Smart Grids in the Netherlands

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TKI Switch2SmartGrids

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Economic Mission Netherlands to Germany
The World Economic Forum
Global Competitiveness Index Heat Map

GCI 2011-2012  GCI 2012-2013

The Netherlands  7  5

GCI score*
- [5.39,5.72]
- [5.00,5.39]
- [4.60,5.00]
- [4.20,4.60]
- [3.80,4.20]
- [2.78,3.80]
- Not covered
The Dutch innovation policy ambitions

- Strengthen position in the top 5 of global knowledge economies by 2020 (GCI/WEF)
- Increase Dutch R&D efforts to 2.5% of GDP by 2020
- Establish Top consortia for Knowledge & Innovation (TKIs) by 2015
  - At least 40% of consortia financed by private sector

Picture: Leslie Juvin, liveloveleslie.com
From top sector policy to smart grid innovation

- Top sector policy of the Dutch government
  - Concentration of R&D funding in nine sectors, including energy
  - Demand and supply of knowledge in these sectors should be better connected, i.e. stronger role for private sector
  - Improving cooperation between companies, universities and government

- Top Team Energy determined seven themes, including Smart Grids

- Innovation Contract Smart Grids 2012 has been formulated, total budget is €25.9 million with a 56% share from companies

- 17 projects have been awarded in 2012

- Innovation Contract has been defined for period 2013-2015, budget from government for 2013 is €5.7 million
Agenda of TKI S2SG – organizing SG community

- Being a top consortium of SG throughout the ‘innovation chain’, i.e. RD&D, and implementation
- Actively stimulate cooperation between companies, academia and governments (match making), and create critical mass in selected topics
- Create ‘eco system’ at both local and international level
Being connected, the new world of energy

Super computers that fit in the palm of your hand
Access to ‘the cloud’
Real-time streaming information
Open systems
Open data
Mobile, and socially connected anytime
Data tsunami
New technologies, new business models, new careers
Social media, social trends

Innovation in SG is about cooperation, multi disciplinary, openness
Innovation Contract Smart Grids: 
4 closely linked program lines

1. Products & Services
2. Virtual Infrastructure
3. Physical Infrastructure

Basic graph: TNO, SG 4 layer model
Four interlinked program lines, all covering research up to market application

- **Discovery (Universities & Research Institutions)**
  - 1) Products and Services (B2C and B2B)
  - 2) Virtual Infrastructure
  - 3) Physical Infrastructure

- **Demonstration (Consortia)**
  - Regional initiatives like Energy Valley, SETS, Smart Energy Regions, Stichting kiEMT, AIM, RCI, USI
  - Pilot projects like PowerMatching City
  - Other projects and initiatives like European Network for Cyber Security

- **Deployment (Companies)**
  - 1) Products & Services (B2C and B2B)
  - 2) Virtual Infrastructure
  - 3) Physical Infrastructure

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**Institutional Innovation**

- 4a) Institutional Innovation

**Social Innovation**

- 4b) Social Innovation
Projects started in 2012

Division of budgets for the 2012 projects among the four program lines

1. SG-BEMS
2. i-Balance
3. MeppelEnergie
4. VIOS
5. PV-SIMS
6. CERISE-SG
7. SEC Smart Energy Markets
8. SEC USER
9. EWEB 2.0
10. CSGnP
11. fDASA
12. KOSTREDIN
13. Warmteweb BG-Hoek
14. SF & SG
15. EVPV-Grid
16. Cyber Security for SG
17. Green Grid

100% = 25.878.491 euro

- Products & services
- Virtual infrastructure
- Physical infrastructure
- Institutional & social innovation
2013 priorities

1. Products and Services

- Energy management, including energy storage as a product or service to consumers, companies, and grid operators
- Goals are to facilitate distributed generation as well as to provide insight to stakeholders and support energy saving

2. Virtual infrastructure

- National and international standardization of protocols and interfaces, e.g. open energy framework, ICT architectures, interoperability, security by design
- Stimulate smart grid projects to be linked to projects in the ICT Roadmap (cross-sector TKI)

3. Physical infrastructure

- Asset management of smart grid infrastructure
- Integration of RES
- DC grids and DC interfaces
- Close cooperation with Dutch branch organization of grid operators

4. Institutional and social innovation

- Optimal use of ‘flexibility’ of the energy system, taking the different interests of the stakeholders into account
- New and changing roles in the energy sector
- Development of services and business
Innovation contract 2013
Challenges on short and medium term

- **Goal of innovation contract.** New, affordable products and services to balance demand and supply. Prevent grid congestion. Support stabilising the energy supply as well as saving energy. SG is 'enabler' of other developments in the energy sector.

- **Longer term goal.** Increase and consolidate status of R&D on specific subjects. Stimulate innovations and deployment in participating companies. Bundling and strengthening cooperation between highly qualified experts.

- **2013 goal.** Develop roadmaps for all program lines to determine R&D focus for coming years, and to be timely prepared for an energy supply based on smart grids. Improve cooperation with other TKIs, e.g. EnerGO & Solar Energy.
# The Dutch characteristics

<table>
<thead>
<tr>
<th>Culture</th>
<th>Energy market</th>
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<tbody>
<tr>
<td><strong>Conducive innovation environment</strong></td>
<td>□ Unbundling of TSO, DSO, production/trade/supply</td>
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<td>▪ Mindset of creativity, collaboration and reliability</td>
<td>□ Well developed gas industry</td>
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<td>▪ Strong and open consultation and consensus model</td>
<td>□ Integrative approach to energy carriers</td>
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<td>▪ Striving for open standards and open source</td>
<td>▪ Multi utility, Multi stakeholder</td>
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<td><strong>Strong societal involvement</strong></td>
<td>□ 12+ Smart Grid demonstration projects</td>
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<td>▪ Well developed PPPs, e.g. national innovation policy, local initiatives</td>
<td>▪ Multi citizen initiatives, privacy consciousness, various living labs</td>
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Collaboration opportunities

- Open living labs for innovation
- Virtual coupling of demonstration projects on both sides of the borders
- Standardization of (new) product & services *)
- Development of consumer engagement

- How to continue?

*) E.g. join forces in CEN/Cenelec, EU Taskforce Smart Grids?
Appendix

Some Dutch innovation hotspots
Amsterdam Smart City

The City of Amsterdam, its inhabitants, and business are involved in the following projects:

**Sustainable Living**
- West Orange
- Geuzenveld
- E-management in Haarlem
- “Onze Energie”

**Sustainable Working**
- ITO Tower
- Monumental Buildings
- Municipal Buildings
- Zuidas Solar Challenge

**Sustainable Mobility**
- Ship to Grid
- EV charging @ home and office

**Sustainable Public Space**
- Climate Street
- Smart Schools
- Sustainable Swimming pools
- Solar workplace outside
Brainport Region Eindhoven
Hotspot of high tech and design

Brainport Region Eindhoven has been declared Intelligent Community of the Year in 2011.

The heart is the High Tech campus area, and is home to:
- more than 100 companies and institutes
- 8,000 researchers, developers, and entrepreneurs
- 50% of all Dutch patent applications
- open Innovation & Triple Helix collaboration
- design of innovative human-technology interactions
  and business models.

Besides the High tech campus there are several other campuses:
• automotive campus, including electric vehicles
• Eindhoven university of Technology Campus

The combination of high tech development and (Dutch) design is creating the industries of the
Brainport Region Eindhoven
Gateway to European entrepreneurship

Innovation & Entrepreneurship Energy at
Brainport Eindhoven

**High tech** solutions and materials e.g.:
- for (thin film) solar
- interconnection techniques (e.g. sensoring and ict)
- electric vehicles.

Strong **interaction** between development, start-ups, international companies and (local)governments.

**Strong position is recognised by Europe** as one of the six locations of the **KIC InnoEnergy**, and covers the region with Belgium and Luxembourg.
Energy Valley

- Background: gas related industry, originating around the largest gas field in North-Western Europe
- Current situation: Hotspot for conventional, sustainable and integrated energy projects
- Focal point: multi-utility (gas, power, heat) smart energy infrastructures at local, regional and pan-European level
- Key competences: integration of gas infrastructures into smart grids, large scale offshore wind balancing
- Examples:
  - Powermatching City Hoogkerk – demand side management and trade between prosumers
  - iBalance – Local balancing in autarky, using (bio)gas and solar and wind
  - ENSEA – Pan-European balancing between sustainable and conventional energy sources
KiEMT – multi utility energy management

Multi utility approach to smartgrids and district optimisation

Solar PV & Thermal

Micro CHP

Building management
KiEMT – Manufacturing and installation engineering

Main benefits achieved:

- Substantial cost savings (OPEX & CAPEX).
- More functionality, higher reliability.
- Focused development of competences including advanced analytics.
- Reduced installation time for replacement old secondary installation.
- Reduced maintenance and work on site.
- Standardization of Method of Working, protocols, signals, alarms, etc.
- Minimize grid investments,
- decrease operational costs
- increase customer value