Etten-Leur, Enexis is the first in Europe to store energy at a neighbourhood level that is fully integrated into the existing low voltage network. Enexis is carrying out this pilot together with Alliander and TNO.

Smart Storage Unit
- Concrete station weighing 16 tonnes
- Partly underground
- Dimensions:
  - Height = 1.80 m
  - Length = 3.00 m
  - Width = 2.80 m
  - Underground depth = 1.87 m
- 4 battery strings
- 4 inverters

Batteries
- Total capacity: 730 V / 320 Ah = 232 kWh
- 4 Li-Ion battery strings of 58 kWh each
- Every string consists of 29 24V 80Ah modules and 1 management module
- 4 x 280 kg
- Charging capacity: 100 kW
- Discharge capacity: 400 kW
- DC Input Voltage: Minimum 650 V – Nominal 720 V – Maximum 830 V
- Supplier: SAFT

Inverters
- Total capacity: 400 kW
- 4 inverters of 100 kW each
- 4 x 300 kg
- Max. DC voltage: 900 V
- Max. DC power: 200 A
- Combined AC S/C power: 1600 A
- Black start capability
- Island mode
- Seamless transition between island mode and network operation
- Supplier: EMForce
By 2020, the municipality of Texel wants to be able to fulfil its own energy needs, entirely, by means of renewable energy. One of the parties that can contribute to this objective is the cooperative, TexelEnergie, which started the Cloud Power project with Liander and Capgemini: a self-sufficient community. The pilot project examines how such a community can function and how the flow of energy can be recorded and charged for. For this purpose, everything revolves around smart energy management.
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EVs & smart energy systems come & work together

Example of a project: Smart grid in balance (2014-2015)

• Decentral renewable energy supply ⇔ demand from EV’s.

• Solar PV, wind turbines & biogas fueled CHP at ACRRES area (WUR) in Lelystad.

• “Prosumers” (15 houses & 5 enterprises), 20 EVs & smart charging infrastructure.

• Through “Charge Service en Operations Platform” (CSOP) EV owner informed (website or app): source of energy, costs, state of charge & CO₂ reduction.
EVs & smart energy systems come & work together

Other projects (see for more projects [http://tki-switch2smartgrids.nl/projecten/](http://tki-switch2smartgrids.nl/projecten/))

- **EVPV-Grid**: energy management using EV batteries as storage for PV production (peaks) at business parks with larger parking areas.
  Power Research Electronics, ABB, TU Delft.

- **High Tech Campus Eindhoven (HTC SG)**: smart charging 150-200 EVs & smart offices.
  DAUT, Enexis, HTCE Site Management, Driessen Autolease, TU/e, Brabantse Ontw. Maatsch., NXP, Automotive NL.

- **Power by the sun**: fast charging stations along Dutch highways including solar panels & batteries for energy storage. First station is Haarrijn along the A2 near Maarssen.
  MisterGreen Products, Alfen, TU Delft.

- **Smart Grid V2X Energy & Mobility**: improving grid management by (dis)charging EVs.
  Cofely, Alliander, ABB, Mitsubishi, Amsterdam Smart City, Hogeschool van Amsterdam.
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Cities as innovation centers ⇒ Green Deal

- Agreement (enterprises, social organisations, local authorities and Ministry Economic Affairs) in order to realise local sustainability ambitions.

- Under a Green Deal Ministry helps to remove bottlenecks such as regulation and to find appropriate partners.

- Areas: energy, climate, water, raw materials, mobility, biobased economy, building and food.
Green Deal Smart Energy Cities 2014-2019

- 5 cities

- Consortia knowledge & innovation:
  - Energy savings in Built Environment (Energy)
  - Solar Energy (Energy)
  - Gas (Energy)
  - Switch2SmartGrids (Energy)
  - CLICK NL (Creative industry)

- NL Grid Operators Association

- Ministry Economic Affairs
Green Deal Smart Energy Cities 2014-2019

- Low carbon energy solutions for 100,000 buildings in 5 cities.

- Companies should be attracted by large number, investing innovative technologies & services.

- Customer / energy consumer oriented.
Summing up: towards the smart city

(who wants to live in a dumb city, anyway)
Thank You
Pictures from

- Amsterdam elektrisch
- The New Motion
- Project “Smart grids in balance” & ACRRES location WUR (GreenFlux and consortium partners)
- TKI Switch2SmartGrids