Identified Digital Twin Activities

Overview of outreach activities undertaken by the DSO4DT Project

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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

This deliverable, D1.1 – Report on Initial Contact with Digital Twin Activities, presents the early outreach activities undertaken by the DSO4DT project to establish collaboration with relevant Digital Twin Activities (DTAs) across Europe. As a Horizon Europe Coordination and Support Action, DSO4DT aims to mobilise European Distribution System Operators (DSOs) and ensure their needs and perspectives are well integrated into the development and adoption of Digital Twins for the electricity system.

The project applied a structured stakeholder mapping and clustering methodology to identify and engage with key actors, including Horizon Europe projects, institutional bodies, associations, standardisation experts, and the Joint Task Force on the Digitalisation of the Energy System (JTF DESAP). These efforts led to over 20 bilateral exchanges and strong participation in an introductory webinar, which brought together over 200 stakeholders from across the Digital Twin ecosystem.

Through these activities, DSO4DT has established a robust foundation for continued engagement, knowledge sharing, and coordination. The insights gained from this initial outreach will directly inform the upcoming Needs Assessment and future deliverables, contributing to a more inclusive and interoperable Digital Twin landscape that reflects the diversity and operational realities of DSOs across Europe.

1   Introduction

Digital Twins are widely recognised for their potential to significantly enhance the management, operation, and resilience of the European electricity grid. As part of Horizon Europe's broader push in this domain, several large-scale research and innovation projects have been launched to drive the development of Digital Twin solutions across different sectors. Among these, the **TwinEU** project stands out as the flagship initiative for the EU electricity system, bringing together over **70 partners** from across Europe, including TSOs, DSOs, technology providers, and research organisations. Its aim is to deliver a federated and interoperable Digital Twin framework to support system-level coordination and optimisation. More information is available on the [TwinEU website](#) and the [CORDIS portal](#).

The DSO4DT project was launched under Horizon Europe to ensure that the voice and needs of DSOs are adequately represented in these ongoing efforts to develop Digital Twins. As a support and coordination action, DSO4DT plays a key role in connecting DSOs to Digital Twin Activities (DTAs) across Europe—especially TwinEU, but also other initiatives such as OpenDEI, the Interoperability Network for the Energy Transition (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). By enabling stronger DSO engagement and coordination, DSO4DT aims to ensure that Digital Twin developments reflect the diversity, operational realities, and regulatory environments of Europe's distribution grids. Acting as a central coordination point for the European DSO perspective in Digital Twin Activities, DSO4DT helps ensure consistency across the various stakeholders involved.

Distribution grids play a pivotal role in enabling a fair and inclusive energy transition across the European Union. DSOs, as the key actors managing these grids, vary significantly in terms of size, regulatory context, regional demand, network topology, and technological maturity. This diversity creates both complexity and opportunity: successful Digital Twin solutions must be adaptable and inclusive of all types of DSOs.

Recognising this need, the DSO4DT project was initiated to mobilise the DSO community and facilitate their meaningful engagement with ongoing Digital Twin Activities. The EU DSO Entity, representing over 830 DSOs across Europe, is uniquely positioned to support this ambition. Through its established network of Expert Groups and Task Forces, the DSO Entity can act as a bridge between operational grid expertise and research-driven innovation. The DSO4DT project leverages this capacity to:

- Strengthen DSO participation in relevant Digital Twin Activities;

- Build and maintain long-term relationships with key stakeholders; and

- Facilitate the widespread and inclusive adoption of Digital Twins across all DSO profiles.

To achieve these goals, DSO4DT implements a three-step approach:

1. **Expert collaboration** – Activate and engage relevant DSO Entity Expert Groups and Task Forces, especially the Task Force on Digitalisation of the Energy System and the Action Plan (DESAP), to exchange directly with Digital Twin Activities.

2. **Targeted outreach** – Connect with the broader Digital Twin community, including technology providers, research consortia, associations, and EU-funded projects.

3. **Knowledge dissemination** – Support the development of best practices and guidance for DSOs through structured knowledge exchange and shared learning.

This deliverable, *D1.1 – Report on Initial Contact with Digital Twin Activities*, marks the first milestone of the DSO4DT project. It sets the foundation for active DSO engagement by identifying and mapping the current European Digital Twin landscape, highlighting relevant stakeholders, and documenting initial interactions and collaboration opportunities. It also explores how DSO Entity's internal expertise has been activated to support these efforts and how future project activities can build on this early engagement.

2   Methodology

2.1   Approach and Initial Outreach

The DSO4DT project recognizes that fostering a strong and collaborative engagement with Digital Twin Activities (DTAs) is essential for the successful integration of DSOs into ongoing DTAs. To achieve this, Task 1.1, "Establish Initial Contact with Digital Twin Activities," focused on identifying key DTAs and establishing strategic relationships during the early stages of the project. This was carried out through a multi-step methodology, combining preliminary outreach with a structured review of relevant projects and literature.

As a first step, DSO4DT engaged with TwinEU, the largest European initiative focused on Digital Twins in the energy sector. Leveraging TwinEU's wide-reaching network and in-depth knowledge of the Digital Twin ecosystem, DSO4DT gained valuable insights into ongoing projects, key actors, and potential synergies. This enabled the project to align its contributions with existing initiatives and to identify areas where DSOs could bring the most added value.

Beyond its engagement with TwinEU, DSO4DT conducted broader outreach across the Digital Twin landscape. Drawing on the DSO Entity's extensive network, the project tapped into pre-existing relationships to gather further input on relevant projects and stakeholders. This participatory approach helped ensure that early engagement was both targeted and inclusive, representing the diversity of actors currently active in Digital Twin development.

To broaden its scope and identify additional DTAs, DSO4DT also implemented a two-step research approach:

1. **Project review** – The team analysed Horizon Europe calls from previous years to identify projects with clear synergies in the area of Digital Twins. Identified projects were documented internally and prioritised for future engagement.

2. **Literature review** – A comprehensive analysis of recent publications and position papers was conducted to uncover additional stakeholders and emerging perspectives in the Digital Twin space. This included reports such as T&D Europe's position paper on Digital Twins and their role in the green energy transition, which highlighted the relevance of engaging with actors

who understand DSOs from a technology supply perspective. Similar reviews were carried out for publications by Eurelectric, E.DSO, Siemens, CurrENT, and others.

Through this structured methodology, DSO4DT established a **well-rounded and informed engagement framework**. By combining targeted outreach with systematic research, the project ensured that its approach to identifying and connecting with DTAs was comprehensive and representative of the full electricity system value chain—encompassing policymakers, system operators, industry associations, and technology providers.

Looking ahead, the DSO4DT project will continue to monitor the evolving landscape of Digital Twin Activities and actively identify **emerging projects, initiatives, and stakeholders** relevant to the electricity system. Particular attention will be given to those developments where **DSO involvement is critical** or where DSO4DT can provide added value through coordination, knowledge sharing, or technical support. This ongoing effort will ensure that DSO4DT remains responsive to new opportunities and continues to promote the integration of DSO perspectives in the design and implementation of Digital Twins across Europe. If relevant new activities emerge, this deliverable may be updated at a later stage of the project to reflect these developments.

2.2   Stakeholder Clustering for Structured Outreach

Following the in-depth identification of Digital Twin Activities (DTAs) described in the previous section, DSO4DT applied a structured clustering approach to categorise relevant stakeholders. This method was designed to enable a systematic and efficient outreach strategy and to ensure comprehensive coverage of key actors across the energy system.

Horizon Europe and Innovation Projects Involved in Digital Twin Activities:

A comprehensive list of projects and DTAs was compiled through early engagement with TwinEU and its associated contacts, as well as via the methodology described in Section 2.1. These included Horizon Europe and national publicly funded projects that focus on or contribute to the development of Digital Twins in the electricity sector. These projects form a key cluster for knowledge exchange, alignment, and mutual visibility.

Institutional Bodies with Influence on Digital Twin Developments:

This cluster includes **EU institutions and formal bodies** that play a role in shaping Digital Twin-related policies, strategies, or funding programmes. These actors were identified based on: existing EU governance structures related to innovation and digitalisation, their relevance to the topic of Digital Twins, and the DSO Entity's ability to leverage its institutional connections within the energy sector.

Associations Active in Digital Twin-related Topics:

Energy associations and sectoral alliances bring critical insights and complementarity to DSO4DT's outreach efforts. Their involvement supports the alignment of Digital Twin development with broader energy system goals, such as flexibility, smart grids, storage integration, and consumer-centric approaches. Engaging with these associations allows DSO4DT to position DSO perspectives within wider industry dialogues.

The Joint Task Force (JTF) with ENTSO-E and its Advisory Board:

This cluster represents a structured collaboration framework that differs from the more exploratory outreach activities above. Based on COM(2022) 552, the European Commission mandated a Joint Task Force (JTF) between DSO Entity and ENTSO-E to collaborate on:

- Defining key concepts and priorities for Digital Twin use cases,

- Identifying relevant digital technologies and solutions,

- Setting smart grid indicators, and

- Providing a roadmap and recommendations for Digital Twin development.

In this context, DSO4DT benefits from an established mechanism of cooperation with TSO counterparts and regular interaction with the Advisory Board. This Advisory Board includes over 20 stakeholder representatives such as smartEN, WindEurope, EASE, BEUC, CurrENT Europe, ESMIG, CEN/CENELEC, and the European Commission itself. The Advisory Board meets bi-annually and provides feedback on the JTF's outputs. DSO4DT identified this as a high-value channel for aligning with the broader Digital Twin ecosystem and for sharing project updates.

Standardisation Bodies and Experts:

Standardisation is a key enabler for interoperability and scalability of Digital Twin solutions. In this cluster, DSO4DT focuses on actors contributing to the development of Digital Twin-related standards. This includes organisations such as CEN/CENELEC, ETSI, and expert groups connected to Horizon Europe projects working on semantic models, architecture reference frameworks, and interoperability layers. DSO4DT also engages with industrial experts, such as those from Trialog, who contribute technical and standardisation know-how relevant to DSOs.

Following this clustering process, an initial list of DTAs and key stakeholders was compiled to structure and prioritise the project's outreach activities. This targeted approach enhances the effectiveness and efficiency of stakeholder engagement across the broader Digital Twin landscape.

A first overview of the identified stakeholders per cluster is presented in the table below.

Table 1: DTA Clusters and examples for identified stakeholders

Clusters	Identified Relevant Stakeholders
Horizon Europe and Innovation Projects Involved in Digital Twin Activities	-TwinEU (Digital Twin for Europe) -BEAVER R&D
Institutional Bodies with Influence on Digital Twin Developments	-BRIDGE -ETIPS NET -European Commission

Associations Active in Digital Twin-related Topics	-T&D
The Joint Task Force (JTF) with ENTSO-E and its Advisory Board	
Standardisation Bodies and Experts	-Trialog

It is important to note that outreach within these clusters is an ongoing process. As the Digital Twin ecosystem continues to evolve, new stakeholders and projects may emerge. The clusters presented here serve as an initial framework and will be updated over time as DSO4DT continues to expand its community, foster new collaborations, and support the adoption of Digital Twins with a strong focus on the needs of DSOs.

3   Engagement Activities Across Clusters

Following the establishment of stakeholder clusters and the identification of key Digital Twin Activities (DTAs), DSO4DT initiated a first phase of targeted outreach. This stage began with introductory **"get-to-know" exchanges**, during which the project team presented the DSO Entity's role, its extensive network of over 830 DSOs, and its unique capacity to support the alignment of Digital Twin developments with the needs of distribution system operators.

This section provides an overview of the **engagement activities carried out with each stakeholder cluster**, as defined in Section 2.2. It highlights the types of interactions initiated, the objectives pursued, and the outcomes of these early efforts. The outreach activities aimed to:

- Raise awareness of the DSO4DT project,
- Build collaborative relationships within the Digital Twin ecosystem, and
- Identify opportunities for deeper DSO involvement in ongoing and future DTAs.

3.1   Engagement by Stakeholder Cluster

3.1.1   Cluster 1: Horizon Europe and Innovation Projects

TwinEU: As the largest Horizon Europe project dedicated to Digital Twin development, and due to its cross-cutting contributions from various beneficiaries, DSO4DT sought to establish contact in the early stages of the project. TwinEU is uniquely placed within the Digital Twin Community, it is not only central in the current landscape, but also provides exceptional knowledge and reach to all relevant DTAs in Europe. Therefore, DSO4DT and TwinEU agreed to continuously exchange knowledge, stay abreast to developments occurring within their dedicated focuses, but also exchange on expert level within the confines of the established Joint Task Force with ENTSO-E.

BEAVER R&D: Following DSO4DT's introductory webinar, the BEAVER R&D, a grid intelligence project funded by the German Federal Ministry for Economic Affairs and Climate Action (BMWK) initiated discussions to explore potential areas of collaboration. As a project focused on the digitalisation of secondary substations and the enhancement of Low Voltage grids as energy hubs through intelligent substations, the value of cooperation was identified. Through close engagement with system operators, DSO4DT presents an opportunity for BEAVER R&D to leverage the expertise available within DSO Entity while also contributing to the upcoming Needs Assessment Reports. Initial discussions took place on what could be anticipated, with both parties acknowledging the mutual benefits of continued cooperation on coming deliverables of the project.

3.1.2   Cluster 2: Institutional Bodies

BRDIGE: DSO4DT proactively engaged with BRIDGE, the European Commission's initiative that brings together Horizon 2020 and Horizon Europe projects focused on smart energy systems. Given the strong synergies between BRIDGE and DTAs, DSO4DT was granted the opportunity to participate in the BRIDGE General Assembly (GA) held on March 25–26. This engagement provided a valuable platform for knowledge exchange, identifying potential avenues for cooperation with key stakeholders involved in the GA. Additionally, it enabled DSO4DT to gain initial insights into the

evolving Digital Twin landscape, which will inform and be integrated into the project's upcoming deliverables.

ETIPS NET: The European Technology and Innovation Platform for Smart Networks for Energy Transition (ETIP SNET) plays a key role in shaping the EU's innovation agenda for smart energy systems, including digitalisation and interoperability topics relevant to Digital Twins. DSO4DT maintains a strong link to this platform through Luis Cunha, Chairman of the ETIP SNET Executive Committee and Board Member of the EU DSO Entity. In his dual role, Luis Cunha oversees the progress of DSO4DT, ensuring alignment between the platform's strategic objectives and the project's contributions to the DSO community.

European Commission: As an important step in the development of DSO4DT, the European Commission (EC) has been kept closely informed to all developments related to DSO4DT. In this case, close cooperation was established in which DSO4DT welcomed a representative from DG ENER to present during its introductory webinar in late February. Furthermore, this close collaboration and communication will be retained within the existing framework of DSO4DTs engagement in BRIDGE, as well as within the JTF, where the EC closely monitors, cooperates, and provides input for future considerations relevant to Digital Twins.

3.1.3   Cluster 3: Associations engaged in Digital Twin Activities

T&D Europe: In late 2024, T&D Europe published a report emphasizing the critical role of Digital Twins in the energy transition. Against this backdrop, T&D Europe and DSO4DT engaged in a constructive exchange, during which opportunities for further collaboration were identified and outlined. Given the composition of T&D Europe's membership, which includes suppliers dedicated to providing system operators with innovative and digitalised grid equipment, this collaboration offers a valuable synergy. By combining the technical expertise of suppliers with the knowledge base of DSO Entity, DSO4DT is well-positioned to gain a deeper understanding of the remaining gaps in Digital Twin development.

3.1.4   Cluster 4: Joint Task Force with ENTSO-E and its Advisory Board

JTF DESAP: DSO Entity has been actively involved in the Joint Task Force on the Digitalisation of the Energy System and Action Plan (JTF DESAP) with ENTSO-E and its Advisory Board for over a year. This collaboration was further strengthened through the launch of DSO4DT, which leveraged the existing framework to engage with key stakeholders within the TSO and DSO community, as well as actors from industry, procurement, innovation, standardization, and various associations representing relevant organizations. As a result, DSO4DT was able to establish connections with prominent and active entities within the European Digital Twin landscape. This engagement remains ongoing, with continued joint efforts focused on developing Digital Twin use cases and advancing a roadmap for Digital Twin adoption for both DSOs and TSOs.

3.1.5   Cluster 5: Standardization bodies and Experts

Trialog: Within this cluster, DSO4DT engaged with Trialog, a French consultancy and innovation company with deep expertise in digitalisation and interoperability in energy systems. DSO4DT held an exchange with Antonio Kung and Olivier Genest, two innovation experts from Trialog with strong links to international standardisation bodies and ongoing developments in Digital Twin-related standards.

During the exchange, Antonio Kung introduced the ongoing standardisation efforts related to Digital Twins in the electricity sector, outlining current gaps and priorities. He noted that other vertical sectors, such as mobility and Industry 4.0, are already further advanced in structuring and implementing Digital Twin frameworks. According to Trialog's analysis, Digital Twin developments across sectors share a common foundational structure and only differ in domain-specific implementations.

As a result, it was recommended that DSO4DT extend its perspective beyond the energy sector and explore relevant activities and standards in adjacent domains. This broader approach could accelerate learning and enhance cross-sector interoperability, especially in areas such as architecture design, data models, and semantic layers.

3.2   Dissemination and Engagement

In the first stages of the project, the following initiatives were deployed:

- A public introductory **webinar** was arranged to present the overall mission of the project
- The **webinar was disseminated through DSO Entity's LinkedIn** page (> 5,250 followers) and internal newsletter (1.000 subscriptions amongst members)
- DSO4DT took part in **TwinEU's "TwinInsider" event** liaising to 150 stakeholders

In addition to the individualised outreach to relevant DTAs in Europe, DSO4DT utilised the full reach of its established European network to develop, announce, and present the value DSO4DT can have within the Digital Twin community. First and foremost, an introductory webinar was arranged to present the overall mission of the project, describe its goals and objectives, outline the concrete work packages of the project, and engage with the broader stakeholder network interested in collaborating with DSO Entity's expertise.

Figure 1: DSO4DT Webinar Announcement

Harnessing the full representative Digital Twin community was the primary goal for this initial webinar. DSO4DT not only targeted the aforementioned cluster contacts as highlighted above but also sought to expand its reach by directing invitations to the identified projects and organisations TwinEU presented. Lastly, a mass invitation strategy was also employed that was circulated amongst DSO Entity's broad member base, relevant external contacts, and most importantly its Expert Groups and Task Forces.

Furthermore, to cultivate strong interest and awareness from stakeholders across the energy sector, the webinar was disseminated in a twofold dissemination strategy - (1) DSO Entity's LinkedIn page that boasts 5,250 followers, (2) DSO Entity's quarterly Newsletter that is sent to over 1000 contacts that represents over 800 DSO members. Furthermore, the engagement on these disseminations were very well received, with over 3000 impressions on two social media posts, as well as over 200 registered participants for the introductory webinar, of which we welcomed over 65%. Participants represented all areas of the Digital Twin community, including representatives from system operators, innovative technology providers, regulators, other Horizon Europe projects, as well as policymakers. Ultimately, this webinar was an exceptional representation of DSO Entity's reach as secretariat staff received several requests for further engagement.

In addition to these disseminations, DSO Entity and DSO4DT was invited to take part in TwinEU's "TwinInsider" event, an arena of discussion that welcomed many relevant DTAs across Europe for a collaborative and engaging day of discussions. In this case, DSO4DTs participation was presented alongside the established connection with ENTSO-E on the work within the JTF. Both associations joined a panel and presented the long-standing relationship that DSO Entity and ENTSO-E have cultivated in their work on Digital Twins, but also on the key findings from the jointly published report on key challenges and opportunities for Digital Twins. However, as a first of its kind Horizon Europe project, project manager Stephan Gross concluded the panel by presenting DSO4DT, its goals and objectives, as well as what is intended to be elaborated upon during the project. As such, "TwinInsider" was an opportune moment to follow-up DSO4DTs webinar disseminations and once again present its goals to key Digital Twin stakeholders.

3.3 Continued Collaboration

As one of DSO4DT's core objectives, continued outreach remains a top priority throughout the duration of the project. As new engagements and collaborations are established across Europe, it is expected that additional topics, stakeholders, and initiatives will emerge, further expanding the project's network and relevance within the Digital Twin community.

Looking ahead, DSO4DT will place greater emphasis on national-level engagement. In later stages of the project, the EU DSO Entity will mobilise its outreach across all 27 EU Member States, working closely with national DSO associations to facilitate local-level collaboration. By reinforcing this link between European expert-level developments and practical implementation at national and regional level, the project aims to ensure that small and medium-sized DSOs are equally empowered to benefit from Digital Twin innovations.

To support this effort, DSO4DT will continue to:

- Disseminate knowledge,

- Facilitate structured exchanges, and
- Promote the added value of Digital Twins for DSOs of all sizes and technical maturity levels.

This ongoing collaboration and outreach will help position DSO4DT as a central facilitator in the evolving European Digital Twin ecosystem.

4   Conclusion

In conclusion, DSO4DT has conducted a comprehensive and effective outreach within its established network, resulting in active participation from a highly engaged Digital Twin community eager to explore potential areas of collaboration. These initial engagements have yielded tangible results, including the cultivation of strong relationships through over 20 bilateral "get-to-know" meetings with various organizations and representatives, as well as the successful establishment of an engaged community via the introductory webinar.

These efforts not only served as invaluable opportunities for direct engagement but also provided an effective platform for reaching a broader audience that might not have otherwise been engaged. Additionally, leveraging the communication channels of DSO Entity, including social media, newsletters, and the website, ensured that the project achieved its maximum external outreach potential.

As a result, DSO4DT has laid a solid foundation for the successful continuation of its work and the delivery of its forthcoming deliverables. By conducting Needs Assessments among identified stakeholders and DSOs in the time to come, the project will be able to leverage the knowledge gained through these exchanges to inform future tasks. This approach will enable DSO4DT to continue supporting DTAs and contribute to the growth of a collaborative community, ultimately facilitating the widespread adoption of Digital Twins among DSOs.