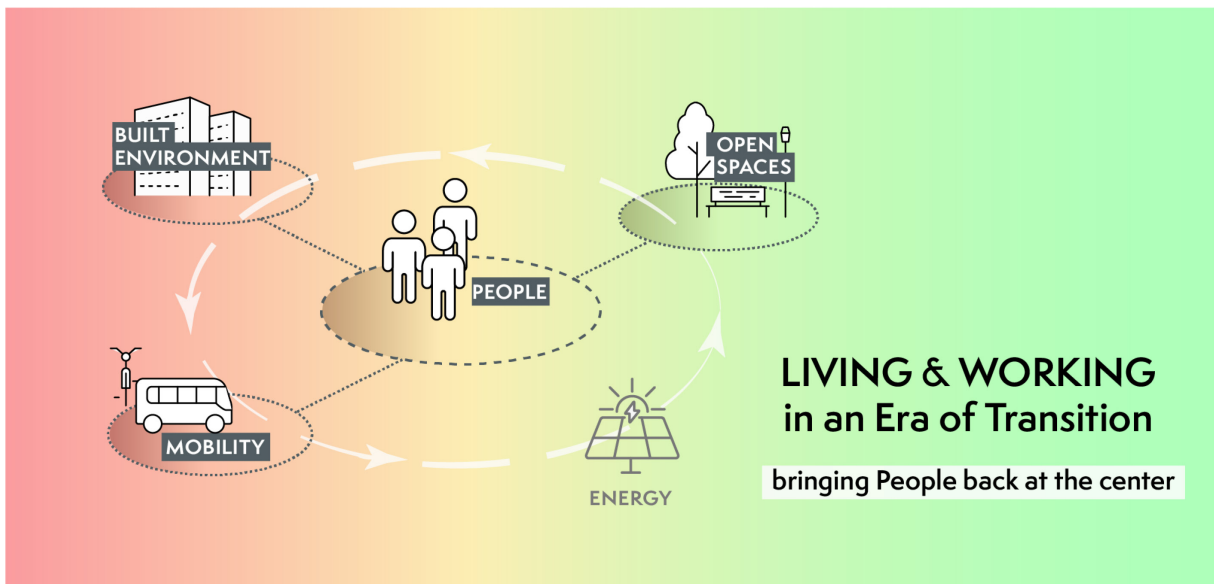




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# Highlights Report Year 1

## SWICE



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**The authors bear the entire responsibility for the content of this report and for the conclusions drawn therefrom.**



## 1 Highlights

The main highlights (results, challenges, learnings, etc.) during the reporting period were the following:

1. *Kick-off of the SWICE project and establishment of a robust management structure to ensure the successful implementation and administration of the project, as well as the efficient communication and dissemination of the SWICE activities and results to all the partners and potential stakeholders.*
2. *Consolidation of the main project documentation to ensure proper management of project data, accurate assessment of risks, and high-quality and innovative management actions (SWICE Data Management Plan, Risk Management Plan, Quality Management Plan and Innovation Management Plan).*
3. *Strengthening of the SWEET consortia network through the participation in SWEET-related gatherings and events.*
4. *Consolidation of the SWICE Position Paper on well-being, followed by a dedicated SWICE internal webinar, to establish the foundation of a common approach to well-being for the whole SWICE consortium.*
5. *Organisation and direction of workshops and surveys involving Living Labs' (LLs) occupants and stakeholders, to build a baseline to analyze of the lifestyle and behaviour of people, and identify the potential for fostering behaviour change. Participatory processes in the Suurstoffi area already lead to the definition of possible interventions to influence residents' mobility behaviour.*
6. *Organisation and direction of the first workshop on the different SWICE LLs to start outlining the characteristics of the labs, the role of stakeholders as well as expected outcomes and impacts in terms of energy savings, well-being, opportunities for upscaling and amplifying results.*
7. *Development of a preliminary version of a digital infrastructure for the collection in longitudinal and non-controlled experimental settings of quantitative and qualitative data about participants' behaviour through the fusion of smartphone sensor data, survey responses, and building data.*
8. *Development of a preliminary version of an energy model that integrates Geographic Information System (GIS) covering the entire Swiss territory. The model and its usage is being validated in the LL of Geneva in collaboration with the SIG.*
9. *Development of a Digital Twin (DT) prototype to help represent, manage, and visualise real-time data, integrating contextual features (i.e. local shadows, orientation), global data (i.e. meteorological figures, simulation algorithms) and real performance.*
10. *A thorough review of European and Swiss Energy Standards, to identify gaps in the existing building regulatory framework, especially when regulations are detrimental to indoor human comfort and well-being.*



## Faits marquants

Les principaux faits marquants (résultats, défis, apprentissages, etc.) pendant la période de référence ont été les suivants:

1. *Kick-off du projet SWICE et mise en place d'une structure de gestion rigoureuse pour assurer la mise en œuvre et l'administration réussies du projet, ainsi que la communication et la diffusion efficaces des activités et des résultats SWICE à tous les partenaires et parties prenantes potentielles.*
2. *Consolidation de la documentation principale du projet pour assurer une bonne gestion des données du projet, une évaluation précise des risques, et un haut niveau de qualité et d'innovation en ce qui concerne les actions de gestion (SWICE Data Management Plan, Risk Management Plan, Quality Management Plan et Innovation Management Plan).*
3. *Renforcement du réseau des consortiums SWEET par la participation à des rassemblements et événements liés à SWEET.*
4. *Consolidation du "SWICE position paper on well-being", suivie d'un webinaire interne dédié aux membres du consortium, afin d'établir les bases d'une approche commune du bien-être pour l'ensemble du consortium SWICE.*
5. *Organisation et direction d'ateliers et d'enquêtes impliquant les occupants et les parties prenantes des Living Labs (LLs), afin de construire une base de référence pour examiner les modes de vie et les comportements des personnes, pour ensuite identifier le potentiel pour favoriser le changement de comportement. Les processus participatifs dans la zone de Suurstoffi conduisent déjà à la définition d'interventions possibles pour influencer le comportement de mobilité des résidents.*
6. *Organisation et direction du premier atelier sur les différents SWICE LLs pour commencer à définir les caractéristiques des laboratoires, le rôle des parties prenantes ainsi que les résultats et impacts attendus en termes d'économies d'énergie, de bien-être, ainsi que d'opportunités d'effets multiplicateur et/ou d'amplification des résultats.*
7. *Développement d'une infrastructure numérique (première version) pour la collecte dans des contextes expérimentaux longitudinaux et non contrôlés de données quantitatives et qualitatives sur le comportement des participants, grâce à la fusion de données de capteurs de smartphones, de réponses à des enquêtes et de données de construction.*
8. *Développement d'une version préliminaire d'un modèle énergétique intégrant un Système d'Information Géographique (SIG) couvrant l'ensemble du territoire suisse. Le modèle et son utilisation sont en cours de validation au LL de Genève en collaboration avec les SIG.*
9. *Développement d'un prototype de Digital Twin (DT) pour aider à représenter, gérer et visualiser les données en temps réel, intégrant des fonctionnalités contextuelles (i.e. ombres locales, orientation), des données globales (i.e. chiffres météorologiques, algorithmes de simulation) et des performances réelles.*
10. *Un examen approfondi des normes énergétiques européennes et suisses, afin d'identifier les lacunes dans le cadre réglementaire existant des bâtiments, en particulier lorsque les réglementations nuisent au confort et au bien-être des personnes à l'intérieur.*



## Highlights

Die wichtigsten Highlights (Ergebnisse, Herausforderungen, Lehren usw.) während des Berichtszeitraums waren die folgenden:

1. *Kick-off des SWICE-Projekts und Aufbau einer robusten Managementstruktur, um die erfolgreiche Umsetzung und Verwaltung des Projekts sowie die effiziente Kommunikation und Verbreitung der SWICE-Aktivitäten und -Ergebnisse an alle Partner und potenziellen Stakeholder sicherzustellen.*
2. *Konsolidierung der Projektdokumentation, um eine ordnungsgemässe Verwaltung der Projektdaten, eine genaue Risikobewertung und hochwertige und innovative Managementmassnahmen (SWICE-Datenmanagementplan, Risikomanagementplan, Qualitätsmanagementplan und Innovationsmanagementplan) sicherzustellen.*
3. *Stärkung des SWEET-Konsortium-Netzwerks durch die Teilnahme an SWEET-bezogenen Veranstaltungen.*
4. *Konsolidierung des SWICE-Positionspapiers zum Thema Wohlbefinden, gefolgt von einem speziellen SWICE-internen Webinar, um die Grundlage für einen gemeinsamen Ansatz zum Thema Wohlbefinden für das gesamte SWICE-Konsortium zu entwickeln.*
5. *Organisation und Leitung von Workshops und Umfragen unter Beteiligung von Bewohnern und Interessengruppen von Living Labs (LLs), um eine Grundlinie des Lebensstils und Verhaltens von Menschen zu erstellen und das Potenzial zur Förderung von Verhaltensänderungen zu identifizieren. Partizipative Prozesse im Suurstoffi-Areal führen bereits zur Definition möglicher Interventionen zur Beeinflussung des Mobilitätsverhaltens der Bewohnerinnen und Bewohner.*
6. *Organisation und Leitung des ersten Workshops zu den verschiedenen SWICE LLs, um damit zu beginnen, die Eigenschaften der LLs, die Rolle der Stakeholder sowie die erwarteten Ergebnisse und Auswirkungen in Bezug auf Energieeinsparungen, Wohlbefinden, Möglichkeiten zur Skalierung und Verstärkung der Ergebnisse zu skizzieren.*
7. *Entwicklung einer digitalen Infrastruktur (erste Version) zur Erhebung von quantitativen und qualitativen Daten über das Verhalten der Teilnehmer in längsschnittlichen und nicht kontrollierten experimentellen Settings durch die Fusion von Smartphone-Sensordaten, Umfrageantworten und Gebäudedaten.*
8. *Entwicklung einer Vorversion eines Energiemodells, das ein geografisches Informationssystem (GIS) integriert, das das gesamte Schweizer Gebiet abdeckt. Das Modell und seine Anwendung werden im LL Genf in Zusammenarbeit mit dem SIG validiert.*
9. *Entwicklung eines Digital Twin (DT)-Prototyps zur Darstellung, Verwaltung und Visualisierung von Echtzeitdaten, Integration kontextbezogener Merkmale (z. B. lokale Schatten, Orientierung), globale Daten (z. B. meteorologische Zahlen, Simulationsalgorithmen) und reale Leistung.*
10. *Eine gründliche Überprüfung der europäischen und schweizerischen Energiestandards, um Lücken in den bestehenden baurechtlichen Rahmenbedingungen zu identifizieren, insbesondere wenn Vorschriften den Komfort und das Wohlbefinden der Menschen in Innenräumen beeinträchtigen.*



## Punti salienti

I principali punti salienti (risultati, sfide, lezioni apprese, ecc.) durante il periodo di riferimento sono stati:

1. *Kick-off del progetto SWICE e creazione di una solida struttura di management per assicurare il successo dell'attuazione e dell'amministrazione del progetto, nonché l'efficiente comunicazione e diffusione delle attività e dei risultati di SWICE a tutti i partner e potenziali stakeholder.*
2. *Consolidamento della principale documentazione del progetto per garantire una corretta gestione dei dati, un'accurata valutazione dei rischi e delle procedure di gestione innovative e di alta qualità (SWICE Data Management Plan, Risk Management Plan, Quality Management Plan e Innovation Management Plan).*
3. *Rafforzamento del network dei consorzi SWEET attraverso la partecipazione a meeting ed eventi legati a SWEET.*
4. *Consolidamento del SWICE position paper sul well-being, seguito da un webinar interno dedicato, per gettare le basi di un approccio comune al well-being valide per l'intero consorzio SWICE.*
5. *Organizzazione e direzione di workshop e survey che coinvolgono gli occupanti e gli stakeholders dei Living Labs (LL), come punto di partenza per analizzare dello stile di vita e del comportamento delle persone e identificare il potenziale per favorire un cambiamento comportamentale. I processi partecipativi nell'area di Suurstoffi hanno già portato alla definizione di possibili interventi per influenzare le abitudini dei residenti nell'ambito della mobilità.*
6. *Organizzazione e direzione del primo workshop sui diversi LL di SWICE per iniziare a delineare le caratteristiche dei laboratori, il ruolo degli stakeholder, nonché i risultati e gli impatti attesi in termini di risparmio energetico, benessere, opportunità di upscaling e amplificazione dei risultati.*
7. *Sviluppo di una versione preliminare di un'infrastruttura digitale per la raccolta, in contesti sperimentali longitudinali e non controllati, di dati quantitativi e qualitativi sul comportamento dei partecipanti attraverso la fusione di dati di sensori di smartphone, risposte a sondaggi e dati di costruzione.*
8. *Sviluppo di una versione preliminare di un modello energetico che integra il Sistema Informativo Geografico (GIS) che copre l'intero territorio svizzero. Il modello e il suo utilizzo sono in fase di validazione presso il LL di Ginevra in collaborazione con il SIG.*
9. *Sviluppo di un prototipo di Digital Twin (DT) per aiutare a rappresentare, gestire e visualizzare i dati in tempo reale, integrando caratteristiche contestuali (ad es. ombre locali, orientamento), dati globali (ad es. figure meteorologiche, algoritmi di simulazione) e prestazioni reali.*
10. *Una revisione approfondita degli standard energetici europei e svizzeri, per identificare le lacune nel quadro normativo edilizio esistente, in particolare quando le normative sono dannose per il comfort indoor e il benessere delle persone.*



## 2 Highlights of the reporting period

1. The SWICE kick-off meeting held in September 2022 and the successful conclusion of the Consortium Agreement marked together the official launch of the SWICE project. The kick-off meeting brought together over 60 participants and was the occasion for the SWICE members and cooperation partners to get to know each other and start fruitful discussions over the first workshop on SWICE Living Labs organized by WP8 (see Figure 1).  
An agile SWICE governance structure has been deployed since the beginning of the project. The EPFL Management Team has been reinforced by the hiring of a new project and Knowledge and Technology Transfer (KTT) manager. An Operational Management Team (composed by the WP leaders) was established to ensure the overall monitoring of the scientific research activities and a smooth communication among WPs. An online management tool (Monday.com) was adopted by the Consortium to facilitate the implementation and monitoring of the activities as well as the internal exchanges. The first Consortium Council meeting is planned for June 2023. The appointment of an Advisory board (AB) has been discussed at length with the SWEET Office and is still pending.
2. The main SWICE management documentation was consolidated and/or updated. This includes:
  - the SWICE Data Management Plan, to ensure the correct management, documentation and dissemination of all data collected and generated in the project;
  - the SWICE Risk Management Plan, to identify and assess potential risks linked to the project and to create strategies to prevent, mitigate, or manage those risks;
  - the Quality and the Innovation Management Plans to outline a common standard for the quality of project outputs and management actions, and to establish a framework that will facilitate the integration of innovative practices into all aspects of the project.
3. To facilitate and reinforce the exchanges with other SWEET consortia, the SWICE management team and some SWICE members participated in meetings and gatherings such as the SWEET conference (June 2022), the SWEET Management meeting (August 2022), the CROSS event (January 2023) and the SWEET KTT meeting (March 2023) (see Figure 3). By engaging with other SWEET projects, SWICE has gained valuable insights and inspiration and has started to explore potential opportunities for collaboration and partnerships. To stay informed about the progress and activities of other SWEET projects, SWICE employs multiple strategies such as following them on social media platforms and subscribing to their newsletters.
4. Within SWICE, a major discussion on well-being and its role in the project has been initiated to lay the groundwork for a common approach across the SWICE consortium. In this regard the SWICE Position Paper on Well-being was briefly presented to the OMT in March '23. This was followed by a more in-depth seminar open to all the SWICE consortium and recorded for future reference (see Figure 2). A group of 12 SWICE researchers interested in the topic was established to bring the discussion forward and agree on how to integrate the notion of well-being in all SWICE work packages. A workshop on well-being in SWICE is also planned for the June annual conference, to discuss first results of SWICE research in terms of well-being and associated frameworks.
5. To identify the most relevant dimensions and indicators to differentiate between different types of lifestyles and behaviours, workshops were organized with LLs' occupants and stakeholders and a survey for LL participant typologies was created. Three stakeholder workshops on sufficiency were organized, each accounting for around 20 participants, in June 2022 (at EPFL), September 2022 (in Zurich), and October 2022 (in Lausanne). A 1-day stakeholder workshops were also performed in the Suurstoffi and a baseline survey was carried out to collect data on



the inhabitants' consumption patterns in mobility and working. This information will be used to characterise the behaviour and lifestyle of the people living or working in selected LLs. This forms a baseline of people's lifestyle and behaviour, and will be used to analyse changes in behaviour resulting from future interventions.

6. A preliminary version of a digital infrastructure was developed for collecting longitudinal and non-controlled experimental data, both quantitative and qualitative, from smartphone sensors, surveys, and building data. Currently, only survey collection is available, but other components are actively being developed. This will enable detailed longitudinal analysis of people's behavior and lifestyle, as well as any changes resulting from interventions or other factors.
7. A GIS-based model covering the whole Switzerland was developed to integrate energy and service demands with urban and geographical characteristics. The system has been validated in the Living Lab of Geneva in collaboration with the SIG, and a clustering algorithm is applied to identify typical districts representative of Switzerland. The model is used to explore the impact of new sustainable living practices on the energy system in Switzerland.
8. A Digital Twin (DT) prototype of one SWICE Living Lab (EPFL) was developed to support the representation, management and visualization of real-time data. This integrates contextual features such as local shadows, orientation, and global data like meteorological figures and simulation algorithms. The DT model allows determining the difference between its real and simulated performance, and to simulate various scenarios that may reduce its carbon footprint.
9. In order to achieve building designs with minimum energy demand and high user comfort, a thorough investigation was conducted on standards from international, European, Swiss federal, and cantonal levels. The 2000-watt society standards, SIA 2040: Energy Efficiency Path, and MoPEC 2014-Cantonal Energy Prescription Model were examined, as well as SIA 2031, SIA 380/1, SIA 380/4 (building energy performance), SIA 180, Smeo standard, and Minergie labels (comfort provision). Post-occupancy evaluations of green-certified buildings were also considered. This led to the development of a design palette for energy-comfort synergies. Results of this research will be presented at CISBAT 2023 and will be the foundation of further study into case studies and the effectiveness of the existing Swiss regulatory framework.



Figure 1. SWICE Kick-off meeting (Sep 2022)





Figure 2. SWICE webinar (Feb 2023)



Figure 3. SWEET KTT meeting (March 2023)



### 3 Outputs of the reporting period

**Other non-peer-reviewed publications (working papers, press articles, etc.)**

Author(s), title, channel or type of publication, year
<i>Sascha Nick, Three stakeholder workshops on sufficiency, report, 2022</i>