bridge
HORIZON 2020

Reference architecture for cross-border and cross-sector energy data exchange

Kalle Kukk, Elering

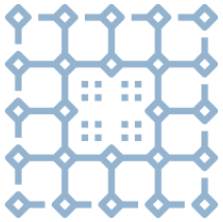
NGIoT Thematic workshop series on IoT and Edge Computing: Energy

18th May 2021

These initiatives are funded by

The areas of BRIDGE projects

This cooperation group involves projects in the areas of



Smart Grids

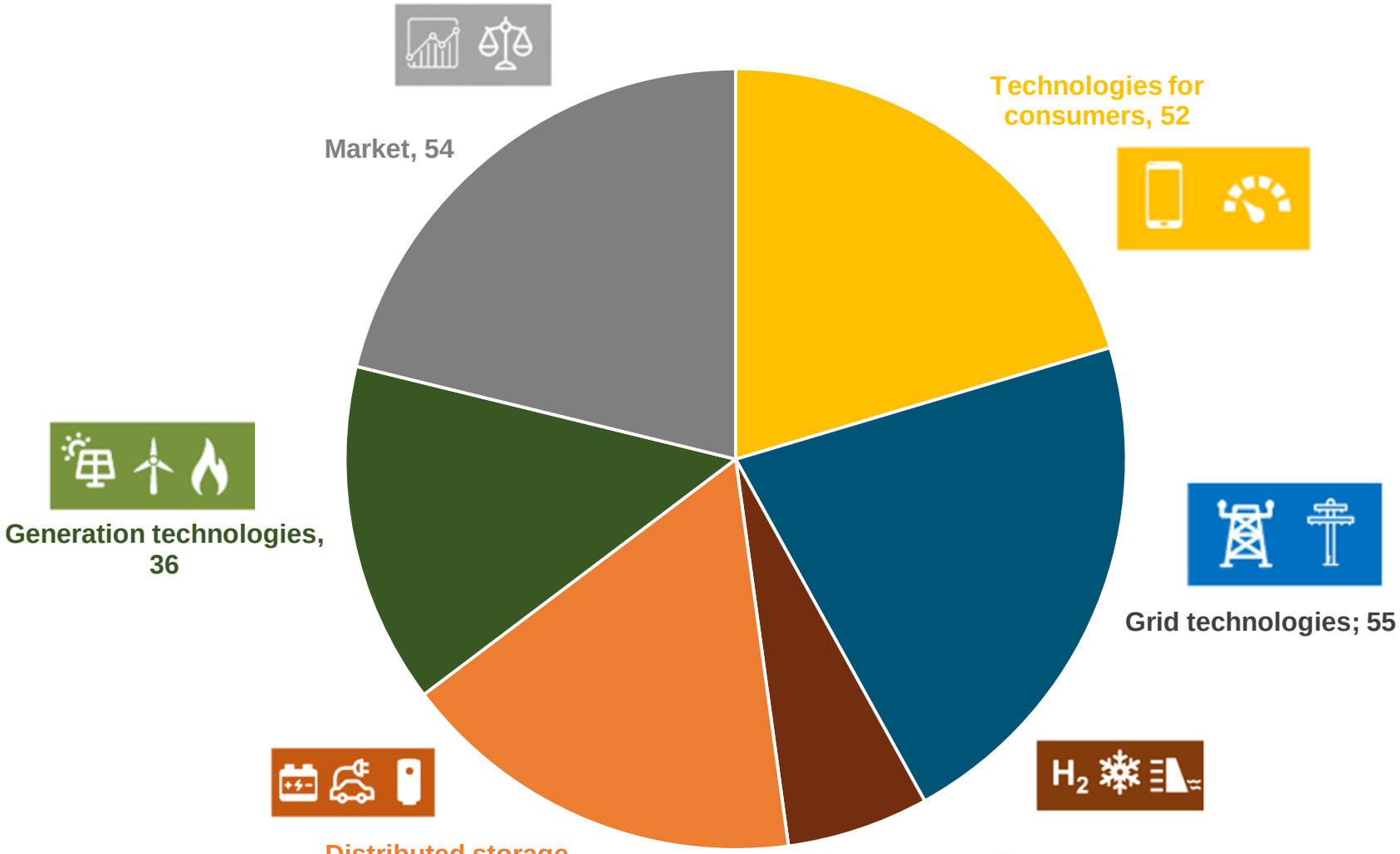
Energy Storage

Islands

Digitalisation

These projects were funded under the Horizon 2020 programme over the past 6 years (2014-2020).

Technologies tackled by BRIDGE projects

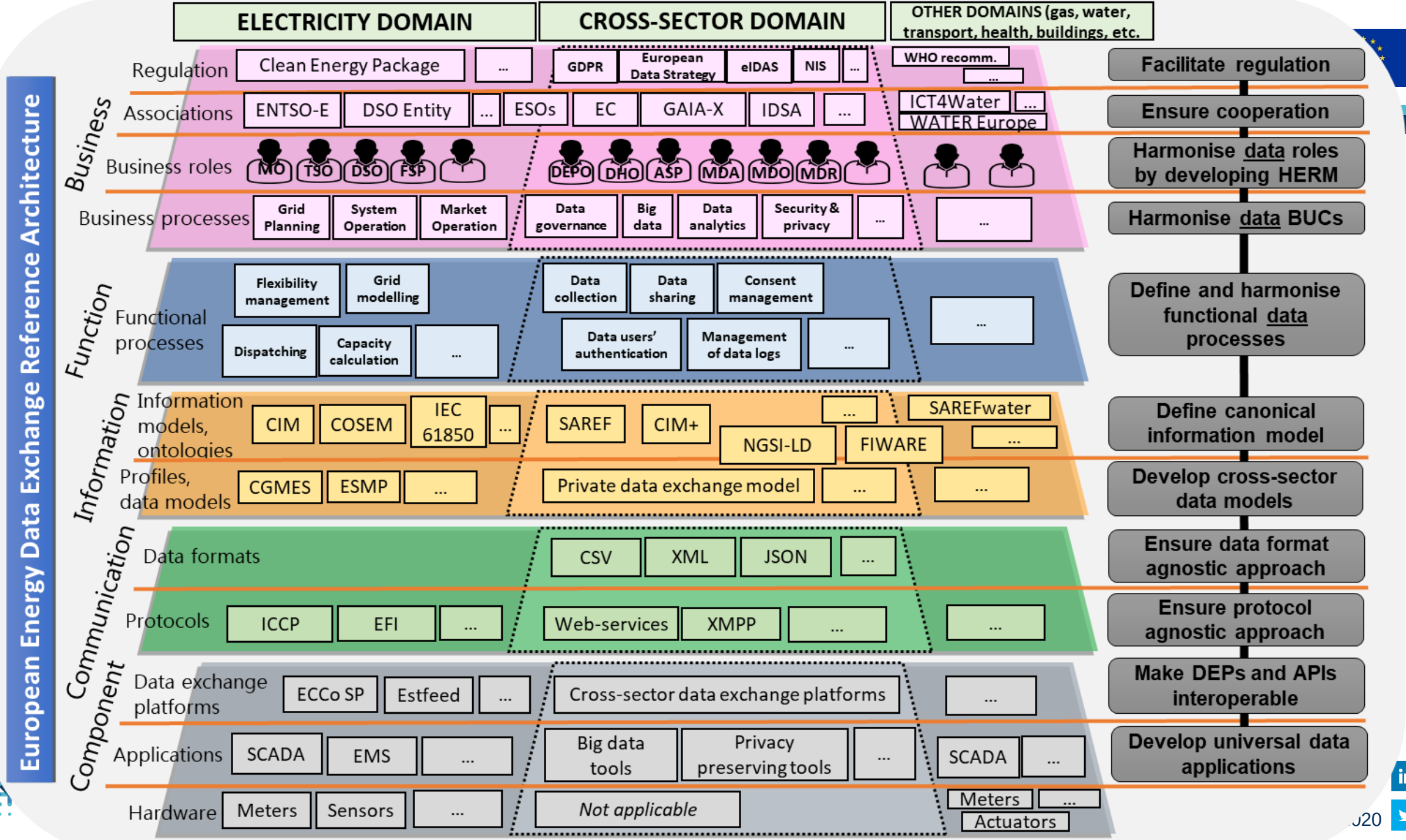


European Energy Data Exchange Reference Architecture

- Horizon2020 smart grid projects under the umbrella of BRIDGE Initiative have investigated the usage of Data Exchange Platforms/Solutions and interoperability of those platforms/solutions.

- BRIDGE study makes recommendations for business process agnostic data exchange reference architecture in the energy domain.

- It should facilitate cross-sector and cross-border data exchange on European level in order to ensure free flow of data between any stakeholders while respecting data privacy.


European Energy Data Exchange Reference Architecture
ELECTRICITY DOMAIN
CROSS-SECTOR DOMAIN
OTHER DOMAINS (gas, water, transport, health, buildings, etc.
Business
Regulation
Clean Energy Package
...
GDPR
European Data Strategy
eIDAS
NIS
...
WHO recomm.
...
Associations
ENTSO-E
DSO Entity
...
ESOs
EC
GAIA-X
IDSA
...
ICT4Water
...
WATER Europe
Business roles
MO
TSO
DSO
FSP
DEPO
DHO
ASP
MDA
MDO
MDR
Business processes
Grid Planning
System Operation
Market Operation
Data governance
Big data
Data analytics
Security & privacy
...
...
Function
Functional processes
Flexibility management
Grid modelling
Dispatching
Capacity calculation
...
Data collection
Data sharing
Consent management
Data users' authentication
Management of data logs
...
...
Information
Information models, ontologies
CIM
COSEM
IEC 61850
...
SAREF
CIM+
...
NGSI-LD
FIWARE
SAREFwater
...
Profiles, data models
CGMES
ESMP
...
Private data exchange model
...
...
Communication
Data formats
CSV
XML
JSON
...
Protocols
ICCP
EFI
...
Web-services
XMPP
...
...
Component
Data exchange platforms
ECCo SP
Estfeed
...
Cross-sector data exchange platforms
...
Applications
SCADA
EMS
...
Big data tools
Privacy preserving tools
...
SCADA
...
Hardware
Meters
Sensors
...
Not applicable
Meters
...
Actuators
Facilitate regulation
Ensure cooperation
Harmonise data roles by developing HERM
Harmonise data BUCs
Define and harmonise functional data processes
Define canonical information model
Develop cross-sector data models
Ensure data format agnostic approach
Ensure protocol agnostic approach
Make DEPs and APIs interoperable
Develop universal data applications

Recommendations 1/5: General

- Leverage **Smart Grid Architecture Model** (SGAM) usage and study its extension to other sectors.
- Facilitate **regulation for cross-sector exchange** of any type of both private data and public data, e.g. through the means of regulation for data spaces and data interoperability implementing acts.
- Ensure **cooperation** between appropriate associations to work on cross-sector and cross-border data management.

Recommendations 2/5: Processes and solutions

- Harmonise the development and content of **data exchange business use cases** for cross-sector domain.
- Define and harmonise **functional data processes** for cross-sector domain.
- Make DEPs (**Data Exchange Platforms**) interoperable by developing APIs (Application Programming Interfaces) which enable for data providers and data users easy connection to any European DEP but also create the possibility whereby connecting to one DEP ensures data exchange with any other stakeholder in Europe.
- Develop universal **data applications** which can serve any domain.

Recommendations 3/5: Data modelling and communication

- Define **canonical data model** facilitating cross-sector data exchange, e.g. by extending Common Information Model (CIM) and/or integrating other sectors' canonical data models with CIM. Study the benefit to use **ontologies** to support cross-sector interactions.
- Develop cross-sector **data models and profiles**.
- Ensure **protocol** agnostic approach to cross-sector data exchange.
- Ensure **data format** agnostic approach to cross-sector data exchange.

Recommendations 4/5: Models for data roles

- Propose to ENTSO-E, ebIX and EFET **new roles** and classes to be included and definitions to be adapted in existing HEMRM. Develop mechanism for proposing new roles by BRIDGE projects.
- **Harmonise data roles** across electricity and other energy domains by developing HERM – Harmonised Energy Role Model. Look for consistency with other domains outside energy based on this HERM – cross-sectoral roles.
- Create a central **repository for roles** used by BRIDGE (and other) projects as part of ‘Use Case Repository’ and/or ‘CIM repository’.

Recommendations 5/5: CIM governance

- Set up and manage a **CIM repository** for BRIDGE projects and beyond.
- Set up a **European CIM User Group** and eventually a Smart Energy Standard User Group.
- Define the strategy to **disseminate** advantages and benefits that CIM usage provides as well as develop a systematic approach in provision of **education** and consulting to all interested parties across Europe.
- Make **CIM UML model(s) and associated profiles** available following a clear procedure.

Thank you for your participation!

connect ● share ● learn

bridge

@H2020_bridge

@bridge_H2020

www.h2020-bridge.eu

This initiative is funded by the