

Smart Grids Reality

TNO innovation
for life

- › **Current Status Smart Grids in the Netherlands**

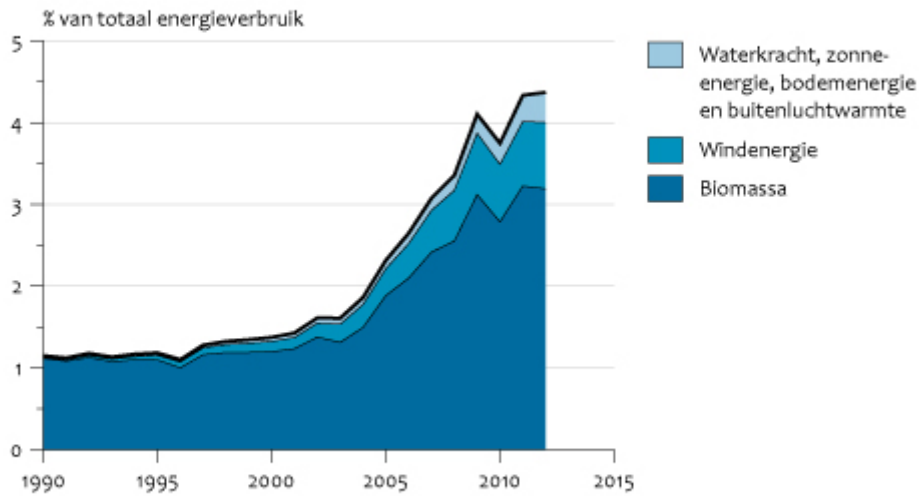
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› Smart Grids – Reality in NL (1)

- › Smart Grids R&D is based on 3 main drivers:
 - › Congestion ‘caused’ by end-users
 - › PV, Heat pumps, CHP’s, Electrical Vehicles
 - › Optimal integration and use of renewable energy
 - › PV and wind energy
 - › Congestion caused by large (virtual) powerplants
 - › e.g. Eemshaven
 - › CHP’s in large greenhouse area’s

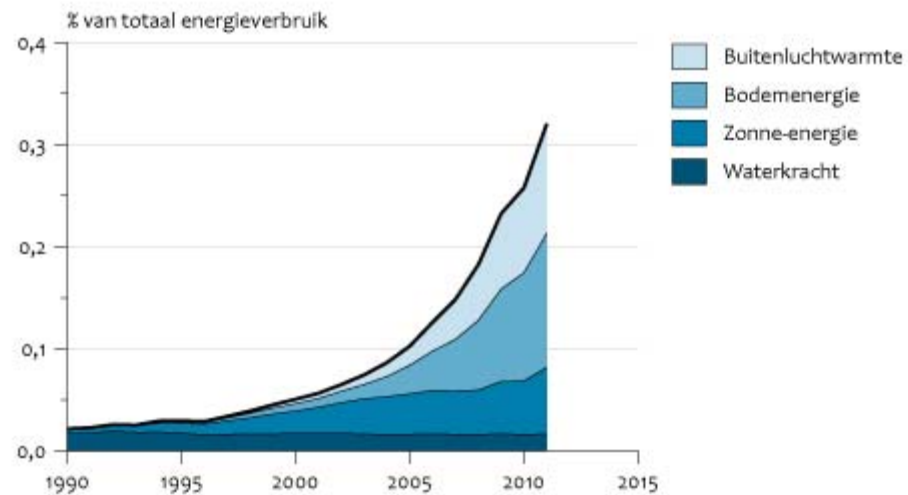
Smart Grids – Reality in NL (2)

Eindverbruik hernieuwbare energie naar bron



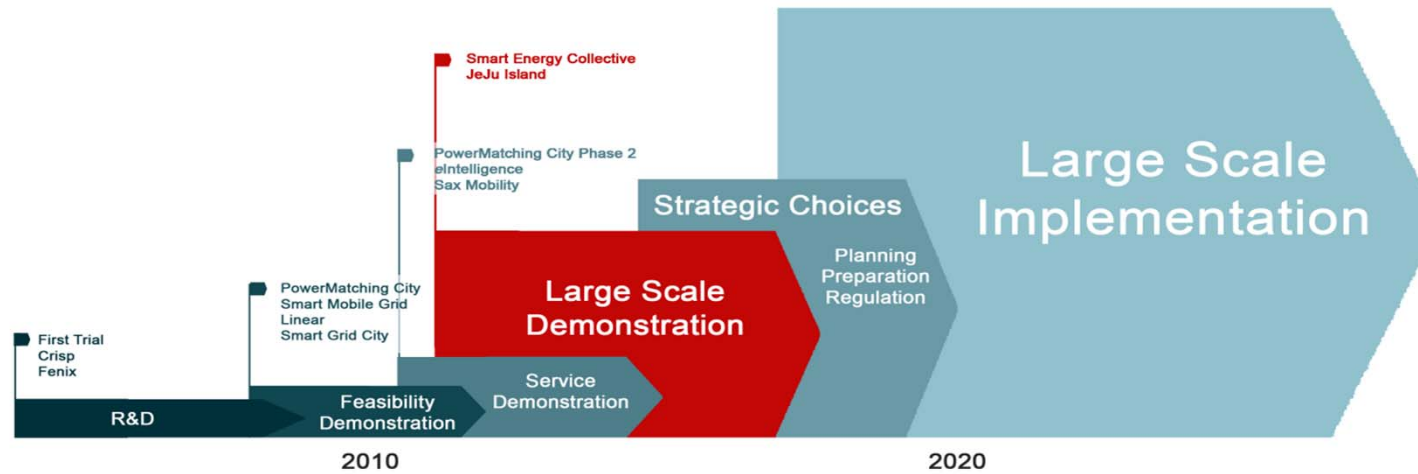
Bron: CBS.

Eindverbruik overige bronnen hernieuwbare energie



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Smart Grids: status in NL



- › Development of knowledge and products: PowerMatcher, Power Router, Smart Cable Guard, SASensor, etc.
- › First demonstration projects: Smart Storage, GROW-ders, PowerMatching City, etc.
- › Large-scale pilots are starting: Smart City A'dam, Easy Street, Couperus, Smart Energy Collective, etc.

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› Technical feasibility studies

- › In experiments and tests, all possible combinations of technology have been tested
- › This resulted in:
 - › New technology and product development (hard & software)
 - › Measurements & analysis on grid effects and stability
 - › Development of demand-response technologies

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Technical feasibility and exploration phase are ready!

› Integrated projects

- › Current running and developing projects focus on integration of:
 - › Technologies from multiple vendors
 - › Multi-vendor, freedom of choice
 - › Customer participation (≠ consumer)
 - › As 'investor' in appliances, devices and services
 - › New business models and revenue streams
 - › Innovation only works when money (or savings) can be made
 - › Regulatory frameworks as enabler and driver

› Strategic choices

- › As it is impossible to predict how the energy system of the future will look like, preparations are made on:
 - › Standardisation
 - › Flexible Power Alliance (flexiblepower.org)
 - › Universal Smart Energy Framework (by SEC)
 - › In EU/global standardisation
 - › Costs reduction of Smart Grid deployment
 - › Affordable LV/MV sensor/actuator technology
 - › Reliable and affordable telecom-infrastructure for Utilities
 - › Enabling new businesses / ESCO's
 - › Provide DSO-grid related information
 - › 'white-label' back-office processes