Regulatory Aspects of Smart Metering for the Gas Sector

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1. **Gas smart metering**
   - State of play in Europe
   - Features of gas smart metering (*vs* electricity)

2. **Experience in Italy with gas smart metering**
   - Requirements: functionality, interchangeability
   - Roll-out (and Covid-related issues)
   - Main issues of gas smart metering

3. **Phase-out of GSM/GPRS licensed communication**
   - Machine-to-machine SIM (mobile)
   - The issue of phase-out of GSM/GPRS

Gas smart metering

- **Last report of the European Commission**

*The picture appears to be quite different when assessing the situation for gas and electricity smart meters. While **three quarters** of Member States have adopted specific legal provisions for the roll-out of electricity smart meters, **only a quarter** of them has done so for the roll-out of gas smart meters*

European Commission, DG Energy, Alaton, C., Tounquet, F., **Benchmarking smart metering deployment in the EU-28 : final report**, Publications Office, 2020, https://data.europa.eu/doi/10.2833/492070

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- **Last report of the European Commission**

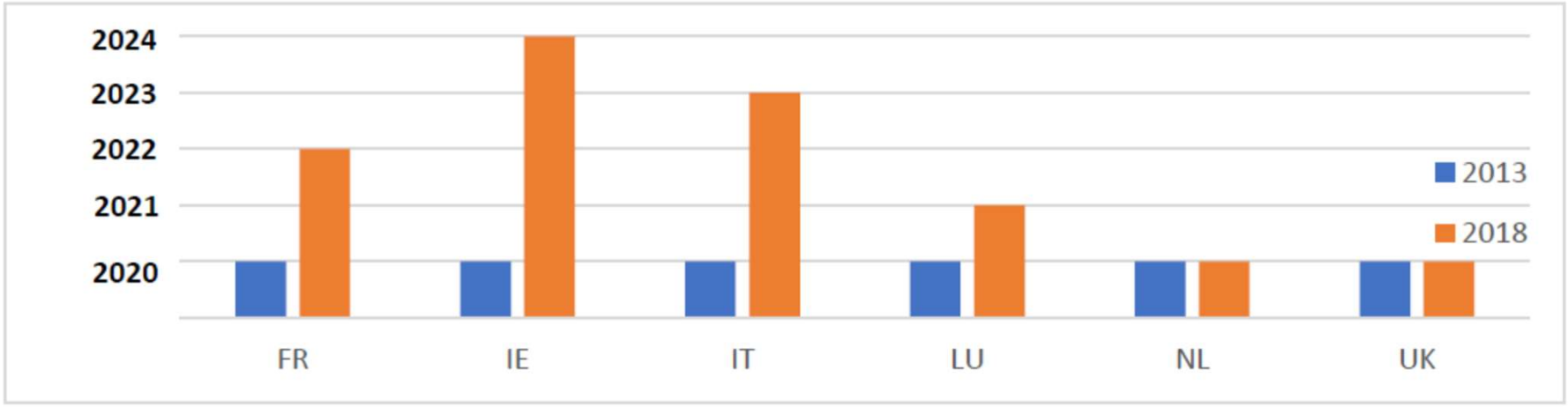

Figure 4: Overview of target period for a wide-scale rollout of gas smart meters for concerned Member State (data collection in 2018), compared to the initial targets set in the first benchmarking study[2] (data collection in 2013)

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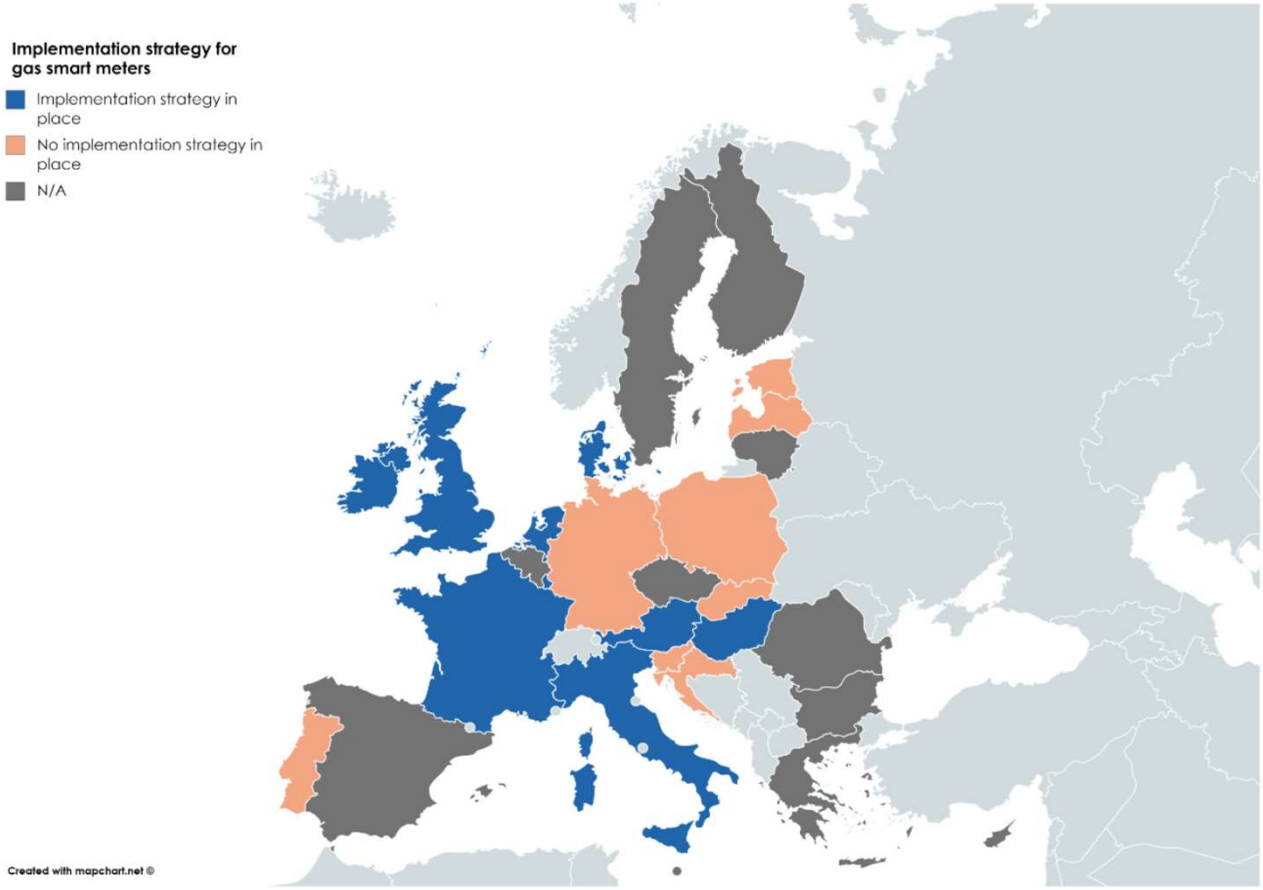

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Smart metering: electricity vs gas

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ELECTRICITY

- Meter is electricity-supplied
- Battery is required only for clock and supply interruption
- Power-line carrier (PLC) as a native communication channel
- No major safety issues for supply management
- Relevance of price changes during the day (ToU tariff)

GAS (G4-G6)

- Meter cannot be electricity supplied
- Battery is required for all kind of electronic operation
- Radio-based communication is needed
- Safety issues for de-activating and activating supply
- Changes during the day are not relevant for gas price

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Gas smart metering: mandatory requirements

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Functional requirements (regulatory decision 155/2008)

N	*Minimum Functional Requirements by Regulation*	>G6	≤G6
1	Temperature adjustment (temperature condition 15 c°)	YES	YES
2	Pressure adjustment (standard 1,01325 bar)	YES	NO
3	Electro -valve switch off available on meter	NO	YES
4	Metering Units' clock/calendar capable of managing seconds	3 min	5 min
5	Interval metering: 70 days capacity, saves minimum 6 monthly	1 hour	1 day
6	Self diagnostic checks	YES	YES
7	Display at the costumer's request	YES	YES
8	Remote up-dating of the meter's software	YES	YES
9	Information on real-time withdrawal at the costumer's request	Pulse emitter output	Physical or logical gate
10	Security and data protection: mechanisms to protect and monitor withdrawal registers	YES	YES

New functionalities under development / trial:
seismic alert/block; home gas safety

Gas smart metering: mandatory requirements

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Interoperability / interchangeability requirements

(regulatory decision 631/2013)

- Interoperability (eg: meter vs concentrator by different vendors)
- Interchangeability (eg: system by different DSOs)
- Gas distribution concession: new tenders, larger areas
- Need to avoid stranded investments at the change of operator
- Request to gas standardization body (CIG) for tecnical norms
- Suite UNI/TS 11021

Gas smart metering roll-out: regulatory guidelines

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Roll out according to volume per point (from higher to lower)

1.High volume meters (>G6)

- around 0.5 M points (total)
- mandatory for all DSOs
- roll-out started 2008
- almost completed **(>95%)**
- Gas volume smart-metered: around 14.5 Mmc (out of 15)
- Communication architecture: point-to-point (SIM-based)

2. Small volume meter (G4-G6)

- around 23 M points
- mandatory for DSOs >50k customers
- roll-out started 2013
- roll-out targets differentiated according to DSO size
- around **72%** (end-2020)
- Communication architecture: either point-to-point (SIM, GSM/GPRS) or via concentrators (RF 169 MHz)

Gas smart metering roll-out: regulatory targets and Covid effects

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G4 - G6 gas smart meters roll-out: targets according to DSO size									
DSO's size (customers served)	2015	2016	2017	2018	2019	2020	2021	2022	2023
LARGE >200 k customers	3%	15%	33%	50%	…	~~85%~~	85% due to Covid-19		
MIDDLE 100 k to 200 k cust.	-	3%	15%	33%	…	…	~~85%~~	85% due to Covid-19	
SMALL 50 k to 100 k cust.	-	-	-	8%	…	…	…	…	85%

Small gas DSOs (< 50K cust.) are not compelled (yet) to roll-out

Main issues of gas smart metering

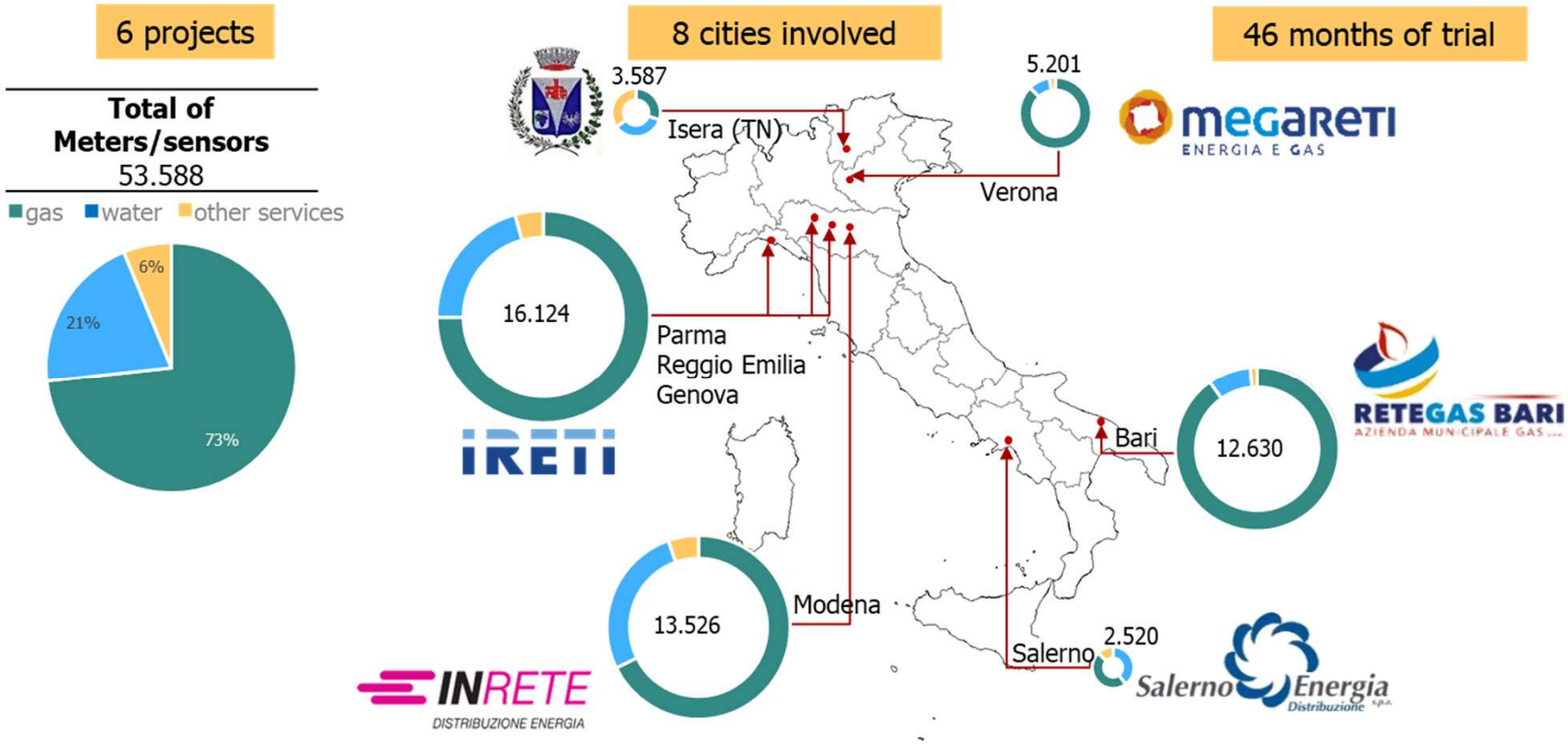
- **Different intensity in the use of battery according to comm.tech.**
  Gas meters are not energised like electricity meters; need for a safe and long-life energy source **(SIM-based licensed communication more energy demanding than RF 19 MHz not-licensed)**

- **Quality of service and use of battery**
  The **frequency of «awakening» of the meter** allows for more frequent readings and for timely download (customer management, security patch, etc.) but requires more intense usage of the battery. Thus, QoS regulatory standards do impact on the whole efficiency of the smart metering system

- **Safety issues**
  For the time being, in Italy **electro-valve is used only for closing** the gas supply (for handling non-payment cases, on supplier's request) but not (yet) for restarting supply, due to safety reasons.

Innovation: pilot projects (2014-18)

- **Sharing of RF 169 MHz communication system among different city services (even not regulated by ARERA)**



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Mobile connections «Machine-to-Machine» in Italy

Smart metering is one of most widespread application of M2M mobile connections

The issue of phase-out of GSM/GPRS

- **The choice of communication technologies is up to the gas DSOs**
  Point-to-point SIM: GSM/GPRS **(phase out!)** or LTE/NB-IoT **(recently)**;
  RF 169 MHz (Wmbus protocol) in architecture with concentrators

- **Embedded SIM in G4-G6 smart meters**
  almost all small gas meters **do not allow change of the modem**
  and most of them do not even allow change of the SIM

- **Large legacy of GSM/GPRS**
  Telco operators are free to maintain in operations GSM/GPRS
  but Telco operators will be **relieved from obligation** to do so from 30.06.22

- **Risk of stranded investments**
  To ensure **continuity of smart metering**, in case of (local) GSM/GPRS phase-out, a new meter has to be installed where DSO selected SIM-based communication (architecture point-to-point)

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