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(DIGIT.B.2 – Interoperability and Digital Government)

and

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Technologies for Smart Communities (CNECT.C.3)

## **Use case on the implementation of the EIF4SCC– Lyon**



## Introduction

This case study delves into the [ASCEND “Accelerate Sustainable & Clean Energy Districts”](#) project, an EU-funded initiative that supports the development and implementation of positive energy districts across Europe to empower smart cities in their energy transition. The ASCEND EU-funded initiative began in 2023 and will continue until 2027, with a budget of €24,662,744.19, of which €19,986,990.32 comes from the EU contribution.

A [Positive Energy District \(PED\)](#) is an urban area or a group of connected buildings that produces at least as much energy annually as it consumes. These districts actively manage a local or regional surplus production of renewable energy while aiming for net zero greenhouse gas emissions. PEDs integrate different systems and infrastructures, promote interaction between buildings, users, and regional energy, mobility, and ICT systems, all in line with social, economic, and environmental sustainability.

The ASCEND project was chosen as a case study because it operates in a key EU policy area (Green Deal) while including interoperability components and therefore its timely relevance. At a time when cities around the world are facing up to the energy transition and European [climate legislation](#) is defining ambitious goals such as the climate neutrality by 2030, ASCEND's focus on sustainability and its collaborative and interoperable approach make it an ideal example. The project demonstrates effective partnership interoperability and scalable solutions re-usable for other smart cities.

## 1. Lyon’s digital transformation

### The establishment of the smart city community

In the last decade, Lyon has become one of the top-ranking smart cities in France. The five main digital priorities of the city, defined for the period 2021-2026, include 1) digital education and digital inclusion; 2) digital responsibility; 3) the impact of digital technology; and 4) the ability to use data as a lever for public transparency, and 5) innovation and residents’ empowerment. While the city is quite active on digital, its smart city strategy was adopted in 2015. As of today, this strategy has not been renewed and is therefore obsolete. At the national level, there is a [strategy](#) centred around ecological transition, along with several regional and metropolitan roadmaps ([Paris](#), [Lyon](#), [Marseille](#)) related to digitalisation and ecological transition.

Lyon has developed and participated into many smart city projects in the last four years, focusing mostly on sustainability and data (e.g., sharing of data across the region and the use of personal data), with the objective to improve the optimisation of internal process and the delivery of digital services. These projects include:

- [DatAgora](#) has been developed by several players: the Lyon metropolitan authority (metropolitan data service), the ERASME laboratory and the University of Lyon. It aims at enhancing the utilisation and value of public data and serves as a collaborative platform where data from various sources are integrated and used to support research, decision-making, and public engagement.

- **Ecolyo (My Data service)**, which enables users to track their electricity, gas and water consumption, as well as their individual consumption levels. The objective is to assist citizens in understanding and reducing their energy (gas, electricity, district heating) and water consumption.
- **Toodego** is a **one-stop shop for consumption** (“Guichet unique des consommations”) aims to improve the energy efficiency of public assets (Metropolitan area, municipalities, landlords, etc.), providing data to meet regulatory obligations. It also facilitates audits, monitors building consumption, and evaluates the outcomes of energy efficiency measures (post-work monitoring).

In the last decade, the city observed an increasing prioritisation of a 'self-data' environment, and therefore a prioritisation of issues such as the protection of personal data and data portability. To meet these needs, the Lyon metropolitan area has set up a deputy department called "[Digital Use and Services](#)". This department represents both the services that produce data, in particular mapping and geomatics, and the services that deal with digital development.

Regarding interoperability and data sharing, the Lyon metropolis has participated in several European projects, including [bloTope](#) (2016/2022), which focuses on natural cooling and waste collection. This project required frequent data exchanges among various actors from public and private services. Additionally, another project called [SMART TOGETHER](#), an energy management initiative, also emphasised interoperability in terms of data exchange and sharing with diverse partners from both the public and private sectors. Building on these experiences, the city of Lyon is now embarking on a new journey with the [ASCEND](#) project, further solidifying its commitment to evolving as a smart city.

To ensure the success of its smart city initiatives, Lyon relies on collaborative smart city ecosystem under the leadership of Lyon Metropolis and Lyon Confluence (SPL), with the participation of different city departments and external suppliers have also fostered innovation and facilitated the implementation of cutting-edge technologies. Collaborations with the private sector are notably conducted with Tuba Living Lab, an urban laboratory that brings together the city and the Lyon metropolitan area, along with a group of companies. Additionally, partnerships with academia, such as the University of Lyon, are frequently established.

## 2. Lyon’s smart city project:

### A. ASCEND

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The ASCEND project, which stands for “**Accelerate Sustainable & Clean Energy Districts**”, is an EU-funded initiative, being conducted from 2023 to 2027. ASCEND aims to create Positive Clean Energy Districts (PCEDs), based on the existing Positive Energy Districts (PED), between 2023 and 2028 and to establish them as a standard solution in European cities to combat climate change and enable citizens to live in inclusive, resilient, and smart communities. For example, the project will result in the construction of "22 26" buildings, where the interior temperature is guaranteed to be between 22 and 26 degrees all year round, without heating, ventilation, or air conditioning. The ASCEND project is coordinated at the EU level by the Metropolis of Lyon, specifically by [SPL Confluence](#), one of the local

actors in the city. As of June 2024, the phase of defining objectives has been completed and the phase of deployment and implementation at various European sites has begun. Among other cities, [Lyon](#) and [Munich](#) have been selected as the “lighthouse” cities where the solutions will be implemented in priority, enabling formalisation, dissemination and replication in other cities.

To meet its ambition of accelerating and expanding positive clean energy solutions, ASCEND has developed four [strategic objectives](#):

- Provide two inclusive and affordable positive clean energy districts in the pilot cities of Lyon and Munich,
- Facilitate the successful implementation of these districts in both the multiplying cities and the pilot cities,
- Extend the sets of solutions to a broad community of cities and investors,
- Disseminate the results widely within the smart city community.

By aligning each city's initiatives with these common objectives, the ASCEND project aimed to deliver significant results while advancing the understanding and implementation of Positive Clean Energy Districts (PCEDs).

[Positive Clean Energy Districts](#) comprise five pillars: Active Citizenship, Zero-Carbon Frugal Buildings, Smart Energy Grids, Decarbonised Public Spaces and Mobility, and Digital Tools. These pillars are coordinated by an 'urban orchestrator'—a public entity that aggregates all components and services of a PCED to implement lasting change at the district level. In ASCEND, each pillar will be connected to the urban orchestrator through a federating digital platform and a 'human network' of local stakeholders.

#### **ASCEND: key stakeholders**

ASCEND is a [consortium](#) composed of 39 partners from 13 member states (FR, DE, HU, CZ, RO, BE, LU, SK, IT, ES, PT, SE, AT) and one associated country (CH). The project is led by two “lighthouse” cities: [Lyon](#) and [Munich](#) and engages six multiplier cities: Porto, Charleroi, Stockholm, Prague, Budapest, and Alba Iulia, which will be spearheading and replicating the concept of PCEDs across Europe. The variety of size, economic and climate conditions, as well as diversity of target areas and governance approaches, has been optimised in order to facilitate the impact at EU-scale of the solution in the future.

Figure 1: Key stakeholders of the ASCEND project



Source: ASCEND website

As shown in the Figure 1, the ASCEND project is composed of stakeholders with different background such as European SMEs, research institutes, network of cities, industrial partners and property developers, citizens' associations and energy providers, among others.

The [cross-cutting experts](#) at the EU consortium level who support the implementation and dissemination of the solution are:

- **Universities:** the [University of St. Gallen](#) (Switzerland) and the [University of Luxembourg](#) (Luxembourg) focus on economic models.
- **Research Centres:** [AIT](#) (Austrian Institute of Technology, Austria) specialises in monitoring and evaluation indicators, and [CARDIF](#) (Spain) works on replicating the project across other European networks.
- **Network of cities:** [Energy Cities](#) is a network of cities, which was already involved in the previous smart city project, SMART TOGETHER.
- **European SMEs:** [DKSR](#) (Daten-Kompetenz für Städte & Regionen), as well as [Twenty Communications](#) and [R2M](#) (Research to market solution, Italy).

## B. Implementation in Lyon

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### Objectives of ASCEND in Lyon

The city of Lyon aims to be climate neutral by 2030. To achieve this goal, the city is focusing its efforts on the production of renewable energy, sustainable mobility and lighting, as well as on helping residents and users to change their habits. ASCEND is, therefore, a project aligned with these objectives.

ASCEND project is operated on two levels: the [Métropole de Lyon](#), which includes Lyon and the surrounding municipalities, and [SPL Confluence](#), a local public company with investors from the city of Lyon and the Métropole de Lyon. SPL Confluence develops sustainable urban projects, conducts studies on urban development and public spaces, and manages construction rights. Through the ASCEND project, the Métropole de Lyon is enhancing and expanding its data services for residents

and the region to support the energy transition. SPL Confluence has identified the following priority areas, and the ASCEND project presents an opportunity to accelerate their efforts:

1. **Improving Environmental Performance:** refers to the enhancement of the performance of buildings by integrating low-carbon materials, bioclimatic architecture, and renewable energy production. For instance, a landmark building project, set to be completed in 2025, will maintain stable indoor temperatures without heating or air conditioning, showcasing the future of sustainable construction.
2. **Boosting Local Renewable Energy Production:** refers to the expansion of local renewable energy production and the creation of a neighbourhood energy community. This community will share locally produced renewable energy, control energy costs, and maintain energy autonomy for residents and users.
3. **Imagining Alternative Mobility Solutions:** refers to reducing the use of conventional vehicles to increase green spaces and promote active transportation. It aims to support this transition by adapting underground areas in buildings to accommodate new mobility solutions.

To meet the objective of making the south of La Confluence a PCED, the planned investment for constructing buildings is €379M allocated by the Lyon Metropolitan Authority, while an additional €6M will be dedicated to renewable energy production systems.

To achieve the ambitious objectives of the ASCEND project at both European and local level, it was necessary to mobilise a range of stakeholders, each with their own expertise.

#### **ASCEND local project participants**

At local level, Lyon is composed of varied partners, some of them are part of the European consortium and others are only local partners:

- **Pilot implementation:** is coordinated mostly by the [SPL Confluence](#) as the European coordinator but also at local level. In addition, the [city of Lyon](#) and the [Métropole de Lyon](#) are involved and follow the project closely. The Metropole de Lyon give access to open components and open data useful for the project. In addition, the pilot implementation is also run by [Urban practice](#), a private sector partner, which is a consulting company specialised in digital transition at different urban scales (building, territory and patrimony).
- **Expert support:** is provided by [Hespul](#), an association specialising in the development of sustainable photovoltaic energy and energy efficiency and by [Enertech](#), a research department specialised in energy performance. Both entities are private sector partners already involved in previous projects such as [SMART TOGETHER project](#).
- **Solution development and maintenance:** will be operated by an IT service provider selected at a later stage. It will also involve collaboration with the entities responsible for the maintenance for private buildings. This collaborative maintenance approach involves multiple stakeholders due to the need to collect data from various sources.

#### **Technical infrastructure of the solution**

The [ASCEND project](#) includes a digital solution involving the development of a local data platform aimed at monitoring the energy performance of the district. This platform tracks the quality, design,

usage, and post-construction performance of buildings, assesses actual building performance, explains various performance metrics, and identifies areas for improvement. In essence, the platform monitors and evaluates the energy performance of buildings and their surroundings to enhance user experience and track the district's achievements.

The platform utilises digital technology to optimally leverage the collected data for performance evaluation. It incorporates [open-source components](#) from the [Métropole de Lyon](#) and previous projects in which [SPL Lyon Confluence](#) collaborated with the city and the metropolitan area of Lyon. [Urban Practices](#) and SPL Lyon Confluence are preparing the specifications for developing the platform and selecting an IT service provider.

Overall, the project is collaborative and request interoperability between the different technical components of the smart city solution. To do so, the ASCEND project use open-source components to effectively manage and exploit relevant data for monitoring and evaluation purposes.

### 3. Interoperability

#### Interoperability assessment

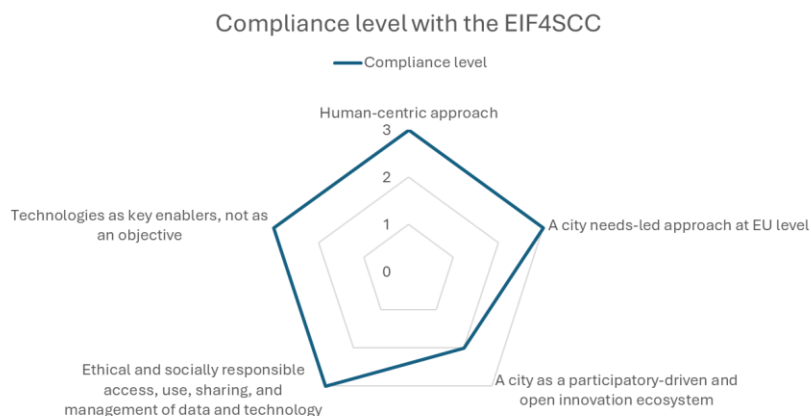
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This series of case studies on smart city projects aims at assessing the level of awareness of the [European Interoperability Framework for Smart Cities and Communities](#) (EIF4SCC). The EIF4SCC is an adaptation of the [European Interoperability Framework \(EIF\)](#) tailored for local governments, providing a comprehensive framework to guide city leaders and officials in establishing public services/projects. The framework is subdivided into several principles and elements, strategically designed to encompass all facets of interoperability, including definitions, recommendations and use cases from cities and communities across Europe. Smart city project leaders interviewed for this case study have been asked to evaluate their project's compliance the recommendations of the EIF4SCC. The following results have been based on the analysis of their self-assessment. In the Figure 2 below is presented the compliance level of the ASCEND Lyon project with the principles of the EIF4SCC. According to the self-assessment by the ASCEND coordinator, the project strongly aligns with the EIF4SCC principles of **"A city needs-led approach at EU level"**, **"Human-centric approach"** as well as **"Technologies as key enablers, not as an objective"** and **"Ethical and socially responsible access, use, sharing, and management of data and technology"**. The ASCEND project, as evaluated by its coordinator, is a comprehensive initiative that prioritises the development of a neighbourhood designed to accommodate a growing population and workforce. This project places human activities at its core, emphasising a human-centric approach. The digital solution of the ASCEND project is the creation of a local data platform. This platform is designed to monitor the energy performance of the district, thereby enhancing user experience and tracking the district's achievements. The platform utilises digital technology to optimally leverage the collected data for performance evaluation and incorporates open-source components. This approach ensures that the technology used serves the needs of the community, promoting ethical and responsible data management. The ASCEND project aims to be reused at the EU level, as demonstrated by the significant consortium created around it. It is a collaborative endeavour that requires interoperability

between the different technical components of the smart city solution. This project represents a significant step towards creating sustainable and efficient interoperable urban environments.

In addition, the ASCEND project complies to some extent with the last EIF4SCC principle of "**A city as a participatory-driven and open innovation ecosystem**".

**Figure 2 : Compliance level with the EIF4SCC Principles of the ASCEND Lyon' project**



Source: Wavestone on the basis of interviewee's input<sup>1</sup>

Moreover, the ASCEND project is mostly aligned with the recommendations of the Interoperability layers of the EIF4SCC as shown in Figure 3. In particular, the ASCEND project was able to rely on the following good practices:

- **Interoperability governance:** One of the objectives of ASCEND is to evaluate data from various actors and components. Therefore, a holistic governance approach is essential to manage different aspects of the project, such as data-sharing agreements with building co-owners and interactions with various building owners and operators. A common foundation is necessary to assess standards and use digital technologies to manage this diversity. Additionally, the platform's long-term sustainability requires anticipating data management needs and integrating interoperability from the initial design and development phase to ensure continuity,
- **Governance integrated services:** ASCEND ensures coherence and anticipation on technical subjects among the partners involved in the platform's development and those from whom data is collected. This is achieved by APIs compatible with various providers, installations, standards, and data protocols, allowing adaptation to a wide variety of solutions and entities. Additionally, communicating about the service from the early design stages to anticipate changes in stakeholders and prepare future maintenance actors is crucial,

<sup>1</sup> Each principle is represented by a spoke, with compliance levels ranging from 0 to 4, indicating the extent of adherence: 0 signifies "Not at all," 1 stands for "To a small extent," 2 represents "To some extent," 3 indicates "To a great extent".



- **Organisational interoperability:** Developing the digital platform for neighbourhood projects requires a clear structure encompassing development, investment, maintenance, and data access. Data sharing agreements define the roles of each entity, whether they are co-owners, property developers, or maintenance providers. While there is no mandatory written structure, a highly defined organisational framework is established for ASCEND to ensure clarity of responsibilities, funding, and operations, all detailed through specifications,
- **Semantic interoperability:** ASCEND project prioritises the preliminary definition of data formats, protocols, and nomenclatures as essential components. For instance, accurately inventorying and identifying the geographical coordinates of an area according to standards allows the linkage of these geographical data with energy data and other collected information. The ASCEND application was built around packaged solutions (notably for digital infrastructure, buildings, and mobility). Each solution is overseen by a responsible partner to coordinate efforts, disseminate knowledge, and ensure consistency among developments carried out in different cities and by various consortium partners,
- **Legal interoperability:** The ASCEND project prioritise the legal coherence and the use of standards to facilitate data management, including reuse licences,
- **Technical interoperability:** ASCEND project ensures the use of standardised specifications and protocols to prevent data silos and facilitate seamless data exploitation across different entities managing building components. By adopting scalable solutions, it enhances sustainability and relevance in data utilisation for diverse stakeholders. The emphasis on durability and data reuse guarantees enhances the quality of urban development projects. Additionally, the project aims for a functional platform that collects, analyses, and shares high-quality data and findings with citizens and operators, promoting transparency and informed decision-making in urban planning.

Regarding the **cultural interoperability**, while being still compliant thanks to the implication of the multitude of different stakeholders, this aspect was not a primary focus of the ASCEND project.

**Figure 3: Level of compliance with EIF4SCC layers of Lyon's ASCEND project**



Source: Wavestone

Overall, the ASCEND project's application in Lyon showcases a comprehensive approach to interoperability governance, promoting its broad adoption across diverse urban settings. The project exemplifies a significant viewpoint on interoperability, illustrating how various systems can integrate seamlessly and communicate effectively, crucial for scaling and adapting solutions across different urban environments.

If you want to learn more on ASCEND, you can consult the [website](#) of the project.