Co-funded by
the Intelligent Energy Europe Programme
of the European Union

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DIRECTIVE

Smart Metering project for Luxembourg

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20/10/2015

Summary

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- Luxmetering G.I.E
- Governing Directives and Laws
- The mission
- Expected benefits and assumptions
- Timing
- Smart Metering functionality
- Security challenges and how they are met

Luxmetering G.I.E

- Economic group of interest (G.I.E.) of the 7 luxembourgish gas and electricity DSO's
- Setup and management of the common national meter reading platform
  - Specification, purchasing, installation and management of the platform
  - Common purchasing policy for field devices (meters, concentrators, handheld units, communication hardwar all DSO's
  - Pil lloutpro ordin

creos
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Governing Directives and Laws

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- **EU Energy Efficiency Directive** (2012/27/EU)

- **Law of June 19th 2015 modifying laws of July 7th 2012 & August 1st 2007** which introduces Smart Metering in Luxembourg:
  - All legacy gas and electricity meters to be replaced by Smart Meters
  - All meters to be read by one national central system, operated by a common operator
  - Besides gas and electricity meters, the system must be open for other metering data like water and district heat

The Mission

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- Create customer awareness for energy consumption (by consumption history, reference and peer to peer comparision,..)
- Market stimulation by new time of use based tariffs from suppliers
- From July 1st 2016 every new installed gas & electricity meter will be a smart meter
- A common central platform, operated by all 7 gas & electricity Distribution System Operators (DSO)
- Multifluid: besides gas and electricity meters, the system will be open for water and district heat

Expected benefits

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- **Customers:**
  - Instant consumption information via customer port (2-12s)
  - Detailed consumption history over 2-3 years
  - More frequent invoice based on precise data
  - Saving advices through suppliers or Independant Energy Service Providers
  - More flexible tariffs based on time of use
- **DSO's:**
  - More precise and frequent quality of service information
  - Faster outage recovery
  - Data input for medium term Smart Grid
  - Better long term planning especially for LV grid
- **Suppliers:**
  - Precise data for invoicing
  - Purchasing optimisation through better forecasting
  - Development of new time of use tariffs with more flexibility for the customer
  - Better revenue protection

Assumptions

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- Customer energy consumption reduction scenarii

Scenario	1	2	3	4
Install inhouse display (IHD)			X	X
Compare customer consumption to reference	X	X		X
Energy consulting	X	X		X
Provide historic consumption data to customer	X	X		X
Clarity and transparency in communication to customer		X		X
Gaz consumption reduction rate	0,5%	1%	3%	3,5%
Electricity consumption reduction rate	0,5%	2,5%	3%	4,5%
Electricity peak reduction	0,5%	2,5%	3%	4,5%

Based on 2011 study « Energy Demand Research Project: Final Analysis » from the British Office of Gas And Electricity Market

Timing

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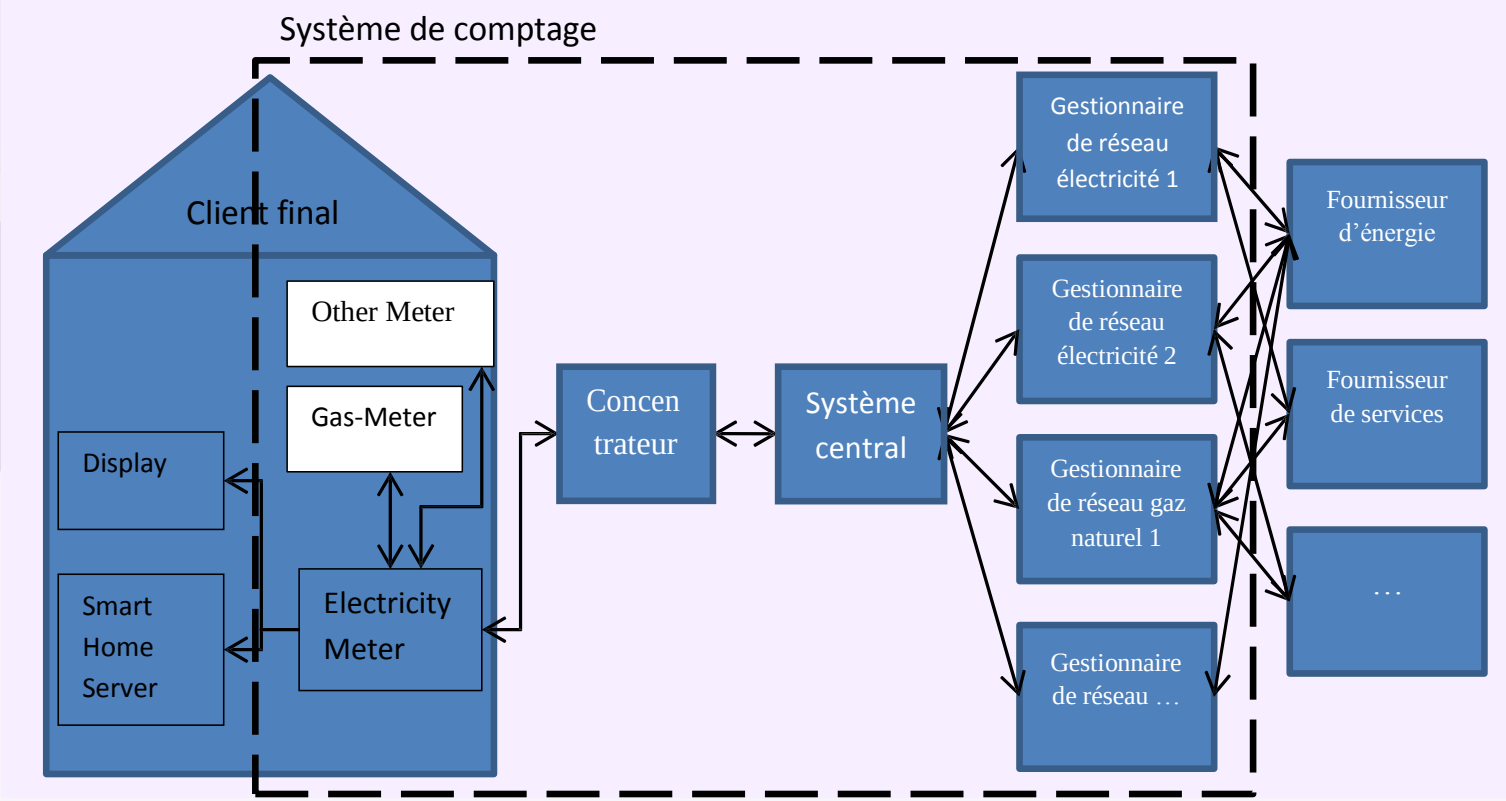
- Starting from July 1st 2016, every new installed or replaced electricity and gas meter will be a smart meter
- >95% of all electricity meters must be replaced by december 31st 2019.
- >90% of all gas meters must be replaced by december 2020.

Smart Meter Architecture



Information flow

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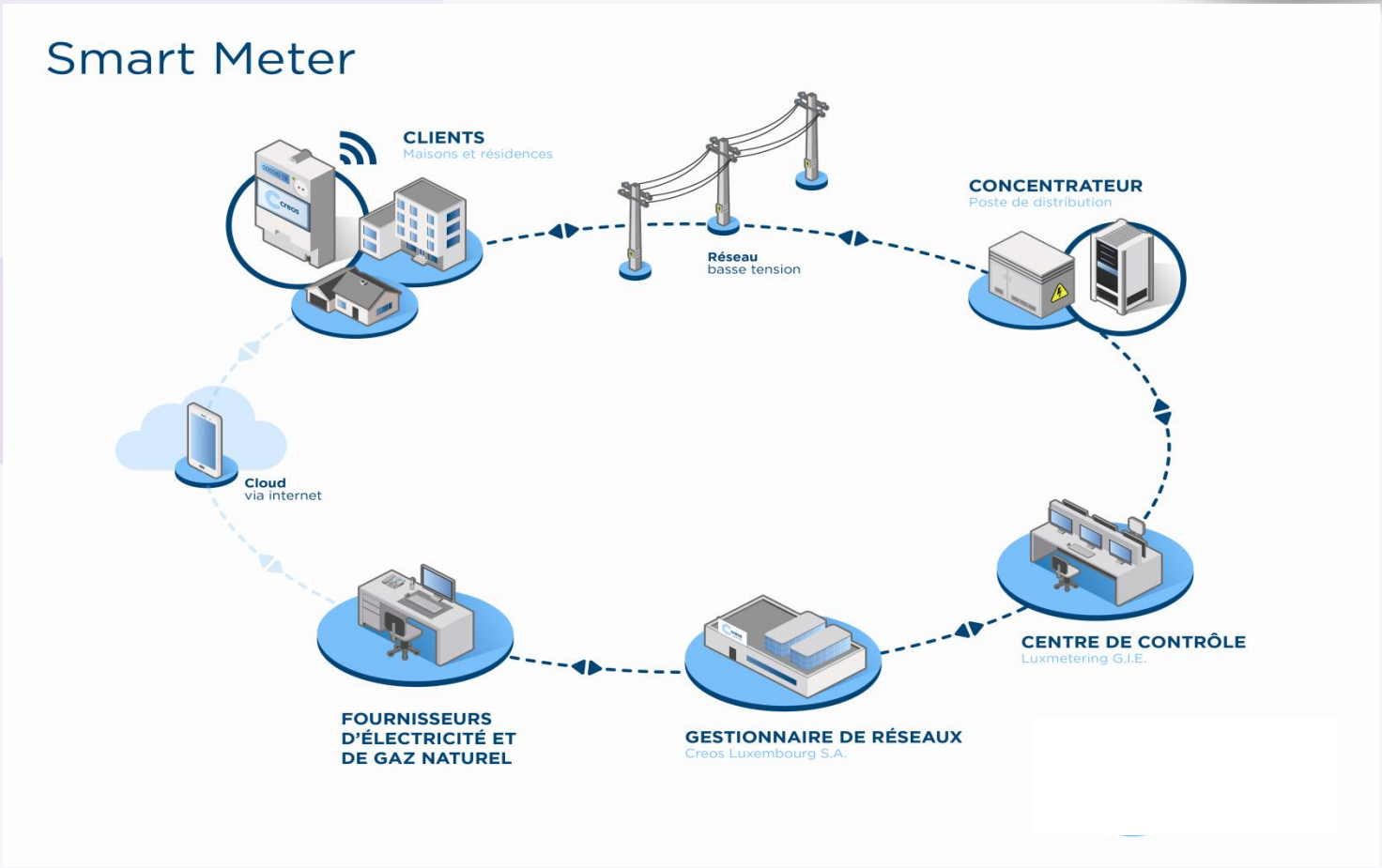

Smart Meter Functionality (1)

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- 4 registers for active, reactive, import and export Energy (1/4h)
- 3 registers for gas, water & heat (1 h)
- Alarms and logs for quality of electrical energy supply (voltage, outages,...) and fraud detection
- Calendar functions for relays

- 2 external relays for home applications
- Service interface (heating,...)
- LCD screen to visualise registers and messages
- PLC connection to concentrator
- M-Bus connection to gas, water & heat meter
- Customer port
- Breaker

Smart Meter Functionality (2)

- 1 Register (1 h)
- Technical alarms and logs (battery & tampering detection)
- LCD screen to visualise registers
- M-Bus connection to electricity meter
- Optional valve (gas only)

Security challenges

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- Customer consumption data is personal data and billing relevant and must therefore be protected
- In-built breaker could lead to mass blackout if system is hacked
- Smart Grid will rely on Smart Metering Sensors information: potential avalanche effects
- Potential impact on Smart Home if hacked
- As multifluid system (electricity, gas, water and district heat) all fluids may be impacted
- Critical infrastructure: sensitive to individual hacking, terror and state influenced attacks

Security Counter Measures (1)

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- 3 security pillars: authentication, encryption, anti replay
- Standard protocols (DLMS_COSEM, TLS)
- Standard hardware with open source software controlled by Luxmetering
- Exposed software (e.g. windows, oracle,…) is contained
- In-built fraud detection at device level
- Independant PKI: HSM (certificates, secrets, keys,..) in central system and in the field
- No internet use between meters and DSO's
- Security monitoring
- Realtime security risk management
- Security sensitive information is kept offline

Security Counter Measures (2)

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- Dedicated secured deployment process from the supplier to the field
- Supplier audit
- Frequent pen testing
- Reduced number of identified system users
- Dedicated Luxmetering Security Officer
- Secrets shared between trusted internal staff
- Own user password policy
- Physical protection of all assets wherever possible
- Crisis handbook and collaboration with external staff for forensics and desaster recovery
- Cyber Risk insurance

„Let‘s keep the lights on, drive energymarkets into the next century, allowing for more sustainable energy policies“

Thank you for your attention

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