GIS GOVERNANCE

GIS4SMARTGRID 2019

IVO KUIJLAARS

25 09 2019



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Dutch Railways / EDS	5 y	Consultant GIS
Engineering office	2 у	Head surveying processing
2		

GIS data layers

Ivo Kuijlaars













 Developing a business data model that provides effective GIS data governance across a range of business applications

- Agenda
 - Introduction
 - Enexis: a Digital Distribution System Operator
 - Data Management
 - The Enexis Business Data Model supports business and IT
 - GIS: the Master Asset Register
 - LV Distribution automation





How many attendants in this room are wearing a blue shirt today?

- What is a blue shirt?
- What is an attendant?
- What exactly is this room?
- What is today?







How many connections does Enexis now have in Eindhoven?

- What is a connection?
 - LV? Public Lighting? EV Charging station? MV? Gas? Water?
 - Technical or administrative?
- What is Eindhoven?
 - City? Region? Service area?
- What is now?
 - This second? Today? 1st of January?
- What is Enexis?











ENERGY THAT MOVES YOU

CORPORATE PRESENTATION ENEXIS GROEP

APRIL 2018





4.332 4.390

2017 2016 Employees

REVENUE In millions of euros

2016: 1.376

PROFIT FOR TE YEAR

In millions of euros

207

BALANS SHEET TOTAL In millions of euros 7.668 2016: 7.284

2017 2016

Gross footprint own emissions

Enexis in tons of CO₂

764.518

612.076

DART-RATE ENEXIS Safety index 0,33

2016: 0,17

CONNECTOR IN THE CHAIN

CONNECTOR IN THE ENERGY CHAIN



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EXCELLENT DISTRIBUTION SYSTEM MANAGEMENT IN FIGURES

SERVICING AREA 1-1-2018



In millions of euros

2016: 384

NUMBER OF CUSTOMERS

2,8 million electricity

2,3 million gas

Electricity grid

- 139.100 km
- 2.786.000 connections
- 34.592 GWh

Gas grid 🔥

- 46.400 km
- 2.315.000 connections
- 6.241 Mm³

OUTAGE TIME





Gas outage time in seconds

	until 2017	2017	2016	2015	2014	2013
Smart meters						
Electricity meters	1.414.309	387.146	366.010	233.247	174.165	128.795
Gas meters	1.136.403	325.299	308.516	149.204	149.494	96.291
Total	2.550.712	712.445	674.526	382.451	323.659	225.086



INDICATORS HOUSEHOLDS

INCREASING THE SUSTAINABILITY OF THE ENERGY SUPPLY

Households

250,000

Solar panels in our servicing area



1.600

1.200

800





Annual use of charging stations since 2012 Source: Evnet.nl

2013

2014

Gemiddelde energieverbruik

2015

2012



External developments with the greatest impact on strategic goals within 5 years

		increasing focus on sustainability					
e and e	electrification of energy demand	increase in sustainable generation	natural gas decrease				
affordabl e storag	sustainable transport breaks through						
ase in a vailable	striving for local optimization and energy supply is increasing						
incre	increasing need for flexibility						
custo highei	mers are placing ever r demands on services	scarcity of technical personnel	more difficult to fit assets into public space and subsurface				



Internal factors for change





Two major programs to realise change

We realize a sustainable energy supply by state of the art services and networks and by taking the lead in innovative solutions

1. State of the art service

Enext

Radical redesign of processes & systems



Samen, slimmer, verder.









Digital DSO OUR VISION ON DIGITAL DISTRIBUTION SYSTEM OPERATION

Digitizing Control Centre

Automatic detection of congestion and deployment of flexibility solutions. Automatic switching in the grid. Limit the duration and impact of the power outages through AI.





Accelerate Energy Transition

Understand the information needs of our stakeholders New innovative Open Data services

Automate grid planning

- Central **Data management**
- Data science

Maintain system

Linking internal and external data sources. Determine grid bottlenecks with smart algorithms / Al. Automatic scenario analysis and solution proposals.



Apply sensor technology to our E&G assets for complete system insight. Maintenance regimes are optimized with the help of sensor data.



Smart Data is key to enabling Smart Grid Systems









Enexis Data Management cooperation model





The six key themes of CMMI's Data Management Maturity (DMM) model



Enexis Business Data Model

- Model for all (important) Enexis data
- Using spoken words (Dutch) Independent of systems and applications
- To establish company-wide definitions
- To define data owner, data manager and data stewards per data object
- To record privacy criteria and data retention periods
- To record data quality and security criteria

Used by IT for architecture, development, integration, compliancy and documentation.

Used by business for governance, understanding, impact analysis and compliance.





Metadata in EBDM

- 1. Data governance (Data domain owners, owners, managers, stewards)
- 2. Data classifications for
 - Availability
 - Integrity
 - Confidentiality
 - Privacy classification
 - Retention times
- 3. Data quality KPIs
- 4. Data type (master, transaction, reference etc)
- 5. Data catalog info (source system, master and copies)











ECDM - Reference models

- EDSN: Market facilitation
- UBL: Universal Business Language, a.o. purchase orders and invoices
- BAG: Base register for Addresses and •

23 Buildings

- HR-XML: HR
- OAGIS: Open Applications Group Integration Specification, canonical business language for information integration.
- UN/CEFACT CCTS: trade facilitation and electronic business.

More on integration and CIM:

GIS: Integrated geographic and schematic locations

Schematic map

Geographic map

Topology: related components (colored)

Topology example: Grid logic model

Relating home connections to transformers

- Hierarchy: structured components
- An MV cabinet consists of:
 - MV installation
 - Transformator
 - LV installation
 - PL installation (public lighting)

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Topology - Hierarchy mapping

Topology Hierarchy Functieplaats MS-055457 Gelo Omschrijving ST ROCHUSSTRAAT ▼ 🔐 MS-055457 B STATION E ST ROCHUSSTRAAT • 🔟 20557531 B BEHUIZING Behuizing MS-055457-M01 B INST MS MS Installatie MS-055457-T01 B TRANSFORM TR-01 MS-055457-L01 B INST LS LS Installatie ▶ ₽ MS-055457-001 B INST OV OV Installatie MS-055457-М01 B INST MS · 🔲 20864323 MS Inst. C B INST MS ST ROCHUS ROCHU • 🔐 MS-\$55457-M01-RS01 B RAILSECT MS-055457-M01-VE01 B VELD MS ▶ 🔐 MS-055457-M01-VE02 B VELD MS MS-055457-M01-VE03 B VELD MS d MS-05 457-L01 B INST LS LS Ø • 🛄 20699640 B INST_LS LS-installat • 🔟 21353530 B TF ONTV TF-ontvang B • @ MS-055457-L01-RS01 B RAILSECTIE MS-055457-L01-VE01 B VELD LS MS-055457-L012 VE02 B VELD LS MS-055457-L01-VE03 B VELD LS 28 # MS-055457-L01-VE04 B VELD LS MS-055457-L01-VE05 B VELD LS

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B VELD LS

GIS as Master Asset Register

- GIS becomes the Master Asset Register: the "single point of truth" for all relevant grid-related, static asset data
- SAP PM is used for the Maintenance and Inspection chain and for the functionality of functional locations and equipment in all processes
- In FAR only relevant grid-related assets are included

Assets workflow

- 1. Work order products consist of assets and work on these assets.
- 2. The assets are registered in the MAR, the activities ("the work") are administered in ERP via projects and associated work orders that are offered to employees via Work Order Management.
- 3. The level of detail will differ in the different systems.
 - The MAR contains the most extensive asset data.
 - In SAP PM the asset tree is copied and displayed as equipments / locations with mutual relationships.
 - Finally, an even smaller part is included as assets in the Financial Assets Register.

Distribution Automation

- 1. Facilitate energy transition
 - Insight into load for predicting / matching supply and demand
- 2. Smart Grid Management through more data
 - Detect asset overloads
 - Faster disruptions
 - Control voltage management
 - Energy theft detection
 - Detection open access doors stations
- 3. Control OVL (and rate) as an alternative technique for TF
 - Future-proof alternative to TF (receivers) in network stations
 - More flexibility in controlling OVL

Disproportionate load on phases (Incorrect PV connection?)

32

Transformer maximum: time for a capacity increase?

Voltage too high (wrong tap step position?)

Energy theft?

- Smart Data is key to enabling Smart Grid Systems
 - DALI sensors and (GIS) data create grid insight, which is directly usable
- GIS is the master asset register
 - to other systems with asset data, like ERP, FAR and DALI
- The Enexis Business Data Model enables data to be smart
 - Defining identity, quality, meaning and security
 - To govern business data usage to be compliant (e.g. privacy)
 - To govern IT data usage according principles

This enables Enexis to become a data driven system operator

TOGETHER WE ARE BUILDING **RELIABLE AND SUSTAINABLE ENERGY** FOR TODAY AND FOR THE FUTURE

WWW.ENEXISGROEP.NL

