Report on Digital Twin Activities Support Needs Assessment – First Iteration

DCOO
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DSOs FOR EUROPE

DCOO4DT
DSOs FOR DIGITAL TWINS

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List of Abbreviations and Acronyms

Acronym	Meaning
DTA	Digital Twin Activities
DESAP	Digitalisation of the energy system
EC	European Commission
EU	European Union
DSO	Distribution System Operator
TSO	Transmission System Operator
JTF	Joint Task Force

Executive Summary

Deliverable 1.2 presents the results of the first iteration of the Support Needs Assessment conducted within the DSO4DT project between April and September 2025. The objective of this work was to collect and document the views of relevant stakeholders active in the development of Digital Twins for the electricity system and to establish an initial overview of their respective approaches, activities, and support needs.

The assessment builds directly on the outcomes of Deliverable 1.1, which mapped the main Digital Twin Activities (DTAs) in Europe and categorised them into five stakeholder clusters. In this second step, the DSO4DT project team engaged these stakeholders through bilateral exchanges to understand their ongoing work and perspectives on Digital Twin development. The results of these discussions have been summarised in this report to provide a factual account of the current Digital Twin landscape from the viewpoint of Distribution System Operators (DSOs).

Based on the exchanges conducted, four main approaches to Digital Twin development were identified:

1. **System operator-driven digitalisation of in-house infrastructure**, focusing on improving data integration and quality as a foundation for future Digital Twin applications.
2. **Technology-provider-driven solution development** guided by evolving regulatory frameworks such as the Digital Product Passport Regulation, with both large suppliers and emerging start-ups supporting DSOs in implementation.
3. **Standardisation and industry-consortia-driven harmonisation**, where organisations such as CEN/CENELEC, IEC TC 57, VDE, and IDTA develop common models and frameworks such as the Asset Administration Shell (AAS) and its domain-specific sub-models for the energy sector.
4. **Research and innovation-driven federated Digital Twin architectures**, led by European and national RDI initiatives exploring system-of-systems concepts and data federation to enable coordinated use cases across DSOs, TSOs, and other energy actors.

These approaches are not mutually exclusive and often intersect through partnerships and shared technical foundations. The results documented in this deliverable provide a structured overview of the current state of Digital Twin developments relevant to system operators in Europe.

The next phase of the Support Needs Assessment will move from bilateral exchanges to joint stakeholder dialogue. The aim will be to bring together the different stakeholder groups to discuss their respective approaches and to explore how collaboration could be organised to generate mutual benefits across the ecosystem.

As a concrete next step, the DSO4DT project will host a Digital Twin MeetUp at ENLIT Europe 2025, inviting all stakeholders engaged in this first iteration, DSO Entity's members, and representatives of the Joint Task Force on the Digitalisation of the Energy System and Action Plan (JTF DESAP) coordinated jointly with ENTSO-E. The MeetUp will be followed by an online webinar to allow wider participation and to discuss the next steps for collaboration and alignment in the development of Digital Twins in Europe.

The insights gathered through these upcoming activities will feed into the second iteration of the Support Needs Assessment and the next deliverable, which will provide an updated and consolidated overview of Digital Twin activities and support requirements across Europe.

1   Introduction

1.1   Background and Link to Deliverable 1.1

The DSO for Digital Twins (DSO4DT) project, funded under Horizon Europe (Call HORIZON-CL5-2024-EUDSO-IBA-2), aims to mobilise European Distribution System Operators (DSOs) to actively support the realisation of Digital Twins of the EU Electricity Grid. The project represents a strategic initiative of the EU DSO Entity to strengthen its members' role in European digitalisation efforts and to provide a single, coordinated interface for Digital Twin Activities (DTAs). In the context of this project DTAs are all projects, initiatives, organizations, and work groups that work on the realization of Digital Twins of the EU Electricity Grid. Key Digital Twin Activities include the Horizon Europe TwinEU project, other related Horizon Europe projects and initiatives like OpenDEI, IntNET, BRIDGE, and the ongoing collaboration between ENTSO-E and the EU DSO Entity within the Joint Task Force on the Digitalisation of the Energy System and Action Plan (JTF DESAP).

Deliverable D1.1 – Report on Initial Contact with Digital Twin Activities – laid the groundwork for this objective by identifying and engaging key actors across the European Digital Twin landscape. Through a series of structured bilateral exchanges, literature reviews, and a public introductory webinar, the project mapped the ecosystem of relevant stakeholders and initiatives. D1.1 established five primary stakeholder clusters to organise subsequent work: (1) Horizon Europe and Innovation Projects, (2) Institutional Bodies, (3) Associations, (4) the Joint Task Force with ENTSO-E and its Advisory Board, and (5) Standardisation Bodies and Experts.

Building on this foundation, Deliverable D1.2 constitutes the next logical step in Work Package 1 (WP1) by analysing the specific support needs of the Digital Twin Activities identified in D1.1. It translates initial contacts into a structured assessment of what type of expertise, input, or coordination is required from European DSOs to ensure that Digital Twin developments reflect the operational realities of distribution networks of all sizes and maturities.

1.2   Purpose and Scope of Deliverable 1.2

The purpose of this deliverable is to document the findings of the first iteration of the Support Needs Assessment for Digital Twin Activities carried out between April and September 2025. It aims to answer a central question:

> *What do Digital Twin Activities need from European DSOs to succeed in developing, validating and deploying fit-for-purpose Digital Twins for the electricity system and how can the DSO4DT project support bridging the gap between in parallel running Digital Twin developments?*

Within this scope, the report seeks to:

- Identify the technical, organisational, and regulatory support needs of Digital Twin Activities;
- Map these needs against the expertise available within DSO Entity's Expert Groups and Task Forces — particularly TF DESAP (Digitalisation of the Energy System and Action Plan);
- Provide an evidence base for targeted support actions under Task 1.3 (Providing Support to Digital Twin Activities – First Iteration); and

- Inform the extended outreach activities under Work Package 2 and the knowledge-building efforts under Work Package 3.

The assessment covers Digital Twin Activities across Europe that directly or indirectly contribute to one or more of the four key outcome areas defined in the project call:

1. Strengthened observability and controllability of the grid;
2. Optimised infrastructure and network planning;
3. Joint modelling for a more resilient grid in terms of RES integration and cybersecurity; and
4. Increased use of active system management and forecasting to support flexibility and demand response.

The deliverable focuses on needs expressed through direct bilateral exchanges between the DSO4DT project with DTAs such as TwinEU, the ongoing Energy Data Space projects, BEAVER R&D, and other related initiatives, complemented by inputs from industry platforms (e.g. CurrENT and T&D Europe) and technical standardisation efforts (by CEN/CENELEC). Additionally, the deliverable contains feedback from European DSOs that can be considered front runners in the implementation of distribution system level Digital Twins.

1.3   Structure of the deliverable

This deliverable is organised into four main sections, each reflecting a distinct component of the first iteration of the Support Needs Assessment carried out within the DSO4DT project.

- Section 1 – Introduction outlines the background and objectives of the Support Needs Assessment, its link to Deliverable 1.1, and the overall scope and methodology applied for this first iteration.
- Section 2 – Methodology describes the approach used to collect and document stakeholder input, including the process of bilateral exchanges, stakeholder engagement, and the framework applied to structure the results.
- Section 3 – Identified Approaches to Digital Twin Development presents the main findings from the exchanges with stakeholders. It summarises the four approaches to Digital Twin development observed across different stakeholder clusters and describes their key characteristics and interconnections.
- Section 4 – Conclusions and Outlook provides a summary of the findings from this first iteration and outlines the next steps of the Support Needs Assessment, including upcoming stakeholder activities such as the planned MeetUp at ENLIT Europe 2025 and the subsequent online webinar.

Together, these sections provide a neutral and factual overview of the outcomes of the first iteration of the Support Needs Assessment and define the framework for the next phase of the DSO4DT project.

2   Methodology

2.1   Approach for Assessing Support Needs

The first iteration of the Support Needs Assessment was designed as an exploratory and qualitative exercise aimed at building a factual understanding of the specific needs expressed by stakeholders actively engaged in Digital Twin Activities (DTAs). Rather than applying a rigid analytical framework, the DSO4DT project adopted a flexible and dialogue-oriented approach that encouraged open discussions and mutual learning between project representatives and external actors.

The assessment relied primarily on bilateral exchanges between the DSO4DT project team and representatives of identified Digital Twin Activities. These exchanges were conducted in the form of informal virtual meetings, which allowed for direct interaction and facilitated a frank exchange of views on ongoing developments, challenges, and areas where DSOs could provide additional support. Each meeting was summarised in concise minutes to ensure that the insights gained were preserved in a consistent format for later analysis and comparison.

During this initial assessment phase, the DSO4DT team purposefully refrained from using predefined questionnaires or assessment templates. This choice was made to avoid constraining the conversation and to ensure that the discussions remained open to unexpected findings or new areas of collaboration. The exchanges thus focused on identifying and understanding the perceived gaps in coordination, expertise, or technical capabilities that could hinder the realisation of Digital Twins for the electricity system.

In total, approximately twenty-five bilateral discussions were held between April and September 2025 with key stakeholders drawn from all five clusters defined in Deliverable 1.1. These included project coordinators of major Horizon Europe initiatives such as TwinEU and BEAVER R&D, representatives of the Energy Data Space projects, industry associations like CurrENT Europe and T&D Europe, and several DSOs that can be considered front-runners in the implementation of distribution-system-level Digital Twins. When relevant, insights from these discussions were cross-checked and validated through exchanges within the Joint Task Force on the Digitalisation of the Energy System and Action Plan (JTF DESAP), which continues to operate in parallel with the DSO4DT project.

The outcomes presented in this deliverable are therefore qualitative in nature, reflecting the shared understanding developed through these initial dialogues. Feedback obtained from one stakeholder was, whenever possible, compared and validated against inputs from other actors belonging to the same stakeholder cluster to ensure the robustness and representativeness of the findings.

2.2   Stakeholder Engagement Overview

During the first iteration of the Support Needs Assessment, the DSO4DT project engaged with approximately twenty-five stakeholders representing all clusters defined in Deliverable 1.1. These clusters include Horizon Europe and national RDI projects, institutional bodies, associations, the Joint Task Force on the Digitalisation of the Energy System and Action Plan (JTF DESAP), and standardisation experts. In addition, several European DSOs from DSO Entity's membership that are actively implementing Digital Twins at organisational level were involved to complement the external outreach with practical operational perspectives.

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The exchanges were primarily organised as bilateral virtual meetings between the DSO4DT project team at DSO Entity's secretariat and representatives of the identified stakeholders. The meetings typically followed an informal format that allowed both sides to openly explore shared objectives and to identify potential areas for collaboration. Many of these interactions originated as follow-up discussions after the project's well-attended kick-off webinar in the first quarter of 2025, which successfully raised awareness across the Digital Twin community and prompted several projects and associations to reach out proactively to the DSO4DT team.

The engagement covered all five stakeholder clusters established in Deliverable 1.1 and included, among others, exchanges with Horizon Europe and nationally funded Digital Twin projects, industry platforms, and a national association representing smaller DSOs, which is particularly active in promoting Digital Twin adoption at local level.

All stakeholders expressed strong interest in continued collaboration with DSO4DT. Each interaction was documented through concise minutes of meeting, which were shared internally with the project team. The consolidated findings and main insights derived from these exchanges form the basis of the analysis presented in this deliverable.

2.3   Evaluation Framework

The evaluation process in this first iteration of the Support Needs Assessment focused on identifying common approaches and recurring concepts that define how different Digital Twin Activities (DTAs) interpret and develop Digital Twins for the electricity system. Although these initiatives often operate independently, they tend to address similar challenges, apply comparable methods, and pursue overlapping objectives.

By analysing the outcomes of the bilateral exchanges and reviewing publicly available project materials, the DSO4DT team identified several recurring patterns that characterise the current Digital Twin landscape. These include:

- the integration of data from heterogeneous operational systems (e.g. SCADA, GIS, and smart meters);
- the use of interoperable data models and digital asset concepts such as the Asset Administration Shell (AAS) and Digital Product Passport (DPP) frameworks;
- the creation of distributed or federated architectures enabling cross-domain data exchange; and
- the ambition to enable predictive operation, planning, and decision-support functionalities through AI-based modelling.

Rather than assessing the maturity or performance of individual DTAs, this first iteration sought to map their conceptual and methodological proximity. The evaluation thus concentrated on identifying where alignment already exists and where divergence occurs across ongoing developments. Understanding these commonalities and gaps is crucial for the DSO4DT project's mandate to bridge approaches and foster convergence between parallel Digital Twin developments across Europe.

In this context, DSO4DT acts as a facilitator of dialogue and coordination among projects that, while following distinct implementation pathways, share similar technical foundations and long-term

objectives. This comparative understanding will serve as the analytical backbone for the next iteration of the Support Needs Assessment and guide the definition of specific support actions under Task 1.3.

3 Identified Approaches to Digital Twin Development

The exchanges conducted during the first iteration of the Support Needs Assessment revealed that the European Digital Twin landscape for the electricity system is currently characterised by four complementary but distinct approaches to development.

Each approach reflects a different entry point into the topic and is predominantly driven by one of the stakeholder clusters identified in Deliverable 1.1.

While these approaches evolve largely within separate communities of practice, they increasingly overlap through partnerships, shared technical foundations, and common regulatory drivers.

The DSO4DT project observed that most Digital Twin Activities (DTAs) pursue one of the following four directions, or a combination thereof:

1. System operator-driven digitalisation of in-house infrastructure
2. Technology-provider-driven solution development aligned with regulatory progress
3. Standardisation and industry-consortia-driven harmonisation across sectors
4. Research and innovation (RDI)-driven federalised Digital Twin architectures

These four approaches collectively shape the current European understanding of Digital Twins for the electricity system and illustrate the diversity of perspectives that the DSO4DT project aims to connect and align.

3.1 System Operator-Driven Digitalisation of In-House Infrastructure

Among the four approaches identified in this first iteration of the Support Needs Assessment, the system-operator-driven development of in-house Digital Twins represents the most immediate and practice-oriented perspective. For Distribution System Operators (DSOs), the main motivation to revise and upgrade their digital infrastructure lies in the pursuit of efficiency gains and operational adaptability in the face of the accelerating energy transition.

The transition towards a decarbonised and decentralised energy system requires DSOs to manage increasingly complex networks with a growing number of distributed energy resources, new demand patterns, and evolving regulatory requirements. At the same time, DSOs operate critical infrastructures that have been developed and expanded incrementally over several decades. Any modification of such systems must therefore be implemented with great caution to preserve reliability and security of supply.

A further challenge identified across all exchanges with DSOs concerns the limited availability of human resources, especially among small and medium-sized operators. This constraint is reinforced by the ageing workforce in many European countries, which affects both technical expertise and operational continuity. As a result, DSOs face the dual challenge of modernising their digital landscape while managing these human-resource limitations.

In response, a growing number of DSOs have embarked on structured internal programmes to develop their own Digital Twins as a means to improve situational awareness, data integration, and analytical capabilities. Although the concrete implementation details differ from one operator to another, the

discussions conducted under the DSO4DT project revealed a set of recurring patterns in how DSOs structure their work. These patterns can be described through several interconnected building blocks that are often developed iteratively and in parallel, listed here:

SCADA Integration: Acquire real-time operational data from the grid to ensure connectivity, establish data interfaces, and improve data quality. This pattern creates the foundation for real-time observability.

Network Digitalisation (GIS): Model the Medium-Voltage (MV) and Low-Voltage (LV) networks and integrate GIS data with operational systems, enabling a spatially consistent digital representation of the grid.

Network Sensorisation: Deploy smart meters and IoT sensors to collect voltage, current, and power-quality data from the field, closing the remaining data gaps at the edge of the network.

Data Collection and Processing: Aggregate data from SCADA, GIS, sensors, and external sources; perform load-flow calculations and real-time analyses; cleanse and standardise the data; and store it in dedicated repositories for further analysis.

Development of Use or Business Cases: Develop operational and planning use or business cases such as scenario simulations, power-flow calculations, energy-balance assessments, and loss analyses to derive actionable insights for network management and investment planning.

These patterns are not executed in a sequential order. Instead, DSOs typically implement several of them in parallel, gradually increasing the level of data integration and automation as experience and resources allow. This flexible and incremental approach enables DSOs to progress towards an operational Digital Twin without the need for disruptive system overhauls.

A recurring finding across the exchanges with DSOs is the critical importance of data quality. Even where data already exists, it is often dispersed across multiple isolated systems and of inconsistent or insufficient quality for advanced analytics. Data cleaning and standardisation are therefore recognised as core prerequisites for Digital Twin development. Improving data quality is an ongoing process that often requires substantial manual effort and close collaboration between various departments relevant for the specific use or business case. Several DSOs that began their Digital Twin initiatives two to three years ago confirmed that achieving an acceptable data-quality level can take considerable time and remains a continuous activity rather than a one-off task.

Overall, this approach demonstrates that the foundation of any Digital Twin lies in robust in-house data management and integration capabilities. While some DSOs pursue this path independently, many establish partnerships with technology providers to accelerate progress and to address resource constraints. These collaborations are often essential to access the technical expertise and tools required for data integration, system modelling, and analytics. However, several DSOs also expressed concerns about potential vendor lock-in resulting from the use of proprietary solutions that limit interoperability or future scalability. Ensuring open interfaces and maintaining control over their data assets is therefore considered a key requirement by DSOs when selecting technology partners.

3.2 Technology-Provider-Driven Solutions Aligned with Regulatory Developments

The second approach to Digital Twin development is primarily driven by technology providers including established industrial suppliers, software vendors, and a growing number of innovative start-ups who design and refine Digital Twin solutions in response to emerging European regulatory and policy frameworks. These actors play a crucial role in translating policy objectives and standardisation advances into deployable technical solutions for system operators.

Recent legislative developments, such as the Digital Product Passport (Regulation (EU) 2024/178) and the Ecodesign for Sustainable Products Regulation (ESPR), have significantly influenced the direction of Digital Twin technologies. These frameworks promote traceability, lifecycle documentation, and data interoperability, encouraging suppliers to embed such principles directly into their products and software systems. As a result, technology providers increasingly develop their Digital Twin solutions around concepts such as the Asset Administration Shell (AAS) and Digital Product Passport (DPP4.0@Grid), which provide a harmonised digital representation of grid components across their lifecycle.

These initiatives, originally rooted in industrial manufacturing, are now progressively adapted to the energy sector. For system operators, they offer a pathway to standardised data exchange, automated asset onboarding, and enhanced equipment transparency, ultimately supporting more efficient maintenance, procurement, and grid planning processes.

In addition to large-scale technology providers, the DSO4DT project identified an emerging ecosystem of start-ups that develop highly specialised Digital Twin applications and offer tailored support to DSOs. Many of these start-ups operate in close partnership with, or are partially owned by, system operators themselves. This ownership model fosters trust and ensures that the solutions are directly aligned with operational needs while maintaining flexibility for iterative development. In several cases, national associations of smaller DSOs have established collaborative arrangements with such start-ups, providing their members with shared access to digitalisation expertise, tools, and implementation support for building Digital Twins at an affordable scale.

While these partnerships present promising opportunities, they also raise familiar challenges. As observed in Section 3.1, some DSOs express concerns about vendor lock-in or technological dependency, particularly when start-up solutions rely on proprietary architectures or when larger suppliers promote closed ecosystems. Consequently, there is a growing emphasis among DSOs on ensuring openness, interoperability, and data sovereignty in all external collaborations.

Overall, this approach reflects a market-driven dynamic, where the continuous evolution of European digital and sustainability regulations stimulates both established suppliers and new market entrants to innovate. The resulting ecosystem provides DSOs with a broader choice of technologies and partnership models, enabling them to advance their digitalisation objectives while contributing to the regulatory and technical alignment of Digital Twin solutions across Europe.

3.3 Standardisation and Industry-Consortia-Driven Harmonisation

A third approach observed during the assessment concerns the work of standardisation bodies and industry consortia that define common data models, ontologies, and reference frameworks to facilitate interoperability between digital systems. These activities provide the structural basis for consistent data exchange across different technologies and sectors.

At the European level, organisations such as CEN/CENELEC, IEC TC 57, and the German Association for Electrical, Electronic and Information Technologies (VDE) are active in developing and maintaining standards relevant for Digital Twins in the energy domain. In parallel, the Industrial Digital Twin Association (IDTA) coordinates the specification of the Asset Administration Shell (AAS). The AAS concept was originally created within the context of Industry 4.0 to describe digital representations of industrial assets. It is currently being extended with domain-specific sub-models to cover applications in the energy sector, including components of the electrical grid and flexibility assets.

These efforts are complemented by the evolution of other established data models and ontologies, such as the Common Information Model (CIM) and the Smart Applications Reference Ontology (SAREF), which are also used to represent assets and processes within energy systems. Together, these initiatives aim to enable interoperability between software solutions, platforms, and sectors that apply Digital Twin concepts.

System operators, technology providers, and research organisations participate in these standardisation activities to ensure that their operational or technical requirements are reflected in the resulting specifications. However, while some of the larger European DSOs are already active in the relevant standardisation bodies, their participation remains limited in number. Representatives from the standardisation community acknowledged that the current level of DSO involvement is insufficient to fully capture the operational needs of distribution networks in ongoing standardisation work.

3.4 Research and Innovation-Driven Federated Digital Twin Architectures

A fourth approach identified during the assessment originates from European and national research and innovation (RDI) initiatives. These projects explore the concept of federated or system-of-systems Digital Twins that connect individual twins developed by different actors into interoperable structures. The underlying objective is to enable data exchange and coordination across organisational and sectoral boundaries while maintaining data ownership and sovereignty.

Projects such as TwinEU, energy data-X, and BEAVER R&D illustrate this approach. They investigate how data spaces, common interoperability layers, and shared reference architectures can support collaboration between Distribution and Transmission System Operators (DSOs and TSOs) as well as between grid operators, market participants, consumers, and generators. This work aims to develop concepts that facilitate the interaction of multiple Digital Twins to support higher-level use cases in network planning, system operation, and resilience assessment.

Within this approach, the research community and industrial partners examine technical aspects such as data federation, semantic interoperability, and cybersecurity for distributed data environments.

These projects also address governance and trust frameworks that define how actors can securely access, share, and process information across system boundaries.

The federated Digital Twin concept is often associated with the system-of-systems paradigm, in which each participating entity maintains its own Digital Twin while enabling selected data and models to be accessed through standardised interfaces. This model is intended to facilitate coordination across different voltage levels and energy domains and to enable use cases that require a system-wide view of grid behaviour and flexibility potential.

This RDI-driven approach represents the most forward-looking vision of Digital Twins. Rather than developing stand-alone tools, it aims to create a federated ecosystem in which multiple Digital Twins interconnect and exchange data securely. Achieving this vision depends on the successful integration of the three preceding approaches: robust in-house data foundations developed by DSOs, interoperable technology solutions offered by suppliers, and harmonised standards defined by the standardisation community.

This approach involves research organisations, technology providers, and system operators who collaborate to design and test the necessary frameworks and interfaces. The outcomes of these activities are intended to inform future developments towards an interoperable European Digital Twin ecosystem for the electricity sector.

3.5   Interconnections Between the Four Approaches

Although the four approaches described above originate from different stakeholder clusters and address distinct aspects of Digital Twin development, the assessment indicates that they are closely interrelated and often progress in parallel. The activities observed under each approach frequently overlap, and many stakeholders contribute to more than one of them.

System operators that focus on the digitalisation of their in-house infrastructure often collaborate with technology providers to acquire the necessary tools and expertise for data integration and modelling. In several cases, these partnerships extend to joint participation in standardisation activities or research projects, thereby creating direct links between the operational, industrial, and research dimensions of Digital Twin development.

Similarly, the technological solutions introduced by suppliers and start-ups are frequently designed with reference to existing standards and regulatory frameworks, while the outcomes of research and innovation projects provide input for the further development of these standards. Standardisation bodies and industry consortia, in turn, use insights from both industrial implementations and research results to refine data models and interoperability specifications.

These interconnections illustrate that the development of Digital Twins for the electricity system is a multi-layered and iterative process that advances through continuous exchange between system operators, technology providers, standardisation experts, and the research community. The DSO4DT project operates at the intersection of these approaches and facilitates communication between the involved stakeholders to promote coherence and mutual understanding.

The outcomes presented in this deliverable therefore represent the first consolidated overview of the ongoing Digital Twin activities relevant to system operators in Europe and provide the basis for identifying targeted support actions in the subsequent phase of the project.

4 Conclusions and Outlook

This deliverable presents the results of the first iteration of the Support Needs Assessment carried out under the DSO4DT project. It summarises the outcomes of the exchanges conducted between April and September 2025 with stakeholders active in the development of Digital Twins for the electricity system.

The discussions held with Digital Twin Activities and related initiatives provided a comprehensive overview of the current directions pursued in Europe. Four main approaches to Digital Twin development were identified:

1. the digitalisation of in-house infrastructure by system operators;
2. the technology-provider-driven development of solutions aligned with regulatory requirements;
3. the activities of standardisation bodies and industry consortia defining shared data models and interoperability frameworks; and
4. the research and innovation initiatives exploring federated or system-of-systems concepts for Digital Twins.

These approaches are pursued by different stakeholder groups but often overlap through partnerships, shared technical concepts, and joint participation in projects and standardisation efforts. The exchanges undertaken within this first iteration created a structured understanding of how Digital Twin developments are progressing across Europe and how DSOs are involved in these processes.

Following this initial phase, which focused on bilateral exchanges between the project team and external stakeholders, the next step of the Support Needs Assessment will aim to bring these stakeholders together. The objective is to enable a structured dialogue across the different approaches to Digital Twin development and to explore how collaboration could be realised to create mutual benefits across all stakeholder groups involved.

As a concrete next step, the DSO4DT project will organise a Digital Twin MeetUp during ENLIT Europe 2025, where all stakeholders previously engaged in bilateral exchanges will be invited to participate, together with DSO Entity's members and representatives of the Joint Task Force on the Digitalisation of the Energy System and Action Plan (JTF DESAP) jointly coordinated by DSO Entity and ENTSO-E. The MeetUp will provide an opportunity for stakeholders to exchange views, identify areas of common interest, and discuss how cooperation can contribute to the advancement of Digital Twin activities across Europe.

Following the event at ENLIT Europe, the project will organise an online webinar to allow a broader range of participants to contribute to the ongoing discussion and to reflect on the outcomes of the MeetUp. The online session will mark the transition to the next phase of the Support Needs Assessment and will inform the continued work on mapping collaboration opportunities and defining support actions in preparation for the second iteration of the assessment and the next deliverables.