Co-funded by
the European Union

INSIEME

TOGETHER TOWARDS THE COMMON
EUROPEAN ENERGY DATA SPACE

WHITE PAPER

Interim Enterprise Architecture for a Common European Energy Data Space

State of play and the path to implementation

15 October 2026

This work has been co-funded by
the European Union's Digital Europe Programme.

About

Authors and contributors

Georg Hartner, Oliver Hödl, Benjamin Ellmer, Menno Kroes, Niklas Notstrand, Tomé Ferreira, Mihaela Weideskog, Florian Weingartshofer, Dragos-Constantin Stoica, Ferdinando Bosco, Matthias Maldet, Hubert Dupin, Yvonne Ruwaida, Laurent Schmitt and Witold Krasny.

Scope and publication status

This public white paper explains INSIEME's interim architecture for the Common European Energy Data Space. It is a standalone publication for discussion and does not replace the controlled architecture baseline. Proposed services, roles and implementation choices remain subject to validation, appropriate mandates and the applicable legal framework.

Published on 15 October 2026 by the INSIEME consortium.

https://www.insieme.energy

DOI: 10.5281/zenodo.23799259

Funding and disclaimer

This work has been co-funded by the European Union's Digital Europe Programme under grant agreement No. 101194952. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the granting authority. Neither the European Union nor the granting authority can be held responsible for them.

The information in this document is provided "as is", and no guarantee or warranty is given that it is fit for any particular purpose. The INSIEME consortium members shall have no liability for damages of any kind, including direct, special, indirect or consequential damages resulting from the use of these materials, subject to any liability mandatory under applicable law.

Copyright

This work is licensed under CC BY-SA 4.0. To view a copy of this license, visit https://creativecommons.org/licenses/by-sa/4.0

How to cite

Hartner G., Hödl O., Ellmer B., Kroes M., Notstrand N., Ferreira T., Weideskog M., Weingartshofer F., Stoica D.-C., Bosco F., Maldet M., Dupin H., Ruwaida Y., Schmitt L., Krasny W. (2026) Interim Enterprise Architecture for a Common European Energy Data Space. INSIEME consortium. https://doi.org/10.5281/zenodo.23799259

Preface

Europe's energy transition depends on people and organisations being able to use reliable information across institutional and national boundaries. Households need practical control over access to their energy data. Public authorities and businesses need clear accountability, while service providers and network operators need compatible ways to work together.

INSIEME aims to make energy data integrations reusable across national markets and interoperable with other sectors. The objective is to let providers devote more effort to useful services and less to repeated integration work. This white paper explains the architecture supporting that ambition which is based on the deliverable D2.2 Interim CEEDS Architecture. [1]

An enterprise architecture is a shared plan for how responsibilities, services and information fit together. During its first 18 months, the INSIEME architecture team developed a repository of more than 1,200 pages using the TOGAF methodology. [1, 17] This paper presents the interim design and explains how existing systems could cooperate across Europe while retaining their lawful responsibilities.

The intended readers are policymakers, public authorities, application developers, energy-service providers and others interested in European energy-data cooperation. The paper sets out – at a high level - the principles, functional building blocks, shared services and governance. It explains how regulated information services and voluntary data sharing fit together, and why different exchanges require different standards. The annex preserves the controlled procedure families for readers who need to trace the design to its implementation detail.

This remains an interim architecture. Some functions derive from adopted European legislation; others are working models for development and validation. A service described here is not necessarily available across Europe, and its inclusion creates no new legal obligation. The definitions page separates INSIEME terminology from the requirements of EU law.

The controlled architecture cited in reference [1] remains the source for detailed procedure definitions and supporting evidence. This white paper makes that work accessible for discussion and invites feedback from European institutions, national actors, service providers and neighbouring data-space initiatives.

The practical priority is to agree responsibilities and common rules, demonstrate complete service journeys across independent implementations, and use the results to guide wider deployment.

Definitions and European legal context

This white paper uses three related terms at different levels. The definitions retain INSIEME terminology while distinguishing EU legal requirements, European policy objectives and the project's architectural contribution.

Data space

An interoperable framework based on shared governance, standards and enabling services for trusted data exchange and reuse. This is INSIEME's working definition. Article 33(1) of the Data Act, Regulation (EU) 2023/2854, sets interoperability requirements for participants offering data or data services to other participants. They must describe datasets and relevant use conditions; describe structures, formats and vocabularies consistently; document access mechanisms and service terms; and, where applicable, enable interoperability of tools that automate data-sharing agreements. Article 33 does not prescribe one universal architecture or technology. [8, 35]

Common European data space

A data space with European scope for a sector, policy purpose or cross-sector activity, operating under European rules and values. Data Act Article 33(1) and Article 30(h) of the Data Governance Act, Regulation (EU) 2022/868, characterise these spaces as interoperable frameworks with common standards and practices for sharing or jointly processing data. Commission policy adds common infrastructures and governance, trustworthy participation and fair access conditions. "Common" does not make all data public, free of charge or centrally stored; applicable access and usage rights remain in force. [8, 13, 36]

Common European Energy Data Space

CEEDS is the European initiative for trusted exchange and use of energy data across organisations and national borders. INSIEME contributes a governed federation of actors, rules, reference models and interoperable services connecting independently operated systems. Common roles, semantics, procedures and interfaces make exchanges executable, observable and testable, while authoritative sources and responsible actors retain their lawful duties. The present architectural focus is electricity, with interfaces to mobility, buildings and other sectors. CEEDS extends beyond INSIEME; its name does not itself appoint an operational entity, national facilitator or statutory authority. [1, 2, 36]

Legal safeguards and alignment across sectors

Horizontal data law operates alongside energy-specific duties. Directive (EU) 2019/944 Articles 23–24 address electricity-data management, access and interoperability; Implementing Regulation (EU) 2023/1162 sets the metering and consumption-data reference model and responsibilities. Personal-data processing requires an applicable basis under GDPR Article 6 and compliance with its other safeguards. Technical permission or participation in CEEDS is not, by itself, that legal basis. [4, 5, 9]

In INSIEME's assessment, operational definitions across the Common European Data Spaces initiative are not yet consistently aligned for cross-sector use. The shared legal descriptions provide a starting point, but detailed roles, governance arrangements and implementation boundaries still need explicit alignment. This is the proposed focus of the DG CONNECT engagement in chapter 8. [8, 13, 36]

Key architectural terms

The following terms describe the proposed architecture. Their use does not change responsibilities assigned by EU or national law.

Federation. Cooperation between independently operated systems through agreed rules and compatible services, while their operators retain responsibility for those systems. [1]

Enterprise architecture. A shared plan connecting objectives, responsibilities, procedures, information and services, used to guide organisational decisions and technology design. [1]

Governance framework. The rules and decision-making arrangements for participation, accountability, access, changes and disputes. A rulebook records these arrangements and the responsibilities of participants. [35]

Interoperability. The ability of organisations and systems to work together and exchange information that they can use correctly. It requires legal, organisational, semantic and technical compatibility. [10]

Data sharing. Making data available for use by others under an agreement or an applicable legal requirement. Sharing may be free or paid and remains subject to relevant rights and safeguards. [13]

Reference model. A common description of roles, information and procedural steps for an activity. Its legal status depends on its source. [1, 5]

Functional building block. A group of capabilities supporting an energy activity, such as access to metering data or energy sharing. It describes what the architecture must enable. [1]

CEEDS shared services. Reusable services supporting several functional building blocks, such as participant checks, shared definitions and procedure coordination. INSIEME identifies eight, labelled S1 to S8. [1]

NDSF — National Data Space Facilitator. A proposed coordination role linking CEEDS with national institutions and systems. Its mandate, accountable organisation and responsibilities should be specified for each national use case; the label does not itself confer regulatory or acceptance authority. [1]

Digital Customer Interface. The customer-facing capability for the establishment and maintenance of trusted and close-to-real time data exchange with system operators and market actors. The definition doesn't presume the existence of a single or multiple DCIs operated by final customers. [1, 9]

Contents

Preface ... 3

Definitions and European legal context ... 4

Key architectural terms ... 5

1 Purpose and public value ... 7

2 From policy to architecture ... 9

3 Principles for a shared system ... 12

4 Shared services behind the functions ... 13

5 The functions CEEDS supports ... 15

6 Standards for the right exchange ... 16

7 Governance and accountability ... 18

8 Interim status and next steps ... 19

9 References ... 20

Annex A Functional building blocks and procedures ... 23

A1 Metering and consumption data ... 23

A2 Basic master data ... 24

A3 Implicit flexibility signals ... 24

A4 Customer switching ... 24

A5 Collective energy sharing ... 25

A6 Flexible connection agreements ... 26

A7 Demand response ... 26

A8 S7 regulated reference models ... 27

A9 Generic data sharing ... 30

1 Purpose and public value

INSIEME's contribution to the Common European Energy Data Space aims to help energy applications and services scale across Europe. Common interfaces, information models and reusable procedures should allow providers to enter additional national markets without rebuilding every integration. Customers would gain greater choice and more accessible services while retaining control over access to their data. The proposed federation connects existing national and sector systems, preserving source responsibility and lawful national arrangements. [1]

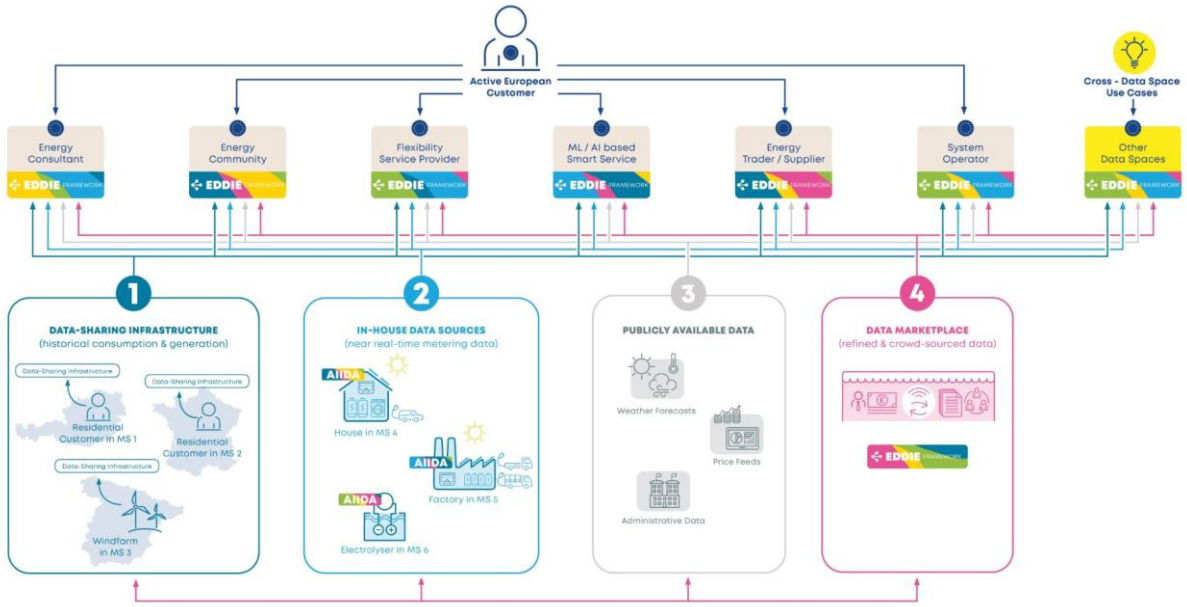

Figure 1. EDDIE's Active European Customer and the four data challenges supporting services across Europe [41].

Four data challenges and cross-sector interoperability

Useful services need to combine four complementary capabilities: access to historical consumption and generation data across national data-sharing infrastructures; secure access to near-real-time in-house metering and equipment data; reuse of publicly available information such as weather forecasts and price feeds; and access to refined data and services through a data marketplace. Figure 1 shows how these four challenges support different providers serving the same active customer.

Cross-sector interoperability extends this value to buildings, mobility, industry, and other data spaces. Agreed meanings, identifiers, access conditions and compatible interfaces should allow energy data to be combined with relevant information from those sectors. Each exchange must preserve its purpose, customer permissions where required, and the responsibilities of its sources. [1, 8, 35]

Standardisation can reduce systemic costs by avoiding repeated integration, mapping, and validation of work across organisations and countries. Reusable interfaces, procedures and interoperability tests can lower market-entry costs and shorten time to market for startups and established providers. Draghi's report on the future of European competitiveness identifies Single Market fragmentation as a barrier to innovative firms scaling in Europe. INSIEME's proposed contribution is to reduce energy-data fragmentation through common, reusable capabilities. [39 pp. 29–30]

Applications and services delivering public value

Energy efficiency applications. Historical data establish consumption patterns; near-real-time data reveal avoidable use and help assess improvements. Public weather and building information provide context, while refined datasets and analytical services can support forecasting and recommendations. Connecting energy and building information across sectors helps providers reuse these applications across countries. [1, 41]

Energy community platforms and energy sharing. A "write once, run anywhere" ambition means reusing application logic and energy data integrations across European markets. Historical and near-real-time data support allocation, monitoring and member services; public price information and reusable forecasting services add context. Common interfaces should allow national participation, allocation, and settlement rules to be handled through defined configurations and mappings. Cross-sector links can connect community services with building management and local mobility. [1, 41]

Demand-response solutions. EU-wide interoperable data exchange should enable providers to combine authorised customer data and flexible-resource information with market signals, grid constraints and verification processes. The four data challenges supply historical baselines, timely measurements, public system and price information, and reusable forecasting or other data services. Cross-sector interoperability can connect flexibility in buildings, heating and industrial processes, enabling new solutions to scale across providers and national systems. [1, 7, 41]

Smart and bidirectional charging and vehicle-to-grid (V2G). These capabilities are outside the INSIEME project scope but illustrate a possible future connection between the energy and mobility sectors. Historical patterns, timely vehicle and charging data, public price and grid information, and forecasting services could support charging schedules and bidirectional energy flows. Delivery would depend on vehicle availability, customer needs, permissions, equipment interfaces and safe grid operation. The D4E, Sustainable Transport Forum and Coalition of the Willing work provides relevant expert input for this future perspective. [7, 40]

AI foundation models and energy services. Common interfaces, shared semantics and governed access could make historical, near-real-time, public and refined energy data more consistently usable across Europe. This would support the development, adaptation and validation of foundation models and other AI-based energy services across countries and market actors. Data quality, lawful processing and the conditions attached to each use remain essential. The Commission's work on novel energy AI applications identifies energy data spaces and harmonised standards as relevant enablers. [34]

The proposed architecture should also support connections to European computing infrastructures and service providers, including EuroHPC AI Factories, emerging AI Gigafactories and cloud services. The Commission's energy roadmap and AI Continent Action Plan provide the policy context. Access for model development, training or validation and the continuous hosting of an operational service have different requirements; an allocation of computing resources should not be treated as a guarantee of long-term hosting. [3, 15]

2 From policy to architecture

European energy and data policies establish the motivation for cooperation and the constraints within which it must operate. The 2022 energy digitalisation action plan and the 2026 digitalisation roadmap support the development of interoperable energy data arrangements. INSIEME translates that direction into a proposed operating design. [2, 3]

Legal status of the sources

Directive (EU) 2019/944 provides the electricity-data management and interoperability framework in Articles 23 and 24. Implementing Regulation (EU) 2023/1162 specifies requirements and procedures for access to metering and consumption data. Implementing Regulation (EU) 2026/855 addresses data required for customer switching; Article 3 applies from 31 December 2026. These instruments are adopted by EU legislation, subject to their respective application dates. Project working models are non-binding design proposals for development and validation. [4-6]

The joint recommendations involving the Smart Energy Expert Group's Data for Energy Group (D4E) and the Sustainable Transport Forum (STF) provide expert input on data exchange for demand-side flexibility. They inform the architecture but do not create binding obligations. INSIEME's choice of eight shared services is a project design decision. [7]

Traceability from policy to design

A policy trace connects a source to the design choice it motivates, the intended outcome, the responsible actors and the evidence needed to assess it. Figure 2 distinguishes the energy-data interoperability stream from the electricity-system operation stream. Both call for common meaning, dependable procedures and clear governance. INSIEME translates these requirements into functional building blocks supported by shared services S1–S8 and the Digital Customer Interface. [1]

The Data Act and the General Data Protection Regulation add cross-cutting requirements. In particular, technical permission to access information does not replace an applicable lawful basis for processing personal data. The responsible organisations must determine the rules that apply to the actual activity. [8, 9]

Legal, organisational, semantic, and technical compatibility in all matters. In everyday terms, organisations need a lawful route, agreed responsibilities, the same understanding of the information, and systems that can exchange it reliably. The European Interoperability Framework provides this useful four-part perspective. [10]

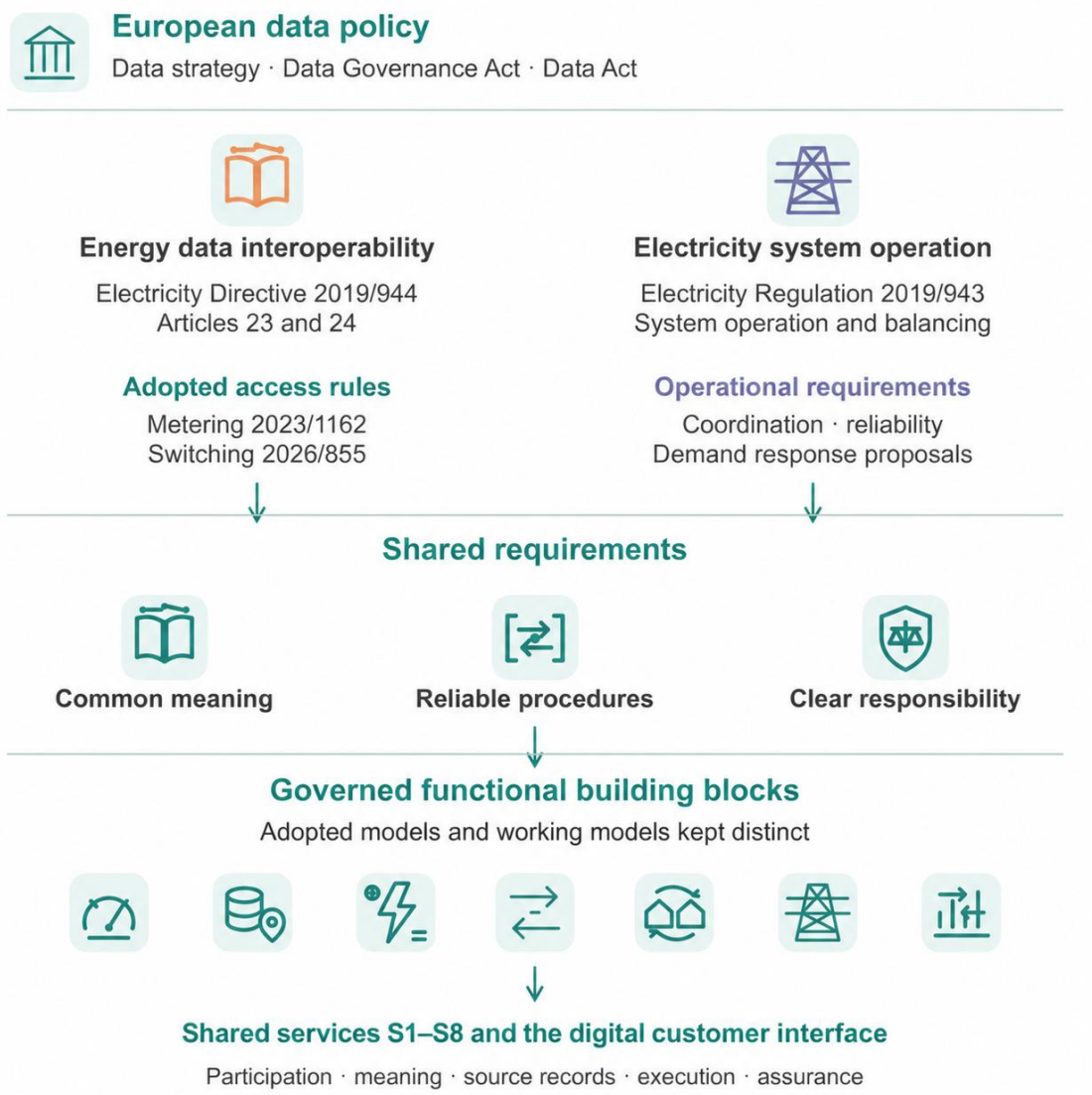

Figure 2. Policy-to-architecture traceability across the energy-data and electricity-system operation streams.

Article 24 and implementing regulations

Article 24(2) of the Electricity Directive (EU) 2019/944 provides the route for common interoperability requirements and transparent, non-discriminatory requirements and procedures implied by Article 23(1). Under paragraphs 1 and 3, Member States must facilitate energy-service interoperability and ensure that electricity undertakings apply to the resulting requirements. Commission Implementing Regulations are abbreviated here to CIRs. [4]

Table 1. Article 24 overview and related INSIEME proposal work. Adopted EU regulations and project proposals have different legal standings.

Area	Position in this architecture
Metering and consumption	Adopted CIR (EU) 2023/1162; the common reference model for data access. [5]
Customer switching	Adopted CIR (EU) 2026/855; Article 3 applies from 31 December 2026. [6]
Demand response	Further implementing rules are under development. RM-DR is a proposal-derived working model. [1, 16]
Energy sharing	RM-SHARE supports the requested/future implementing-act work; it remains a working model and is meant to support the Citizen Energy Package. [1]
Flexible connection agreements	INSIEME proposes common procedures as input to future CIR work. RM-FCA remains on a project proposal and will likely turn into a structured recommendation for policy makers. [1]
Master data and price signals	Supporting working models; no separate adopted CIR is claimed for them in this baseline. [1]
V2X, smart and bidirectional EV charging	Future perspective outside the INSIEME project scope. These EV-specific capabilities may inform a future CEEDS extension; they are not project delivery commitments.

A common European approach to flexible connections

Article 6a of Directive (EU) 2019/944, as amended, provides the framework for flexible connection agreements (FCAs). INSIEME's Grid Flexibility reference-model proposal develops data-exchange procedures in the format of an implementing regulation: customer-interface setup, onboarding, withdrawal, termination and activation or limitation. Common implementation guidance could reduce divergence between national approaches. [11]

The proposal is a contribution towards future CIRs for FCAs. It is not presented as an adopted regulation or a published Commission draft. Its common roles, information and procedures can be assessed and tested while the future legal scope and adoption process remain as matters for the competent institutions. The five procedure profiles are listed under A6 in the annex.

3 Principles for the Common European Energy Data Space

The INSIEME team has agreed to twelve enterprise architecture principles to guide cooperation, customer rights and implementation. Their identifiers connect this public explanation to the controlled architecture. [1]

AP-01 Keep decisions close to their responsibility. Coordinate shared European needs while preserving lawful national and local authority over decisions and data.

AP-02 Build on systems that already work. Reuse capable systems through agreed connections. Assess continuity, security, migration effort and future supplier choice before replacing them.

AP-03 Make participation fair and open. Use open, non-discriminatory participation rules and proportionate checks. Participation alone does not confer a right to access every dataset.

AP-04 Make responsibility visible. Name an accountable owner for each outcome, record and complaint, including when several organisations contribute to a service.

AP-05 Use the same meaning for information. Agree definitions, versions and mappings so that a technically successful exchange also produces the intended business result.

AP-06 Design for trust and protection. Build privacy, security, lawful purpose and data minimisation. Demonstrate safeguards and provide ways to exercise rights and challenge decisions.

AP-07 Reuse services across different functions. Share participant checks, information definitions and other common capabilities, with clear responsibilities and dependable coordination.

AP-08 Keep interfaces open and systems replaceable. Publish connection rules and support different implementations, portability and workable exit arrangements.

AP-09 Change the design using evidence. Use demonstrations, national experience and regulatory changes to guide revisions, with recorded decisions and managed transitions.

AP-10 Give customers practical control. Explain who uses information, why and for how long. Support permissions, correction and applicable rights while respecting lawful retention duties.

AP-11 Separate definitions from records and actions. Distinguish information, meaning, authoritative source records and procedure execution. Identify their versions, so decisions remain explainable.

AP-12 Support fair access to the customer interface. Enable eligible actors to use published interfaces, subject to purpose, authority and safe operation, without unjustified technical exclusivity.

4 Shared services behind the functions

S1 Participants Registry

S1 is at an early design stage. It is intended to provide federated and cross-border support for organisations, their roles and mandates, connect with applicable national identity arrangements, and support cross-border participation.

S2 Vocabulary Hub

S2 governs shared definitions, information profiles and mappings, including the IEC CIM family of standards. Each profile specifies the fields and rules for an exchange.

S3 Reference Data Registry

S3 locates reliable reference information: identifiers, responsible organisations and authorised sources, with source responsibility and validity visible.

S4 European Process Interoperability Service

S4 coordinates procedures across independently operated systems. It uses participant credentials from S1, semantic mappings from S2 and governed reference information from S3 to support common European APIs, procedure routing and status information. The EDDIE Open-Source code basis released under Apache 2.0 has been selected as a reference implementation of S4. This will be extended based on the requirements of INSIEME demonstrators. [41]

S5 Service-Level Overview

S5 provides an overview on the availability of functional building blocks. It is to be made available by the CEEDS operational entity to communicate to market participants which procedures are supported. It does not replace statutory oversight or an existing regulatory reporting system.

S6 Interoperability Testing

S6 is intended to provide independent, repeatable interoperability test bed against agreed profiles and along use cases. Test scope and participation must follow the applicable legal requirements and project or service agreements. S6 is likely to become an area of activity for competitive domain implementation.

S7 Regulated Domain Services

S7 connects regulated sources whose operators retain responsibility. Statutory access and open-data reuse should not require a marketplace purchase. However, S8 mechanisms may be used to fulfill the implementation needs of S7 services, for example to distribute grid hosting capacities. [17]

S8 Data and Services Marketplace

S8 supports discovery of data, services and AI models, agreement negotiation and trusted exchange. It adopts the OneNet reference architecture and its Data Space Protocol connector. The INSIEME implementation targets DSP 2025-1; interoperability testing must cover the selected versions and counterpart connectors. Mixed connectors preserve supplier choice. S1–S6 provide supporting checks and coordination, and the OneNet Connector is intended for release under Apache 2.0. [37]

Digital Customer Interfaces

Digital Customer Interfaces make the requesting actor, purpose, scope and duration visible and helps customers manage permissions, withdraw them or seek help. INSIEME proposes extensions to IEC 62746-4 for expressing grid-edge and behind-the-meter data exchange needs, managing permissions and consent, and enabling optional end-to-end encryption. These technical capabilities must respect the applicable legal basis and the relevant conditions for consent or other lawful processing. [1, 9, 31]

How the services work together

Figure 3 shows how participant trust, semantics and reference information support S4 procedure coordination. S5 and S6 provide assurance; S7, S8 and the Digital Customer Interface provide access capabilities.

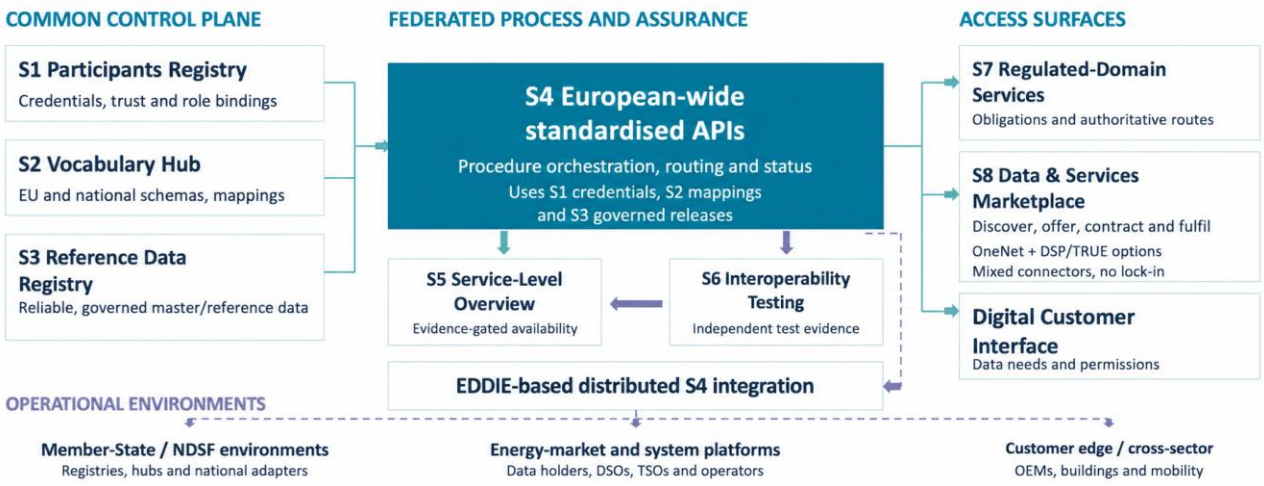

Figure 3. How the shared services work together.

The common control plane establishes who participates, what information means and which reference records apply. S4 uses these inputs to route procedures and report progress. National and sector implementations can provide this coordination through common procedures and interfaces, without requiring a single central S4 implementation.

S6 test evidence feeds the S5 view of readiness and performance. This supports release and acceptance decisions within an agreed scope, with evidence limitations, the accountable decision-maker and regulatory responsibilities made explicit.

EDDIE-based integration connects S4 to national registries and hubs, market and system platforms, and customer environments. Existing responsibilities remain with NDSFs, distribution and transmission system operators (DSOs and TSOs), original equipment manufacturers (OEMs) and other participating actors. [1, 17]

INSIEME intends to release reference implementations of S1–S8, the Digital Customer Interface and S4 integration components under Apache 2.0. The licence permits inspection, adaptation and commercial reuse and includes a contributor patent grant, subject to its conditions. Third-party components retain their own licences. [38]

5 The functions CEEDS supports

The architecture combines seven controlled customer and market functions with regulated information services and generic data sharing. Figure 4 shows these three complementary parts. Their legal status and maturity differ. [1, 17]

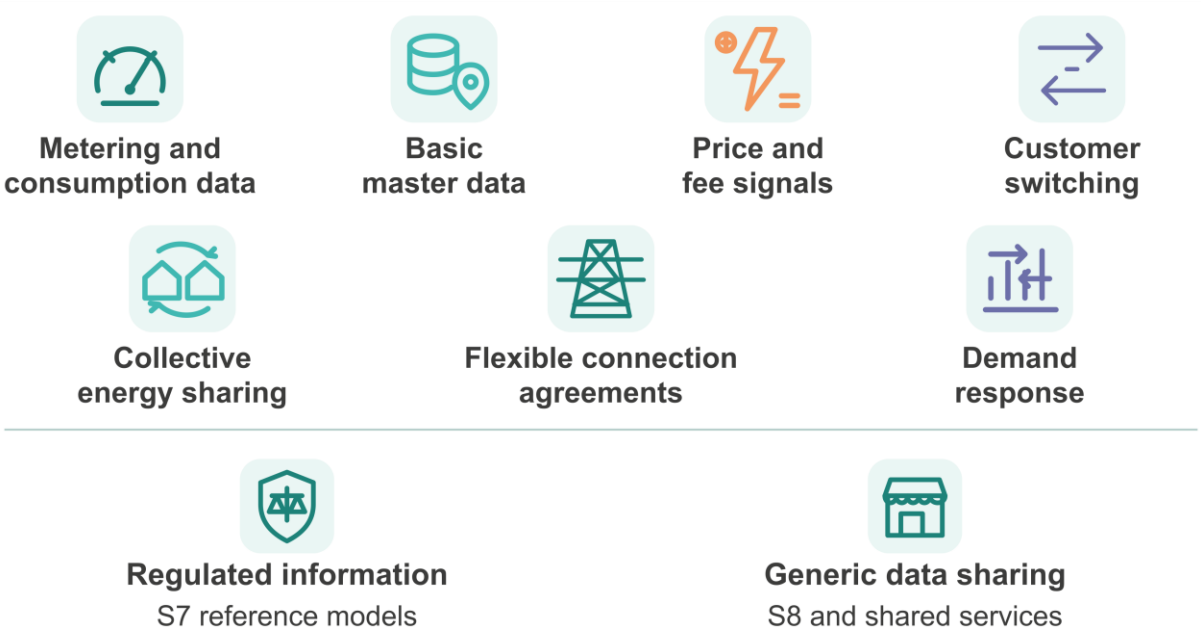

Figure 4. Customer and market functions, regulated information, and generic data sharing.

Metering data access and customer switching have adopted EU implementing regulations. Basic master data and price signals support working models. Energy sharing, flexible connection agreements (FCA) and market-based demand response have project procedure models whose future legal and implementation status must be kept explicit. The FCA proposal is described in Article 24 overview. [4-6, 11]

S7 reference models connect existing regulated sources, including the ENTSO-E Transparency Platform and grid-capacity publications. Generic sharing supports additional datasets, forecasts and services under an appropriate legal or contractual basis. It can include openly available data; a commercial agreement or customer permission is required only where the specific exchange calls for it.

The annex retains the 76 initial controlled procedure profiles and adds separate categories for S7 and generic sharing. These additions extend the report's coverage without presenting new project procedure identifiers as already approved.

6 Standards for the right exchange

For INSIEME, the IEC Common Information Model (CIM) is the first-choice standards family for electricity-market data exchange. Its shared meanings and messages support consistent exchanges. Standards complement applicable access rules, laws and service agreements; they do not confer data-access rights. [19, 22-28]

The economic value of standardisation comes from reuse. Shared definitions, interface profiles, and conformance evidence can reduce repeated development and validation costs across the system. For providers expanding into another country or sector, this can shorten integration of work and time to market. S2, S4 and S6 make this ambition concrete through governed profiles, common procedures and testing across independent implementations. National legal and operational requirements still need to be handled explicitly. [1, 39 pp. 29–30]

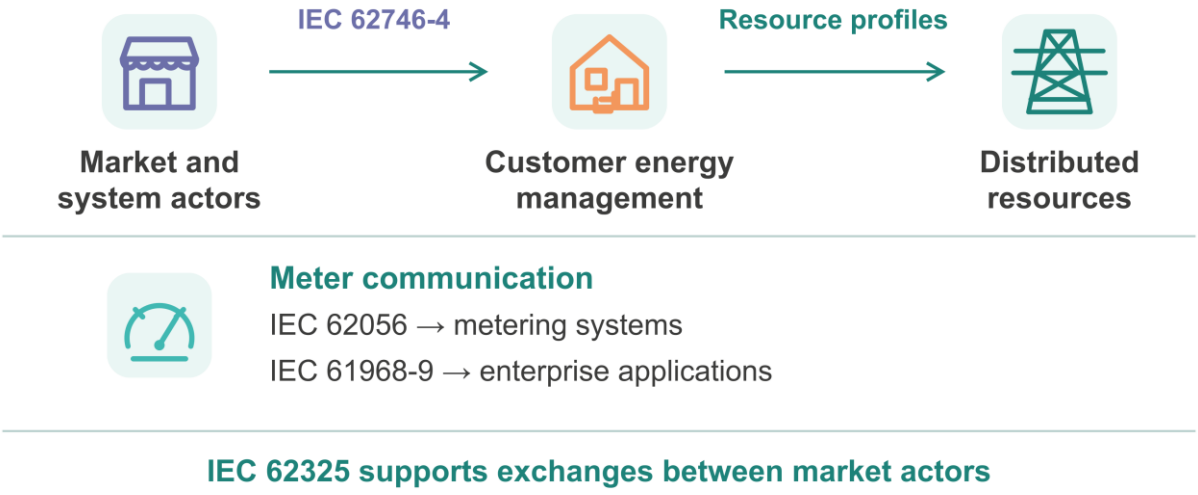

Figure 5. D4E Market–Edge standardisation architecture matching exchanges to interface standards.

The D4E Annex diagram connects market participants, system operators, metering, and customer energy management. Its colours distinguish IEC TC 57 for power-system and market information, TC 13 for meter communication, and SC 23K for electrical energy-efficiency products. The diagram supports the joint recommendations involving D4E and STF. [7]

The Common Information Model (CIM) supplies shared meanings. IEC 62325-351 defines the European market profile, IEC 62325-450 the modelling rules, and IEC 62325-451-x the market processes. Start with the relevant part and the applicable ENTSO-E or platform profile. IEC 61970 and IEC 61968 cover complementary grid and distribution of information. [19, 22, 23, 29]

IEC 63402-1 defines the customer energy-management architecture within residential and commercial premises. It complements the exchange standards in Table 2; it does not itself specify every device protocol or data-security requirement. [33]

For INSIEME, S2 should publish the profile, version and mappings; S3 should identify authoritative reference records; S4 should apply the procedure; and S6 should test independent implementations. Label project extensions explicitly. A standard number alone does not demonstrate interoperability. [17]

Matching standards to data exchanges

For market exchanges, start with IEC 62325 and the applicable platform profile. For grid-edge data exchange, IEC 62746 is the agreed convergence target. Table 2 also identifies complementary standards for grid, meter, and equipment data. [19, 22-32]

Table 2. IEC standards for energy data exchanges and their scope.

Data exchange	Relevant IEC standard	Scope and boundary
Public electricity-market information	62325-451-6	Publication messages, including Transparency Platform data under its implementation profiles. [24]
Operational balancing exchanges	62325-451-7	Balancing-market business processes; distinguish these from public balancing-data publication. [25]
Consumption data to market participants	62325-451-10	My Energy Data exchange. Access authority still follows the relevant rules. [26]
Transmission-capacity allocation	62325-451-3	Cross-border market allocation; not a generic format for local connection capacity. [27a]
Settlement and reconciliation	62325-451-4	Information needed for settlement; it does not prescribe settlement formulae. [27b]
Message receipts and status	62325-451-1 and -451-5	Acknowledgements, problem statements, and status requests. [28a, 28b]
Grid objects and capacity context	61970-301 and 61968-11	CIM grid and distribution vocabulary. Hosting capacity publication still needs a governed application profile. [29a, 29b]
Meter communication and back-office data	62056 family; 61968-9	DLMS/COSEM for meter communication; 61968-9 for enterprise meter-reading and control exchanges. [30a, 30b]
Demand-side resource information	62746-4	CIM profiles linking customer energy management and power-system management. Published in 2024. [31]
Distributed resources and local automation	61850-7-420	Logical-node models for distributed resources and distribution automation; not a public market-data portal format. [32]

Generic datasets need a declared schema, units, time basis, quality, and usage terms. Select and test a profile that fits the exchange. [17, 19]

7 Governance and accountability

The proposed governance model separates European coordination, shared operations, national facilitation, and source of responsibility. It requires appropriate mandates and agreements; the diagram does not transfer statutory powers. [1]

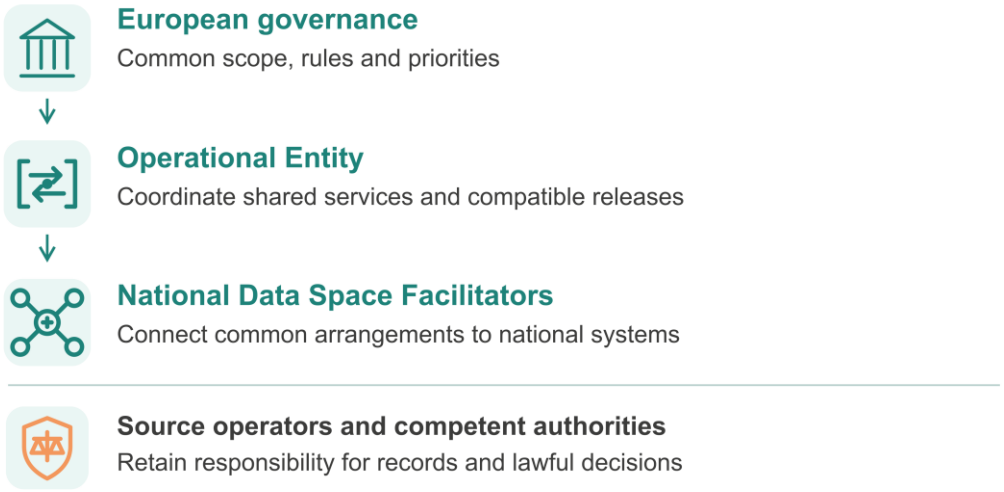

Figure 6. Proposed governance roles and responsibilities.

The proposed European governance arrangements set common scope and participation rules. The Operational Entity would coordinate shared service specifications, compatible releases and support. NDSFs would connect this work to national systems and institutions under an agreed mandate for each use case. An NDSF is not automatically a regulator, certification body or data controller. Each complete service journey needs a named accountable owner, defined operating responsibilities and a practical route for incidents and complaints. [1]

For S7, the regulated operator remains responsible for the authoritative publication, its timetable, and corrections. CEEDS governance should agree with source references, version handling, and escalation, rather than replace that operator. For generic sharing, the parties must make usage terms, responsibility, and remedies clear. [17]

Changes to definitions, source records and procedures need evidence, consultation, a recorded decision, and a published transition plan. Tests must cover compatibility across versions and independent implementations. Oversight should assess fair access, customer rights, service outcomes, and the resolution of failures. Open-source releases need named maintainers, published tests, versioned documentation, and a security-response process.

Operational readiness requires responsible organisations to understand system behaviour, diagnose failures, maintain services, and recover from disruptions. Performance and scalability should meet agreed service levels. The proposed Operational Entity, National Data Space Facilitators and service operators therefore need suitable tools, documented procedures, clear responsibilities and sufficient skills and resources.

8 Interim status and next steps

This white paper describes the controlled architecture edition of 26 September 2026, whose recorded maturity assessment is dated 31 August 2026. Its components are at different stages of development. The architecture provides a basis for implementation and validation; it does not establish that an integrated European service is ready for routine operation. [1]

Table 3. Plain-language reading of the source maturity assessment. These are architecture stages, not operational availability ratings or certifications.

Architecture position	What the baseline supports
Early definition	S1 participant arrangements require further co-design. The integrated CEEDS journey remains at an early definition stage.
Structured draft	S3 reference data and S8 marketplace have a structured design, with material decisions still to be resolved.
Draft ready for bounded validation	S2, S4, S5, S6, S7 and the customer interface have a more developed design suitable for defined validation and pilot planning.

Demonstrate one complete journey

The next priority is a bounded procedure carried out in two independently operated environments. The same agreed definitions and responsibilities should produce equivalent outcomes in both. Testing should cover success, refusal, withdrawal of permission, incompatible information, and service interruption.

Acceptance needs a named decision authority and an evidence trail. The shared testing and service-overview capabilities should make the result repeatable and its limitations visible. Independent implementations are essential to demonstrate interoperability rather than compatibility within a single supplier system.

Review and endorsement of the final architecture

The INSIEME Enterprise Architecture team plans a further review of the interim architecture with the aim of seeking formal endorsement at the project's General Assembly in April 2027. The review should incorporate demonstration results, clarified responsibilities, feedback from national implementations and the proposed alignment of definitions.

Align definitions with DG CONNECT

INSIEME will reach out to DG CONNECT to propose a structured dialogue on aligning data-space definitions across sectors, in coordination with DG ENER, the Data Spaces Support Centre and relevant European Data Innovation Board work. The starting point should be a comparison of the definitions, roles and boundaries used by the initiatives against Data Act Article 33 and Data Governance Act Article 30(h). The intended result is a shared glossary, an explicit distinction between horizontal requirements and sector-specific extensions, and an agreed process for maintaining these definitions as legislation and implementation evolve. [8, 13, 36]

9 References

[1] INSIEME Project: Deliverable D2.2 CEEDS Interim Enterprise Architecture. Submitted to the European Commission for review, 30 September 2026.

[2] European Commission: Digitalising the energy system - EU action plan. COM(2022) 552 final, 18 October 2022. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52022DC0552

[3] European Commission: Strategic Roadmap for Digitalisation and AI in the Energy Sector. COM(2026) 501 final, 3 June 2026. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52026DC0501

[4] Directive (EU) 2019/944 of the European Parliament and of the Council on common rules for the internal market for electricity and amending Directive 2012/27/EU (recast), 5 June 2019. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32019L0944

[5] European Commission: Implementing Regulation (EU) 2023/1162 on interoperability requirements and non-discriminatory and transparent procedures for access to metering and consumption data, 6 June 2023. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R1162

[6] European Commission: Commission Implementing Regulation (EU) 2026/855 of 14 April 2026 on interoperability requirements and non-discriminatory and transparent procedures for access to data required for customer switching, 31 December 2026. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32026R0855

[7] European Commission: Directorate-General for Mobility and Transport, Data exchange for demand-side flexibility and smart and bidirectional charging – Joint report, Publications Office of the European Union, 2026, https://data.europa.eu/doi/10.2832/5751857

[8] Regulation (EU) 2023/2854 of the European Parliament and of the Council of 13 December 2023 on harmonised rules on fair access to and use of data and amending Regulation (EU) 2017/2394 and Directive (EU) 2020/1828 (Data Act). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32023R2854

[9] Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation). https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32016R0679

[10] European Commission: Directorate-General for Digital Services, New European interoperability framework – Promoting seamless services and data flows for European public administrations, Publications Office, 2017, https://data.europa.eu/doi/10.2799/78681

[11] Directive (EU) 2024/1711 of the European Parliament and of the Council of 13 June 2024 amending Directives (EU) 2018/2001 and (EU) 2019/944 as regards improving the Union's electricity market design. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:32024L1711

[12] European Commission. A European strategy for data. COM(2020) 66 final, 19 February 2020. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0066

[13] Regulation (EU) 2022/868 of the European Parliament and of the Council of 30 May 2022 on European data governance and amending Regulation (EU) 2018/1724 (Data Governance Act). https://eur-lex.europa.eu/eli/reg/2022/868/oj

[14] Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity (recast). https://eur-lex.europa.eu/eli/reg/2019/943/oj

[15] European Commission: AI Continent Action Plan. COM(2025) 165 final, 9 April 2025. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52025DC0165

[16] European Commission: Citizens Energy Package. COM(2026) 115 final, 10 March 2026. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A52026DC0115&qid=1773310492603

[17] INSIEME Project: Software Architecture of the INSIEME Project. https://architecture.insieme.energy/

[18] Commission Regulation (EU) No 543/2013 of 14 June 2013 on submission and publication of data in electricity markets and amending Annex I to Regulation (EC) No 714/2009 of the European Parliament and of the Council. https://eur-lex.europa.eu/eli/reg/2013/543/oj/eng/pdf

[19] ENTSO-E. Transparency Platform Manual of Procedures v3.5. https://www.entsoe.eu/data/transparency-platform/mop/

[20] Regulation (EU) 2024/1747 of the European Parliament and of the Council of 13 June 2024 amending Regulations (EU) 2019/942 and (EU) 2019/943 as regards improving the Union's electricity market design. https://eur-lex.europa.eu/eli/reg/2024/1747/oj/eng

[21] Directive (EU) 2023/2413 of the European Parliament and of the Council of 18 October 2023 amending Directive (EU) 2018/2001, Regulation (EU) 2018/1999 and Directive 98/70/EC as regards the promotion of energy from renewable sources, and repealing Council Directive (EU) 2015/652. https://eur-lex.europa.eu/eli/dir/2023/2413/oj

[22] International Electrotechnical Commission: IEC 62325-351:2016 Framework for energy market communications - Part 351: CIM European market model exchange profile. https://webstore.iec.ch/en/publication/25128

[23] International Electrotechnical Commission: IEC 62325-450:2013 Framework for energy market communications - Part 450: Profile and context modelling rules. https://webstore.iec.ch/en/publication/6841

[24] International Electrotechnical Commission: IEC 62325-451-6:2018 Framework for energy market communications - Part 451-6: Publication of information on market, contextual and assembly models for European-style markets. https://webstore.iec.ch/en/publication/60715

[25] International Electrotechnical Commission: IEC 62325-451-7:2021 Framework for energy market communications - Part 451-7: Balancing processes, contextual and assembly models for European style market. https://webstore.iec.ch/en/publication/64428

[26] International Electrotechnical Commission: IEC 62325-451-10:2020 Framework for energy market communications - Part 451-10: Profiles for Energy Consumption Data ("My Energy Data"). https://webstore.iec.ch/en/publication/61111

[27a] International Electrotechnical Commission: IEC 62325-451-3:2014 Framework for energy market communications - Part 451-3: Transmission capacity allocation business process (explicit or implicit auction) and contextual models for European market. https://webstore.iec.ch/en/publication/6844

[27b] International Electrotechnical Commission: IEC 62325-451-4:2017 Framework for energy market communications - Part 451-4: Settlement and reconciliation business process, contextual and assembly models for European market. https://webstore.iec.ch/en/publication/29116

[28a] International Electrotechnical Commission: IEC 62325-451-1:2017 Framework for energy market communications - Part 451-1: Acknowledgement business process and contextual model for CIM European market. https://webstore.iec.ch/en/publication/31307

[28b] International Electrotechnical Commission: IEC 62325-451-5:2015 Framework for energy market communications - Part 451-5: Problem statement and status request business processes, contextual and assembly models for European market. https://webstore.iec.ch/en/publication/21818

[29a] International Electrotechnical Commission: IEC 61970-301:2020 Energy management system application program interface (EMS-API) - Part 301: Common information model (CIM) base. https://webstore.iec.ch/en/publication/62698

[29b] International Electrotechnical Commission: IEC 61968-11:2013 Application integration at electric utilities - System interfaces for distribution management - Part 11: Common information model (CIM) extensions for distribution. https://webstore.iec.ch/en/publication/6199

[30a] International Electrotechnical Commission: IEC 61968-9:2024 Enterprise business function interfaces for utility operations - Part 9: Interfaces for meter reading and control. https://webstore.iec.ch/en/publication/75041

[30b] International Electrotechnical Commission: IEC 62056-1-0:2014 Electricity metering data exchange - The DLMS/COSEM suite - Part 1-0: Smart metering standardisation framework. https://webstore.iec.ch/en/publication/6397

[31] International Electrotechnical Commission: IEC 62746-4:2024 Systems interface between customer energy management system and the power management system - Part 4: Demand Side Resource Interface. https://webstore.iec.ch/en/publication/78336

[32] International Electrotechnical Commission: IEC 61850-7-420:2021 Communication networks and systems for power utility automation - Part 7-420: Basic communication structure - Distributed energy resources and distribution automation logical nodes. https://webstore.iec.ch/en/publication/34384

[33] International Electrotechnical Commission: IEC 63402-1:2025 Energy Efficiency - Customer Energy Management Systems - Part 1: General Requirements and Architecture. https://webstore.iec.ch/en/publication/68879

[34] Brynskov, M: Novel AI applications in the energy sector: Detailed characteristics building on the emerging energy data space and the development of a digital twin of the energy system. Final report, June 2025. https://digital-strategy.ec.europa.eu/en/library/artificial-intelligence-unlocking-smarter-greener-energy-future

[35] Data Spaces Support Centre. Blueprint 3.0. https://blueprint.dssc.eu

[36] European Commission. Common European data spaces. https://digital-strategy.ec.europa.eu/en/policies/data-spaces

[37] Engineering: TRUE Connector https://github.com/Engineering-Research-and-Development/true-connector

[38] Apache Software Foundation: Apache License, Version 2.0. https://www.apache.org/licenses/LICENSE-2.0.html

[39] European Commission: European Political Strategy Centre, *The future of European competitiveness. Part A, A competitiveness strategy for Europe*, Publications Office of the European Union, 2025, https://data.europa.eu/doi/10.2872/9356120

[40] International Energy Agency: Vehicle-to-grid technology, Paris, 20 May 2026. https://www.iea.org/reports/vehicle-to-grid-technology

[41] EDDIE Project: European Distributed Data Infrastructure for Energy. https://www.eddie.energy

Annex A Functional building blocks and procedures

A1–A7 retains the 76 controlled procedure identifiers and titles. A8 and A9 provide additional descriptive categories for S7 and generic sharing. The lists distinguish adopted models, project proposals, and regulated publication of families. [1, 17]

Use this annex as an index from the functions described in chapter 5 to the procedure of families in the source architecture. A reference model for groups for related exchanges; each numbered entry identifies one procedure within that model. Select the family that matches the intended activity, then consult the cited source for the detailed roles, messages, conditions and exceptions needed to implement it. The titles are not implementation specifications.

Read each section's status line before using its entries: an adopted legal reference model, a working recommendation and a project proposal have different authority. A8 and A9 organise additional publication and sharing activities rather than extend the controlled procedure numbering. The shared services described in chapter 4 support these exchanges across functions; they are not additional steps in each list.

Abbreviations used in the source titles: CESU — collective energy sharing unit; AC — allocation coefficient; FC — flexible customer; CSO — connecting system operator; CU — controllable unit; SP — service provider; SPU / SPG — service providing unit / group; w/wo — with or without.

A1 Metering and consumption data

RM-METER · Adopted legal reference model — Implementing Regulation (EU) 2023/1162.

This model concerns customers and eligible parties accessing metering and consumption data through the responsible data-access arrangements. The entries distinguish historical data access, ending access or permissions, and near real-time data access where available. They describe separate procedures rather than a sequence that every customer must complete.

For example, RM-METER.2 is titled "Access to validate historical metering and consumption data by an eligible party". "RM-METER" identifies the metering reference model and ".2" identifies this procedure; it does not mean the second step in a universal workflow. A service provider seeking a customer's historical consumption data would start with this entry, then use the full model to establish the applicable access conditions and the responsibilities of the eligible party, customer and responsible data-access actors.

RM-METER.1	Access to validated historical metering and consumption data by the final customer
RM-METER.2	Access to validated historical metering and consumption data by an eligible party
RM-METER.3	Termination of service by an eligible party
RM-METER.4	Revocation of an active permission by the final customer
RM-METER.5	Activate near real-time data flow from smart meter or smart metering system (where applicable)
RM-METER.6	Read near real-time data from smart meter or smart metering system

A2 Basic master data

RM-MASTER · Working recommendation — JWG and INSIEME model.

Master data identify the accounting points and market parties involved in an exchange. These procedures support customers and eligible parties in obtaining those records and managing access to later changes. They also cover finding market parties by role, helping participants identify the organisations involved.

RM-MASTER.1	Access to accounting point master data by the final customer
RM-MASTER.2	Access to accounting point master data by an eligible party
RM-MASTER.3	Termination of access to future accounting point master data changes by the eligible party
RM-MASTER.4	Revocation of access to future accounting point master data changes by the final customer
RM-MASTER.5	Access to market party master data
RM-MASTER.6	Access to list of market parties by their role

A3 Implicit flexibility signals

RM-SIGNAL · INSIEME working model for access to price and fee information.

These procedures give customers, service providers, and energy-sharing participants access to price and grid-fee information. They distinguish residual energy from energy allocated within a collective sharing unit and include updating the unit's price information. Such signals help users assess the cost implications of when and how they use electricity.

RM-SIGNAL.1	Access to energy price for residual energy
RM-SIGNAL.2	Access to grid fee for residual energy
RM-SIGNAL.3	Access to energy price for energy sharing unit - allocated energy
RM-SIGNAL.4	Update price information in CESU register
RM-SIGNAL.5	Access to grid fee for energy sharing unit - allocated energy

A4 Customer switching

RM-SWITCH · Adopted legal reference model — Implementing Regulation (EU) 2026/855.

This model covers the information exchange needed when a customer changes supplier. Its two entries distinguish carrying out the switch from cancelling it where the optional cancellation procedure applies. The relevant suppliers and responsible market data actors use the detailed reference model to determine their respective actions.

RM-SWITCH.1	Switching Supplier
RM-SWITCH.2	Cancellation of Switching Supplier (Optional)

A5 Collective energy sharing

RM-SHARE · Working model for energy sharing; not an adopted implementing act.

This working model concerns customers participating in a collective energy sharing unit and the organisations operating or serving that unit. The groups below cover joining and leaving, operation and flexibility, allocation and settlement, and qualification. Together they describe the information exchanges supporting the unit lifecycle; they are not a single mandatory sequence.

Registration and membership

RM-SHARE.1	Registration of a collective energy sharing unit
RM-SHARE.2	CESU operator queries if metering point may be assigned to the CESU
RM-SHARE.3	Final customer queries if metering point may be assigned to a CESU
RM-SHARE.4	CESU operator requests metering point to be added to the unit [optionally] with the info of the share of the energy allocation
RM-SHARE.5	CESU operator requests metering point to be assigned to CESU data eligible party too
RM-SHARE.6	CESU operator requests metering point to be removed from CESU
RM-SHARE.7	Final customer requests its metering point to be removed from CESU

Operation and flexibility

RM-SHARE.8	Support to short-term flexibility markets
RM-SHARE.9	Energy management w/wo flexibility provision
RM-SHARE.10a	Flexibility verification and settlement done by flexibility requesting party
RM-SHARE.10b	Flexibility verification and settlement done by flexibility market operator or other third-party support tool

Allocation settlement and member access

RM-SHARE.11a	Receive self-consumption information for CESU without CESU intervention (fixed AC, proportional-to-consumption AC, etc.)
RM-SHARE.11b	Receive self-consumption information for CESU from dynamic allocation
RM-SHARE.12	CESU internal settlement w/wo flexibility provision
RM-SHARE.13	Direct access to its own data by CESU member
RM-SHARE.14	Change the allocation mechanism of the CESU

Qualification

RM-SHARE.15	Company qualification for participating in flexibility markets
RM-SHARE.16	Assets qualification for participating in flexibility markets

A6 Flexible connection agreements

RM-FCA · INSIEME proposal for future CIR work; Article 6a legal anchor. [11]

This proposal concerns a flexible customer and the connecting system operator managing a flexible connection agreement. The entries cover initiating the Digital Customer Interface, onboarding the customer, ending the agreement from either side, and activating or limiting flexibility. They outline the proposed relationship's lifecycle rather than establish additional legal obligations.

RM-FCA.1	Initialization of digital customer Interface
RM-FCA.2	Onboarding of a FC to FCA in the Digital Customer Interface
RM-FCA.3	Revocation of a flexible connection agreement by the final customer
RM-FCA.4	Termination of a flexible connection agreement by the CSO
RM-FCA.5	Activation or limitation of flexibility

A7 Demand response

RM-DR · Proposal-derived working model; not an adopted procedure model.

This working model concerns customers, service providers, and system operators coordinating demand response. A controllable unit is the equipment or resource represented in the procedures; service providing units and groups organise resources for service delivery. The groups below separate resource and provider registration, qualification, and the measurement and verification of delivered flexibility.

Controllable unit data and lifecycle

RM-DR.1	General access to Controllable Unit master data by an entitled party
RM-DR.2	Controllable unit registration
RM-DR.3	Update Controllable unit information
RM-DR.4	De-registration of CU
RM-DR.5	Suspension of CU by an entitled party
RM-DR.6	Re-activation of CU

Service provider participation and customer contracts

RM-DR.7	Service provider registration
RM-DR.8	Service provider application for qualification
RM-DR.9	Service contract revocation by final customer
RM-DR.10	Service contract termination by service provider
RM-DR.11	SP Customer switching or new registration on CU
RM-DR.12	Cancellation of SP registration on CU
RM-DR.13	Update Service Provider profile information
RM-DR.14	Update Service Provider critical information
RM-DR.15	De-registration of Service Provider
RM-DR.16	Suspension of Service Provider qualification by System Operator
RM-DR.17	Revocation of Service provider
RM-DR.18	Reactivation of Service provider

Service providing units and groups

RM-DR.19	SPU or SPG grid pre-qualification
RM-DR.20	SPU or SPG product pre-qualification
RM-DR.21	SPU or SPG product verification
RM-DR.22	SPU or SPG registration
RM-DR.23	SPU or SPG update
RM-DR.24	SPU or SPG de-registration
RM-DR.25	SPU or SPG application
RM-DR.26	SPU or SPG suspension
RM-DR.27	SPU or SPG re-activation
RM-DR.28	General access to SPU or SPG master data by an entitled party

Delivery measurement and verification

RM-DR.29	Bidding and activation of active power flexibility product
RM-DR.30	(conditional) Temporary limits
RM-DR.31	Baseline data handling
RM-DR.32	Making measurement data available
RM-DR.33	Quantification
RM-DR.34	(Optional) Baseline validation

A8 S7 regulated reference models

Additional publication and access of families; the original operators retain their mandates. These categories are not new RM procedure identifiers. [17-21]

S7 connects users to regulated information published by responsible source operators. Here are the entries group for publication and retrieval activities by information family, such as connection capacity or electricity-market transparency. They help readers identify the source, the information sought, and the relevant publication arrangements; source operators retain responsibility for their records.

Grid hosting capacity and connection capacity information

Reference family: information on capacity available for new connections. [11, 17, 20]

- Provide grid hosting capacity and connection capacity information.
- Publish location, available capacity, pending requests, and update time.
- Select the relevant area or connection area.
- Read and download the published information.
- Update or correct the publication and retain its source of reference.

ENTSO-E Transparency Platform

Reference family: statutory electricity market publication. Data categories are listed below. [18, 19]

- Identify the primary data owner and responsible submission route.
- Prepare data under the applicable publication profile.
- Submit through the transmission system operator or approved data provider.
- Validate, acknowledge, and resolve submission errors.
- Publish, retrieve, and reuse the available records.
- Correct or update records under the applicable rules.

Renewable energy and system information

- Publish and retrieve renewable shares and greenhouse gas information.
- State time, area, calculation method, and responsible source.
- Update or correct the records.
- Define separate scope and authority for additional system-state data.

Dynamic prices and network tariffs

- Identify the applicable source, area, and validity period.
- Publish and retrieve the signal and its conditions.
- Update, replace, or correct the signal.

Transparency Regulation data categories

Regulation (EU) No 543/2013, Articles 6–17. Each family includes the applicable thresholds, timing and quality rules in the Regulation and ENTSO-E implementation documents. [18, 19]

Article 6 Load. Actual total load; day-, week-, month- and year-ahead forecasts.

Article 7 Consumption outages. Planned and actual unavailability of consumption units.

Article 8 Adequacy. Year-ahead forecast margin.

Article 9 Infrastructure. Future transmission infrastructure changes.

Article 10 Network outages. Planned and actual transmission unavailability; offshore-grid impacts.

Article 11 Offered capacity. Forecast and offer cross-zonal capacity; flow-based parameters; direct-current link restrictions; annual capacity-constraint reports.

Article 12 Capacity Use. Requested, allocated and nominated capacity; allocation of prices and revenues; day-ahead prices; net positions; congestion income; scheduled exchanges; physical flows; third-country allocations.

Article 13 Congestion management. Redispatch, countertrading and remedial action costs.

Article 14 Generation forecasts. Installed capacity by type and unit; scheduled generation; wind and solar forecasts.

Article 15 Generation outages. Planned and actual generation-unit and production-unit unavailability.

Article 16 Actual generation. Output by unit and type; wind and solar production; reservoir and hydro-storage filling.

Article 17 Balancing. Rules; reserve volumes and prices; accepted offers; activated energy and prices; imbalance prices and volumes; financial balance; exchanges between control areas.

These are publication families, not a substitute for the Platform's complete dataset definitions or regulatory thresholds.

Additional Transparency Platform families

The Platform's scope also reflects the Electricity Balancing Guideline, System Operation Guideline and European balancing implementation frameworks. ENTSO-E's Manual of Procedures and its release roadmap control the detailed coverage. [19]

Balancing publication groups

- Balancing capacity.
- Balancing energy.
- Cross-zonal capacity for balancing.
- Financial system balance.
- System balance.
- Rules and terms, and conditions.

Further implementation and statistical datasets

- Long-term flow-based capacity calculation for the relevant regions.
- Balancing Capacity procurement algorithm outputs.
- Elastic demand in the applicable automatic frequency-restoration framework.
- Statistical Data Portal and Factsheet datasets.

Common profile and publication procedures

- Identify the legal source, dataset definition, and publication of owner.
- Select the applicable implementation guide, schema, and code lists.
- Test submission and retrieval against the approved profile.
- Record the dataset release and implementation date.
- Monitor publication availability, completeness, and corrections.
- Preserve provenance when data is reused through S7.

Manual of Procedures v3.5 is the documentation reference checked for this report. Dataset implementation follows the published roadmap; the version number does not imply that every change is already deployed. [19]

A9 Generic data sharing

Voluntary or otherwise lawfully authorised exchange beyond specific regulated procedures. The lifecycle categories below organise the architecture's generic-sharing approach; they are not adopting EU procedures. [17]

Generic sharing concerns data providers, service providers and users exchanging information outside the specific procedure of families above. The groups below follow an arrangement from describing and discovering an offer to establishing access, maintaining it, and eventually changing or ending it. The applicable conditions depend on the dataset, participants, and purpose of the exchange.

Describe and discover

- Describe a dataset or service, its schema, quality, and responsible source.
- Publish metadata and applicable usage conditions.
- Discover and select the relevant offer or open dataset.

Establish the right to use

- Identify the parties and check roles, purpose, and entitlement.
- Request access where needed.
- Agree terms or obtain permission where the exchange requires it.
- Record the applicable legal basis and conditions.

Provide and maintain access

- Provide the agreed transfer, query, or subscription.
- Apply to the declared information profile and reference identifiers.
- Monitor quality and availability; manage errors and corrections.
- Update data, metadata, and profile versions.

Change or end the arrangement

- Change the agreed scope or terms.
- Withdraw applicable permission or end access.
- Apply retention and deletion obligations; retain required evidence.

Architecture examples

- T4-5_03 — Distribution-grid long-term forecast.
- T4-5_04 — Distribution-grid short-term forecast.
- T4-5_05 — Access grid-hosting-capacity information.