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syn.ikia | Sustainable plus energy neighbourhoods

Syn.ikia's Newsletter

Winter edition - February 2025

Dear friends and colleagues,

The journey towards **Sustainable Plus Energy Neighbourhoods** (SPENs) has always been more than just an energy transition—it's about transforming the very fabric of our communities.

As we near the final stage of the syn.ikia project, the human dimension of these neighbourhoods stands at the forefront. Across Europe, we have seen how sustainable housing not only enhances energy efficiency but also fosters social connections, improves public health, and creates more inclusive and accessible communities. It's the people, and the stories of resilience and collaboration that truly make these neighbourhoods special.

As we reflect on five years of groundbreaking work, we are proud to announce our final conference, 'SUSTAINABLE PLUS ENERGY NEIGHBOURHOODS – THE WAY FORWARD'. This event will not only showcase the technical achievements of SPENs but will also celebrate the communities that have embraced them.

Since 2020, syn.ikia has united 13 partners across seven countries to pilot and validate four real-life SPENs, demonstrating innovative solutions for energy efficiency, flexibility, and local renewable energy integration. With the revision of EU directives like the Energy Performance of Buildings and Renewable Energy Directive III, the SPEN concept is key to implementing resilient neighbourhoods.

Highlights this month include:

- Spain's demo welcomed its first residents, emphasizing the importance of awareness, financial solutions, and local collaboration.
- Austria's Wir InHAUSer won the State Prize for Architecture and Sustainability, setting a new benchmark for low-energy refurbishment.
- New tools like the MBx model help quantify SPENs' social, economic, and environmental benefits for policymakers and investors.
- Research breakthroughs in energy management and building optimisation are paving the way for smarter, more flexible energy systems.
- Housing policy is gaining momentum at the EU level, with ongoing discussions on scaling up sustainable plus energy neighbourhoods.

A recent report also highlights the multiple benefits of SPENs, which extend beyond energy savings to include social cohesion, improved public health, and better access to community facilities. SPENs align with EU sustainability goals and offer lower investment risks while providing substantial benefits for society.

Read on for more insights, breakthroughs, and inspiring project results

The syn.ikia Coordinator
Niki Gaitani, NTNU

Event: Join us at the syn.ikia Final Conference!

📅 **24 March 2025**
📍 **Brussels, European Committee of the Regions**
🕒 **10:00 - 16:00 CET**

After five years of groundbreaking work, the syn.ikia project is coming to a milestone moment! Our final conference, **'SUSTAINABLE PLUS ENERGY NEIGHBOURHOODS – THE WAY FORWARD'**, will showcase how Sustainable Plus Energy Neighbourhoods (SPENs) can become the norm across Europe.

Since 2020, syn.ikia has united 13 partners from seven countries to pilot and validate four real-life SPENs, demonstrating innovative solutions for energy efficiency, flexibility, and local renewables. Now, as Europe accelerates the implementation of the Energy Performance of Buildings Directive and the Renewable Energy Directive III,

SPENs offer a blueprint for scaling up sustainable neighbourhoods.
What to expect?

- Keynotes from leading experts
- Live demonstrations of SPEN technological and social innovations
- Engaging panel discussions on policy, finance & flexibility

This is your chance to connect with policy, academia, finance & industry leaders shaping the future of energy-positive neighbourhoods.

Register here

📖 New reports

Report on Mainstreaming the neighbourhood approach into EU building policies

This report maps the developing policy landscape at the EU level and provides recommendations to guide policymakers in the implementation of SPENs at national and local level.

Sustainable Plus Energy Neighbourhoods (SPENs) are more than neighbourhoods with a positive energy balance. Conceptualising new buildings that are integrated into the urban infrastructure and engaging local communities in decision-making can yield multiple economic, environmental and social benefits.

SPENs have a unique opportunity to integrate wider environmental and social objectives that are well aligned with all three ESG dimensions and EU taxonomy requirements. While SPENs require significant additional investments, they also provide multiple benefits for society and residents and present a lower risk for investors.

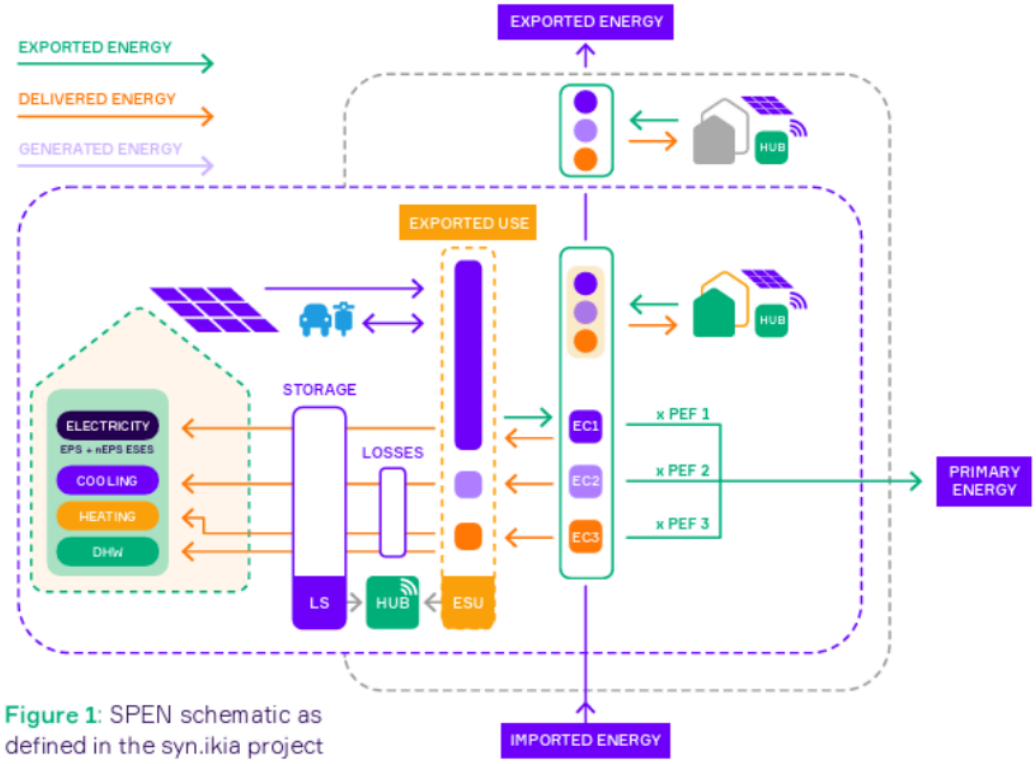


Figure 1: SPEN schematic as defined in the syn.ikia project

Read the report

Multiple benefits of sustainable plus energy neighbourhoods and their potential impact on policy and investment decisions

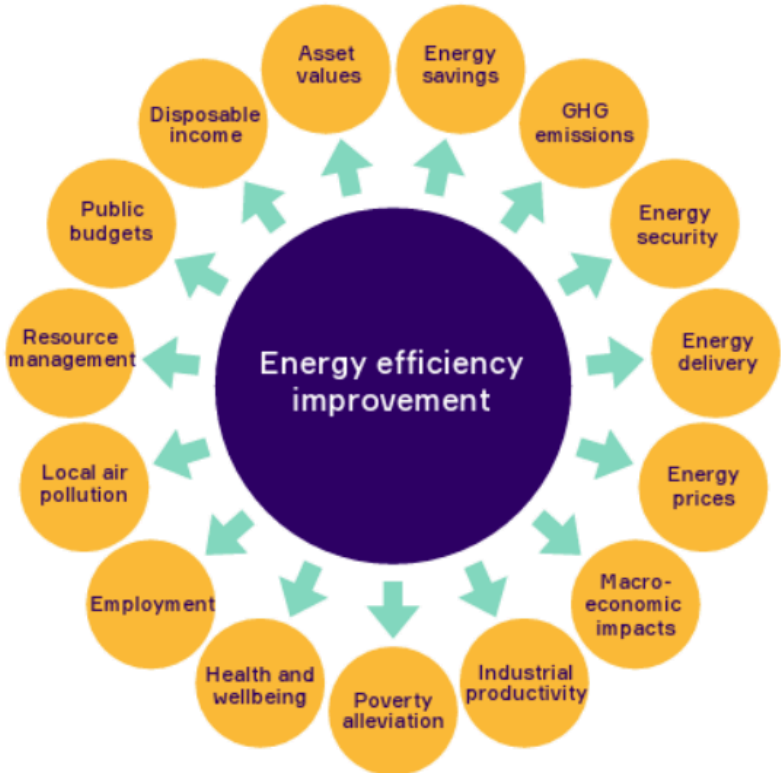
In this report, we propose a syn.ikia definition for multiple benefits of SPENs to provide a clarity on the concept and advance the transparent measurement of impacts beyond energy savings and emission reductions

Sustainable plus energy neighbourhoods offer multiple social, economic and environmental benefits, which consistently overlap with the three pillars of sustainability. This report identifies multiple benefits of SPENs that can be quantified and monetised, promoting policy innovation to support sustainability at the neighbourhood level.

Benefits at the neighbourhood level have not yet been fully conceptualised and mapped in detail. These benefits include reduced costs through

economies of scale, social cohesion, improved public health and wellbeing, inclusion, and improvements in accessibility, community facilities, safety and public spaces. In addition, socially inclusive transformation depends on community engagement, availability of shared assets, co-design and social support, which could be strengthened through SPENs.

Figure 2: Multiple benefits of energy efficiency on macroeconomic level. Retrieved from [7]



Read the report

News from the syn.ikia demos

Updates from the Spanish Demo: From Barcelona- social housing, innovation and positive energy buildings

The Spanish demo is set to welcome its first tenants in the coming weeks! To reflect on progress, syn.ikia partners gathered in Barcelona for a review of key lessons learned across all four demo sites.

Key Takeaways:

- Awareness-raising is crucial—residents engage more when they understand energy systems and their climate impact.
- The role of energy managers (Spanish demo) and tenant ambassadors (Dutch demo) has proven effective in guiding residents.
- Monitoring data is essential for improving technologies and ensuring long-term efficiency.
- Financial solutions are needed to make sustainable housing both affordable and accessible.

Local representatives stressed the importance of collaboration, social cohesion, and innovation to drive the transition to Sustainable Plus Energy Neighbourhoods (SPENs). A highlight of the visit was the study tour of the new demo building in Barcelona, showcasing how design can foster community engagement.

Learn more about the Spanish demo

News from the Austrian demo: syn.ikia Austrian demo wins the State Prize for Architecture and Sustainability 2024

The Wir InHAUSer residential complex in Salzburg, part of the syn.ikia project, has been awarded the State Prize for Architecture and Sustainability 2024! Recognised for its innovative and resource-efficient refurbishment, the project was one of three winners selected from 83 submissions.

Why It Stands Out:

- Smart, sustainable upgrades—from outdated, inefficient housing to a modern, low-energy building.

- Expansion with a timber hybrid structure, increasing apartments from 75 to 99 while preserving the original silhouette.
- Energy-efficient solutions, including pellets, heat pumps, and wastewater heat recovery.

The award highlights Austria's commitment to climate-friendly, energy-efficient, and resource-conscious construction. Congratulations to the entire team behind this inspiring transformation!

Learn more about the Austrian demo

News from partners

[BPIE] MBx tool - Quantifying multiple benefits of sustainable plus energy neighbourhoods for investment and policy decision-making

syn.ikia was present at the European Council for an Energy Efficient Economy (eceee) conference on 'Sustainable, safe & secure through demand reduction'. Victoria Taranu, Senior Researcher at BPIE, presented one of the newest syn.ikia tools.

The MBx tool, developed within syn.ikia project, is a step forward in quantifying and monetising the social welfare, micro-economic and environmental benefits of projects, by considering the added values of the SPEN approach. This decision-making tool for policymakers and investors uses Social Cost-Benefit Analysis (S-CBA) method to compare the benefit-cost ratio and return-on-investment of SPEN against that of BAU. MBx tool can help investors identify ESG investment opportunities and future-proof real estate assets.

Read More

[Housing Europe] Watts needed: securing a just energy transition for housing

syn.ikia is proud to present the second episode of the *Making a House a Home* podcast series, produced in collaboration with Housing Europe. This episode tackles a pressing question from the European Parliament: how can we achieve a fair energy transition while

ensuring access to affordable, sustainable housing?

With the first-ever EU Commissioner for Housing, a dedicated Task Force, and the upcoming Affordable Housing Plan, housing policy is taking centre stage in Brussels. Our guests—MEP Brigitte van der Burg, a key voice on Europe's housing crisis, and Julien Dijol, Policy Director at Housing Europe—explore:

- The impact of Fit for 55 & the Energy Performance of Buildings Directive on low-income households
- Financial and regulatory solutions to scale up sustainable housing
- How social and cooperative housing can drive innovation in the sector

Housing Europe, representing 43,000 public, cooperative, and social housing providers across 31 countries, highlights real-world solutions, including syn.ikia's plus-energy neighbourhoods—communities that generate more renewable energy than they consume.

Listen here

Community buy-in wins half the battle for sustainable neighbourhoods

syn.ikia is excited to present the third episode of the *Making a House a Home* podcast series, produced in collaboration with Housing Europe. This episode explores the policy framework needed for a just energy transition, with a special focus on Sustainable Plus Energy Neighbourhoods (SPENs)—communities that generate more energy than they consume while remaining affordable and inclusive.

Joining the discussion is Ciarán Cuffe, Co-President of the European Greens and key architect of the recast Energy Performance of Buildings Directive (EPBD). Together, we dive into:

- Why a neighbourhood approach is crucial for decarbonising Europe's buildings
- The political and practical barriers to scaling up SPENs
- The role of social housing providers in driving this transition

With the EU introducing a Commissioner for Housing, a cross-policy task force, and momentum building for a pan-European investment platform, could this be the turning point for energy-positive neighbourhoods?

Listen here

[DTU] New academic papers published!

Shahab Tohidi, Henrik Madsen, Davide Calì, Tobias KS Ritschel, "Optimal price signal generation for demand-side energy management," ***Smart Energy*****, 2025.**

This paper investigates optimal price generation via the Flexibility Function and studies its employment in controller design for demand-side management, its capability to provide ancillary services for balancing throughout the Smart Energy Operating System, and its effect on the physical level performance. Sequential and simultaneous approaches for computing the price signal, along with various cost functions are analysed and compared

Henrik Madsen, Georgios Tsaousoglou, Tobias Kasper Skovborg Ritschel, Shahab Tohidi, Hanne Binder, Henrik Lund Frandsen, Rune Grønborg Junker, "Incentivising and activating multi-purpose flexibility for the future power system," ***Danish Utility Regulator*****, 2024.**

This paper outlines the large economic benefits of demand-side flexibility both with respect to direct savings related to infrastructure investment and indirect savings for the consumers through cheaper electricity prices and lower grid costs. It is argued that one of the main barriers for the green transition and for achieving these benefits is the existing regulatory framework and most importantly the existing tariffs and energy taxes. Another challenge is the conventional market design which is a barrier for activating flexibility both locally at DSO-levels and in multi-energy carrier settings. This paper will outline principles for proper tariffs and energy taxes as well as new disruptive methodologies needed for integrating flexible assets into energy markets.

Shahab Tohidi, Davide Calì, Henrik Madsen, "Adaptive Model Predictive Controller for Building Thermal Dynamics," ***IEEE Control Systems Letters*****, 2024.**

Model predictive controllers are becoming widespread in building thermal dynamic control and energy management systems. Decreasing building energy consumption, load shifting, cost reduction, and indoor air quality improvement are some of the topics that these controllers have been shown to be efficient. However, they rely on accurate models that are hard to develop and can be expensive. Additionally, the model should be time-varying to represent the thermal dynamics in a building. To address this issue, this paper proposes an adaptive model predictive controller for thermal dynamic control in buildings. It includes an adaptive parameter identification algorithm that updates the model parameters and guarantees that the estimated parameters converge to the actual values.