



Smart Meter

„Clean Energy for all Europeans - the role of regulators and active consumers”
Energy Community Regulatory School

1. Definitions / objectives / status in EU

2. Legal framework

3. Setting the scene

4. Monitoring and reporting

5. Advantages and conclusion

***Smart metering system** is an electronic system that is capable of measuring electricity fed into the grid or electricity consumed from the grid, providing more information than a conventional meter, and that is capable of transmitting and receiving data for information, monitoring and control purposes, using a form of electronic communication. (e-Directive 2019/944)*

Smart metering systems aim **to support retail markets** to fully deliver **benefits to consumers** and the electricity system through enabling **demand response, dynamic pricing competition, and other energy services** to evolve.

They have a key role promoting **energy efficiency and empowering final customers**, in particular with regard to their interaction with consumer energy management systems and smart grids.

“The Clean Energy Package, Meeus and Nouicer, 2019”

Smart metering in EU - Status

Study “Benchmarking smart metering deployment in the EU-28”

<https://ec.europa.eu/energy/studies/benchmarking-smart-metering-deployment-eu-28>

- close to 225 million smart meters for electricity and 51 million for gas will be rolled out in the EU by 2024. This represents a potential investment of €47 billion
- by 2024, it is expected that almost 77% of European consumers will have a smart meter for electricity. About 44% will have one for gas
- the cost of installing a smart meter in the EU is on average between €180 and €200
- on average, smart meters provide savings of €230 for gas and €270 for electricity per metering point (distributed amongst consumers, suppliers, distribution system operators, etc.) as well as an average energy saving of at least 2% and as high as 10% based on data coming from pilot projects.

Target period for a wide-scale rollout of electricity smart meters

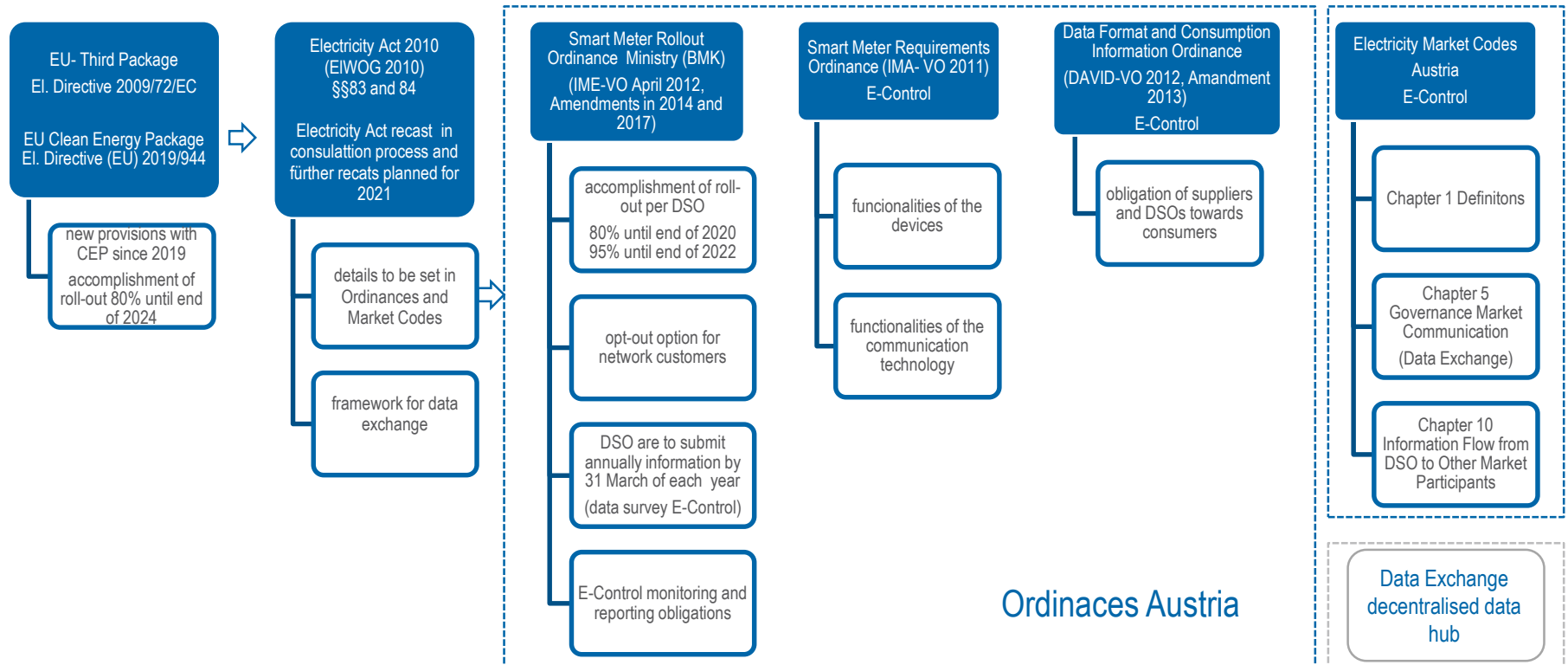
- < 2020
- 2020
- 2021 - 2025
- 2026 - 2030
- > 2030 or undefined



Overview of target period for a wide-scale rollout of electricity smart meters with at least 80 % of all consumers for each Member State.

Legal framework regarding smart metering

from European Union to national legislation and market codes in Austria



Ordinaces Austria

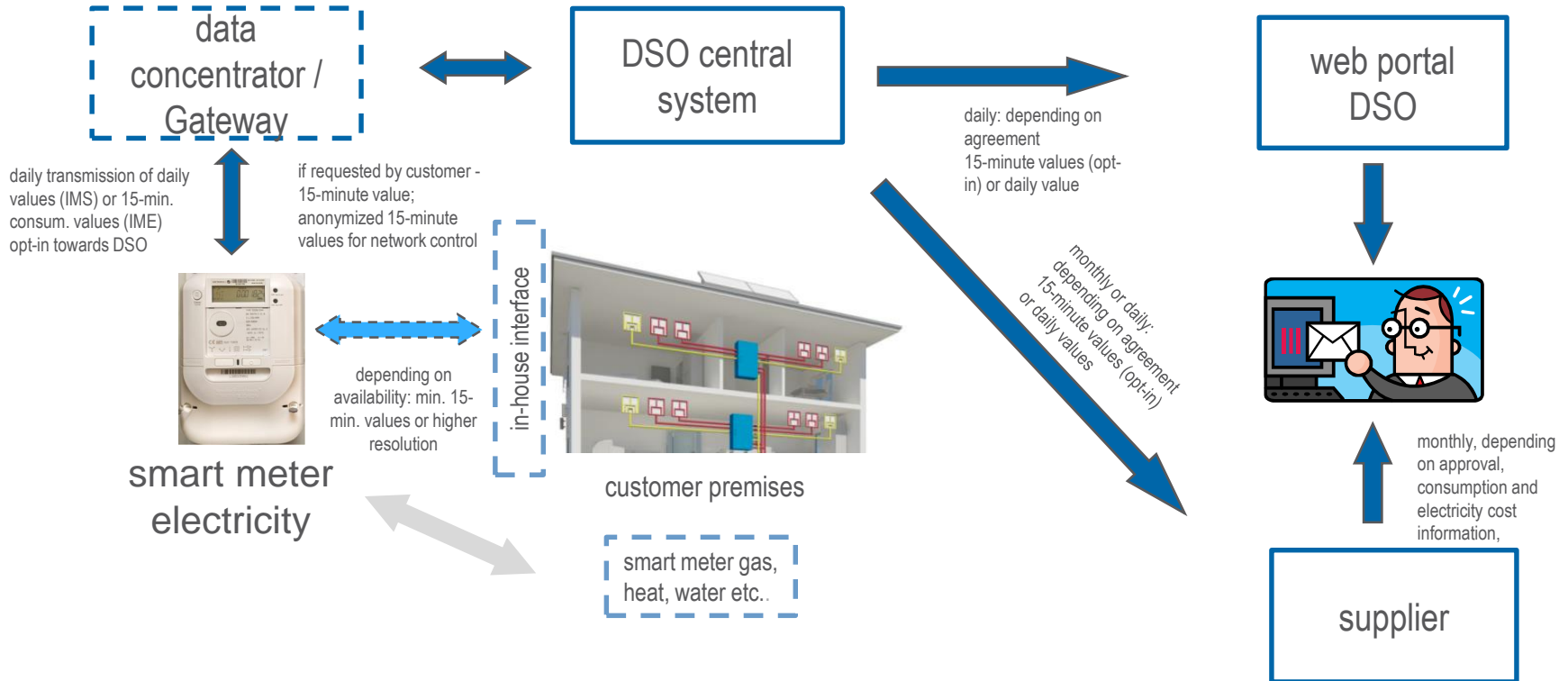
- Depending on the meter configuration and upon customer consent, the following functionalities are to be available:
 - reading of 15-min. consumption values (opt-in. IME*) or daily consumption values (IMS**), memory for 60 days,
 - daily data transfer from smart meter to DSO (and web portal of customer) and from DSO to supplier,
 - opt-out (DSZ*** only): reading, memory and data transfer only for billing purposes allowed.
- Upon his/her wish, a customer is to be equipped with a smart meter within 6 months.
- DSOs are allowed to collect anonymous 15-min. consumption values for network control.
- Smart meter devices should have:
 - 4 interfaces for connection to other metering devices (gas, water, heat...),
 - In-house interface for the communication with customer devices.
- Fulfilment of data protection and security provisions.
- Customer information (web portal, consumption information),
- DSOs reporting obligations (roll-out plans and deployment progress) towards the Ministry (BMK) and E-Control.
- Annual reporting and monitoring obligations of E-Control.

*IME – intelligent meter in extended configuration; **IMS – intelligent metering device in standard configuration

***DSZ – digital electricity meter

Information flow is precisely regulated

Electricity Act, Ordinances, Electricity Market Codes, Technical Documentation www.eutilities.at



Setting the scene

DSO landscape in Austria is very inhomogeneous

- 123 distribution system operators (DSO),
- 6.24 million metering points to be equipped with smart meters, with < 0.4% of metering points on network level 6,
- number of metering points per DSO varies between <10 and 1.57 million:
 - one half of all DSOs operates only low voltage level grid and have altogether less than 50.000 metering points,
 - small DSOs are usually only secondary business (cooperative societies, municipalities, small businesses), therefore with extremely low level of digitalisation,
 - only 16 DSOs have more than 50.000 metering points,
 - 6 DSOs have more than 500.000 metering points,
- most of DSOs cover rural areas and connecting 44% of all metering points to their grid, DSOs in urban area are responsible for 36% customers, the other DSOs cover both rural and urban areas.

Implementation of smart metering systems

Fields of work DSO

- Technology assessment
- Public tenders for devices and communication technology
- IT tasks including internal system preparation for data management including data exchange with other parties
- Provision of data security and data privacy policy issues
- Raise of smart meter acceptance by customers
- Installation of smart meter devices at customers premises
- Testing and proper and reliable operation of the whole new smart metering system

Reporting

- Tool for data collection
- Tool for data analysis
- Annual reports regarding progress of smart meter installation
- Exchange with stakeholders (Chamber of Labour, Federal Office of Metrology and Surveying, Association of the electrical and electronics industry, Austrian Regulatory Authority for Broadcasting and Telecommunications....)

Monitoring and evaluation

- continuous assessment of legal framework and report on required amendments,
- rules for data exchange between market participants (DSOs, suppliers, customers)
- suppliers issues
- Hotline & Dispute Settlement (customer issues)
- Evaluation of information on DSO websites

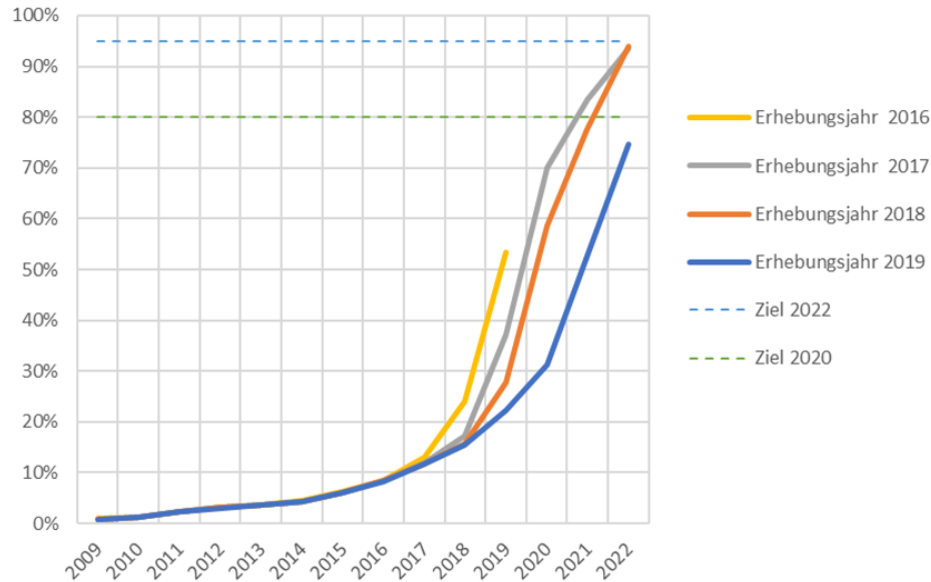
Supportive activities

- Raise of acceptance by customers through various public relations activities
- flyers and leaflets
- Website information: www.frag.e-control.at
- FAQ

Roll- Out Status in Austria

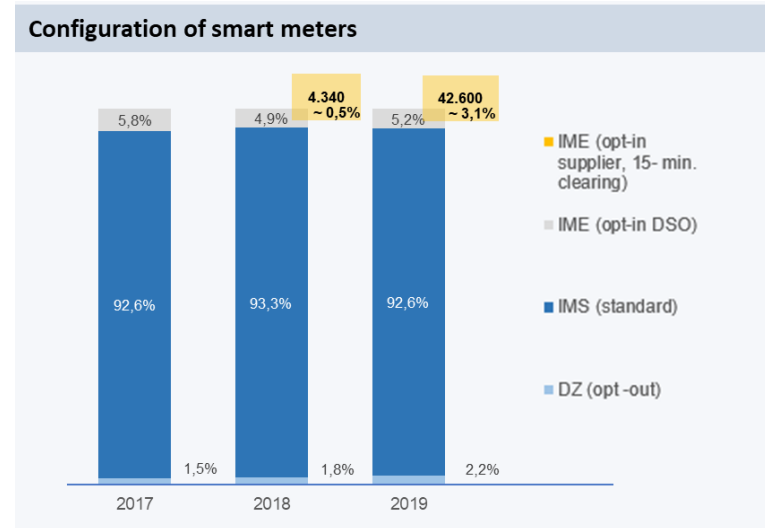
The targets set in the Ordinance IME-VO are not to be reached within deadline.

Comparison of cumulated degrees of roll-out in reports for 2016, 2017, 2018, 2019 compared to binding national set targets



Smart Meter Roll-Out Report Austria,
<https://www.e-control.at/marktteilnehmer/strom/smart-metering/monitoring>

Number of installed smart meter devices in 2019: 1,4 Mio. (22.2%)



End of 2019, 72.900 (5.2%) metering points were equipped with smart meters for which 15-min. consumption values are read and transmitted to DSO; for more than half of these, 15-min. consumption values are being transmitted also to supplier.

Communication Technology

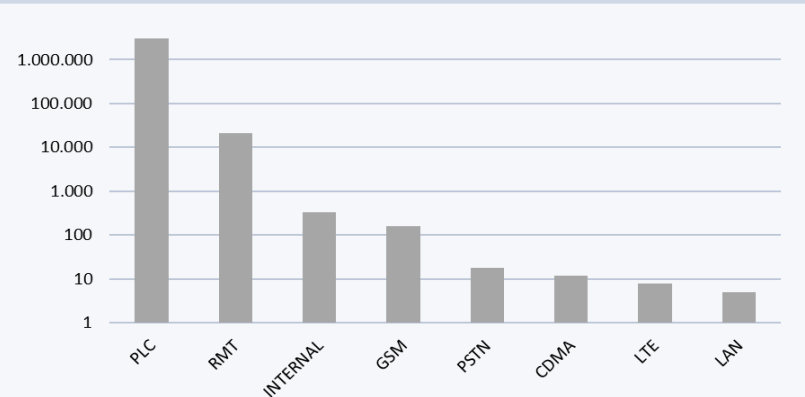
In more than 95% of cases PLC technology

there are 92,600 data collectors receiving data from 3.1 million smart meters and transmitting them to corresponding DSO central systems:

- > 99% metering devices use PLC technology (powerline communication) to data collectors.
- > from data collectors to central systems in 90% of cases wireless mobile communication (public communication networks).

only around 130.000 (4%). smart meters use mobile public networks to communicate directly with DSO DSO systems

Transmission technology smart meter - data collector
[no. of metering points in logarithmic scale]



Source: E-Control

CDMA	Code Division Multiple Access
GSM	Global System for Mobile Communications
Internal	DSO internal communication network
LAN	Local Area Network
LTE	Long Term Evolution (LTE, also 3.9G) or LTE-Advanced or 4G
PLC	Powerline Communication
PSTN	Public Switched Telephone Network
RMT	Radio Mesh Technology

- cost optimization through new pricing models,
 - elimination of the estimated consumption in billing and aliquot prescription based on the previous year's consumption, thus avoiding additional payments or excessive advance payments,
 - no more uncertainty in billing, even if the consumption pattern or the annual average temperature changes,
 - possibility to remote meter readings at any time (e.g. in the course of a change of supplier or new registrations), and the resulting increased billing quality,
 - automation of processes, e.g. in the course of supplier change and increases in service quality.
- enhanced possibility to support renewables integration
 - participation in the electricity market as prosumer or through renewable energy communities, citizens' communities, aggregators
 - participation in the balancing reserve market,
 - power quality,
 - grid tariffs: cause-based cost sharing,
 - Integration of e-mobility.



- accurate forecasting of future energy consumption - this reduces the balancing energy risk and achieves non-discriminatory equality of all suppliers,
- possibility to offer new energy tariff models to customers and thus act in an innovative and more customer-friendly way,
- by offering suitable energy tariffs (peak load / base load), consumption peaks can be shifted and thus economic advantages generated,
- potential to improve the offers and thus increase the competitiveness.

- Increasing the efficiency of network operations,
- Improvements in network planning and network control,
- Possibility of automatic power limitation,
- Failure management with identification of customer installations affected by failures and targeted efficient fault elimination,
- Possibility of monitoring and evaluating the voltage quality characteristics (current) recorded by the system,
- Support of the integration of decentralized generation plants (electricity),
- Individual load profile measurement,
- Shifting of consumption peaks and equalization of the network load through tariff incentives for customers,
- knowledge of the actual amount of energy delivered, e.g. for the exact determination of network losses.

The deployment of smart meters is one of the main pillars of new digitalized electricity market. Without full roll-out and proper functioning of the smart metering systems, the system cannot further develop.

The required and aimed transformation of the existing energy system is a major challenge for all parties involved and can only be successfully achieved through active cooperation between relevant market participants, especially DSOs and suppliers, the regulatory authority and the legislator.

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