SOLAS CAPITAL

WHITE PAPER SERIES

October 2025

www.solas.capital

From Energy Bills to Energy Assets: Smart Buildings Revolutionizing the Power Grid

How Buildings Transform from Consumers to Active Energy System Partners

ABSTRACT

Buildings are undergoing a profound shift from passive energy consumers to active *prosumers*—producing, consuming, and trading energy while leveraging digitalisation and advanced storage technologies to maximise flexibility and efficiency. The European building sector is at a pivotal moment, transforming from the continent's largest energy consumer into a dynamic prosumer network.

This white paper offers practical guidance for navigating this transition. It quantifies the economic benefits, examines regulatory frameworks, and highlights critical success factors for building prosumerism. As Europe advances toward its 2050 carbon-neutrality goals, intelligent energy-enabled buildings will be central to delivering a resilient, affordable, and sustainable energy future.

Author: Sebastian Carneiro

Co-Author: Maria Tulgara

Buildings: From Bill-Payer to Profit-Maker

Buildings as Prosumers: Leading the Energy Transition

Buildings are undergoing a fundamental transformation from passive energy consumers to active participants in the energy system. This whitepaper examines how buildings are evolving into "prosumers" that both consume and produce energy, integrate advanced storage systems, participate in energy communities, and leverage intelligent demand response technologies.

The building sector represents a critical challenge and opportunity in the global energy transition. Buildings currently account for **40% of EU energy consumption, 36% of greenhouse gas emissions** and more than half of the continent's gas consumption[1], making them the single largest energy consumer and a critical focal point for decarbonisation efforts. The integration of intelligent demand systems, battery energy storage systems (BESS), energy communities, heat storage technologies, and smart appliances represents a transformative opportunity to revolutionize the energy landscape.

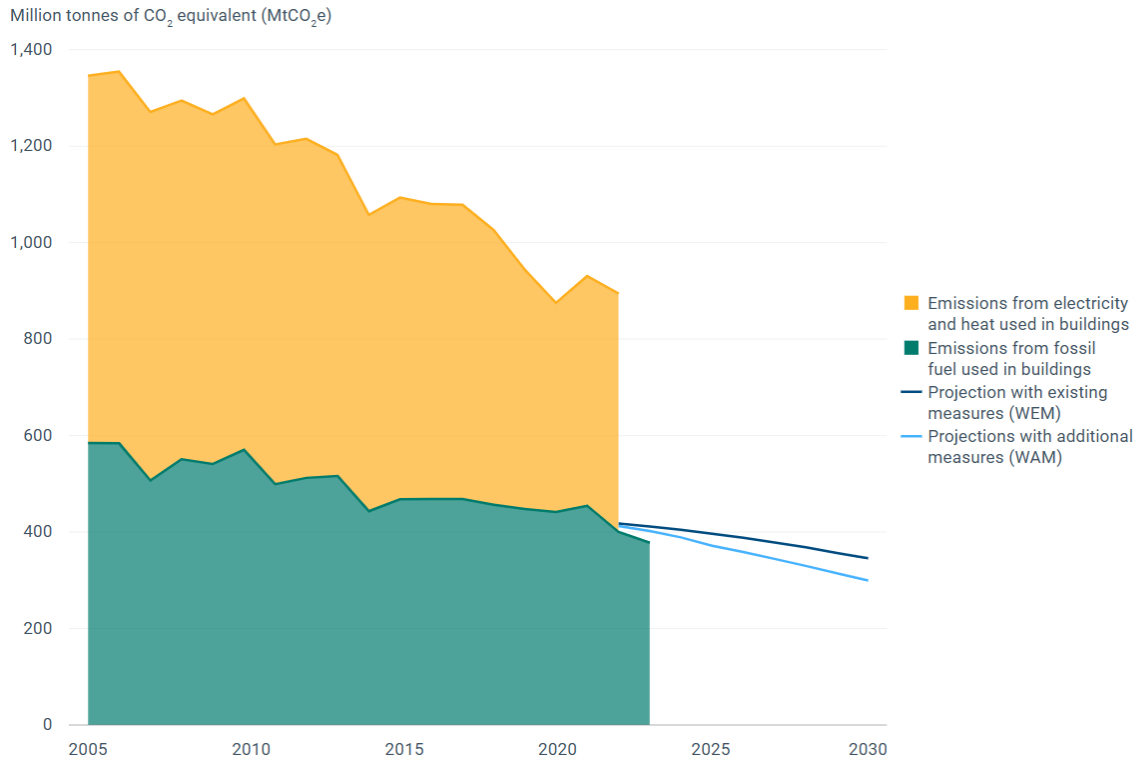


Figure 1: Greenhouse gas emissions from energy use in buildings in Europe[2]

[1] European Commission (Directorate-General for Energy), 2025. Commission sets the EU's building sector on a pathway towards greater energy efficiency and decarbonisation. Commission sets the EU's building sector on a pathway towards greater energy efficiency and decarbonisation

[2] European Environment Agency, 'Greenhouse gas emissions from energy use in buildings in Europe' (EEA, 31 October 2024) https://www.eea.europa.eu/en/analysis/indicators/greenhouse-gas-emissions-from-energy/greenhouse-gas-emissions-from-energy-use-in-buildings-in-europe.

Buildings as Prosumers: The Economic Model

Energy prosumption represents a paradigm shift in how buildings interact with the energy system. Through the deployment of residential renewable energy technologies energy prosumption reduces greenhouse gas emissions, speeds up the energy transition and provides important community benefits:

- **Self-consumption savings**: Avoiding retail electricity prices and grid and other levies
- **Feed-in tariff revenues**: Earning €0.03-0.20/kWh for exported electricity (varies by country and system size)
- **Revenues from selling to energy communities**: By pooling generation with neighbours, building owners can earn higher rates than wholesale prices through local trading, by selling surplus electricity to other community members who consume more or do not own generation assets, thereby enabling internal peer-to-peer trades within the community.
- **Grid service payments**: Additional revenue from providing flexibility services
- **Property value increases**: Buildings with integrated renewable systems command premium prices

The Scale of Building Energy Consumption

Defining the scale of Transformation

The buildings sector encompasses the energy used for construction, heating, cooling, lighting, and powering appliances and equipment in residential and commercial spaces. In 2024, global electricity consumption rose by 4.3%—an increase of nearly 1,100 terawatt-hours (TWh), more than double the average annual growth of the past decade. The buildings sector was the primary driver of this surge, accounting for over 600 TWh of additional electricity use, or nearly 60% of the total increase.[3]

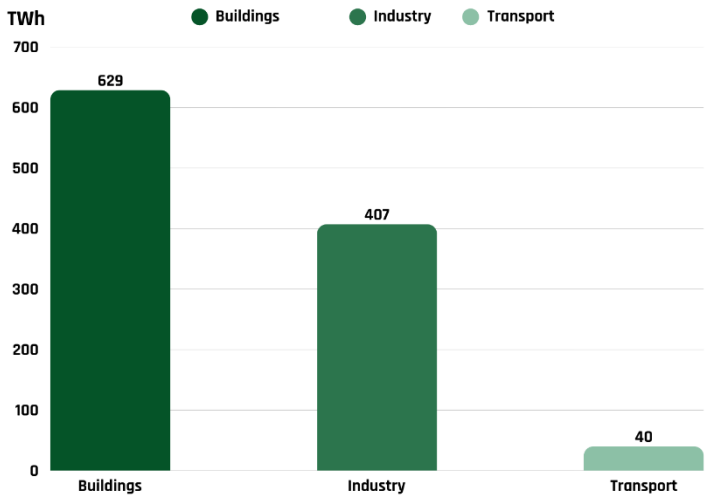


Figure 2: 2024 electricity consumption by sector[2]

[3] IEA (2025). Global Energy Review 2025. International Energy Agency. https://www.iea.org/reports/global-energy-review-2025/electricity, p.21-22

At present, about 35% of the EU's buildings are over 50 years old, 85% of EU buildings constructed before 2000 and almost 75%[4] of the building stock is energy inefficient. At the same time, only about 1%[5] of the building stock is renovated each year.

Buildings have the potential to have a central role in the transition of EU citizens from energy consumers to energy prosumers, with growing possibilities of integrating energy savings, energy production and energy storage technologies. This transformation is enabled by the convergence of multiple technologies: distributed renewable energy generation, advanced storage systems—including battery storage (BESS), EV charging, and thermal storage—and intelligent demand management. The decreasing prices of upfront costs, combined with supportive policies, is enabling buildings to transition from cost centers to potential profit centers in the energy system. Buildings can now:

- Generate their own renewable electricity
- Store excess energy for later use
- Sell surplus power back to the grid
- Participate in demand response programs
- Optimise energy consumption based on real-time pricing.

Regulatory Framework

Building Energy Efficiency and Prosumerism in Europe

Buildings in Europe are rapidly evolving from passive energy consumers to active energy producers and prosumers. The European Union's updated Energy Performance of Buildings Directive ("EPBD") (EU/2024/1275), effective since May 2024, mandates that new buildings must be "zero-emission buildings" by 2030, requiring them to generate or source very low amounts of energy largely from renewable means onsite or nearby. The EPBD establishes additional ambitious goals, aiming to reduce energy consumption by 11.7% by 2030 across the EU's building stock. It also promotes energy independence by encouraging the uptake of renewable energy sources and strengthening the competitiveness of cleantech companies and the construction sector.[6]

This regulatory framework underpins a holistic transformation in building energy generation capacity across multiple technologies, aiming to decarbonise the built environment by 2050.

[4] European Commission. *Energy Performance of Buildings Directive (EU/2024/1275)*. 2024. https://energy.ec.europa.eu/topics/energy-efficiency/energy-performance-buildings/energy-performance-buildings-directive_en.

[5] World Green Building Council. 2024. *EPBD and Renovation Minimum Energy Performance Standards factsheet*. https://www.bpie.eu/wp-content/uploads/2022/02/rev6_SPIPA_EU.pdf, p.4.

[6] Commission, 'Commission sets the EU's building sector on a pathway towards greater energy efficiency and decarbonisation' (30 June 2025) https://energy.ec.europa.eu/news/commission-sets-eus-building-sector-pathway-towards-greater-energy-efficiency-and-decarbonisation-2025-06-30_en

The Technical Reality

Rooftop Solar PV

Solar PV is projected to become the leading source of renewable electricity by 2029, driving 80% of the growth in global renewable capacity[7] This expansion is fuelled by the rapid deployment of large-scale solar power plants and the widespread adoption of rooftop solar systems by businesses and households. As a result, the role of buildings in the energy system is undergoing a fundamental transformation, shifting from passive energy consumers to active participants in electricity generation and grid interaction.

Solar PV is the cornerstone of building-integrated energy generation in Europe. The revised EPBD enforces optimised solar energy generation design for all new public and non-residential buildings with floor areas over 250 m^2 starting in 2026, with milestone expansions to older buildings by 2030. From 2029, the obligation extends to all new residential buildings and roofed car parks physically adjacent to buildings[8]. The directive streamlines permitting, requires national criteria for exemptions, and mandates support frameworks to ensure technical and economic feasibility—positioning buildings as key contributors to the EU's clean energy transition.

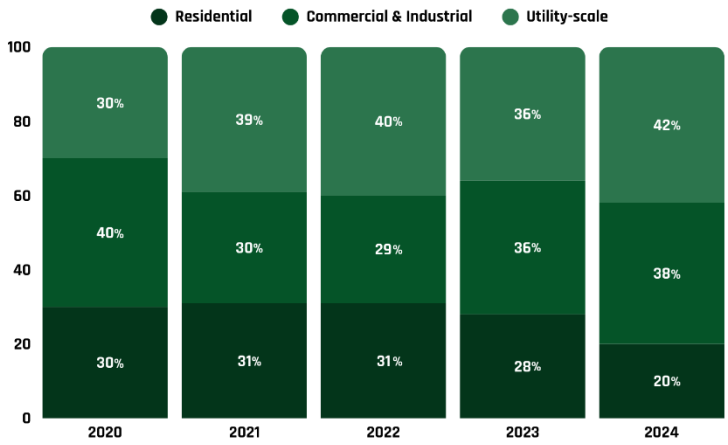


Figure 3: EU-27 annual solar PV segmentation 2020-2024 [9]

Globally, the number of households equipped with solar photovoltaic (PV) systems is projected to increase substantially, rising from approximately 25 million today to over 100 million by 2030.[10] The transformation is driven by significant cost reductions, as global spot prices for solar PV modules fell

[7] IEA. (2024). *Renewables 2024: Analysis and forecast to 2030* (Revised version, October 2024), page 8

[8] Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast) [2024] OJ L202/75, art 10.

[9] SolarPower Europe. (2024). EU Market Outlook for Solar Power 2024-2028. SolarPower Europe. p.11

[10] International Energy Agency. (2024). *Net Zero by 2050: A Roadmap for the Global Energy Sector*. https://iea.blob.core.windows.net/assets/deebef5d-0c34-4539-9d0c-10b13d840027/NetZeroby2050-ARoadmapfortheGlobalEnergySector_CORR.pdf , p.74

by 50% between December 2022 and December 2023 and continued to decline over 2024 due to growing overcapacity in the supply chain and intense competition among manufacturers[11].

Battery Energy Storage Systems (BESS)

BESS plays a crucial role in enabling flexibility for buildings and communities. By storing surplus renewable energy generated on-site or within the community, BESS allows shifting energy use from peak demand or high price periods to off-peak or low-price times, ensuring grid stability and economic benefits for owners.

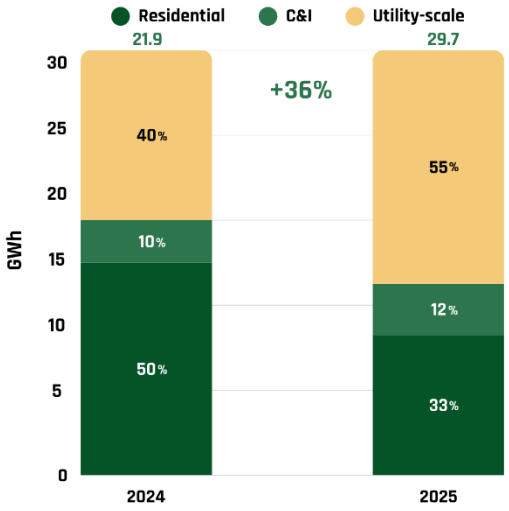


Figure 4: Europe annual BESS installed capacity 2024-2025[12]

In residential buildings, BESS are primarily used in conjunction with solar photovoltaic (PV) systems to store excess solar energy generated during the day for use during the evening or periods of low solar generation. This hybrid PV+BESS setup significantly increases renewable self-consumption and energy self-sufficiency.

European pilot projects show that homes equipped with both PV and BESS can cover up to 80% of their annual power demand, compared to about 48% coverage when only PV is installed without storage. Even households with electric heating demand can cover around 60% of their annual demand with PV+BESS, versus 38% without storage. These systems also bring substantial environmental and financial benefits, such as reducing CO2 emissions by roughly 2.8 tons per year, saving about 3.4 MWh of energy annually, and cutting annual energy costs by approximately €390 per household

Electric Vehicles (EVs)

Electric vehicles represent a revolutionary opportunity for buildings to expand their energy storage capacity and grid interaction capabilities. As EVs become increasingly prevalent, their large battery

[11] International Energy Agency, "Renewables 2024: Analysis and Forecast to 2030" (IEA, Paris, October 2024) https://iea.blob.core.windows.net/assets/17033b62-07a5-4144-8dd0-651cdb6caa24/Renewables2024.pdf, p.92.
[12] SolarPower Europe. (2025). *European battery storage grows 15% in 2024, EU energy storage action plan needed* [Europe annual BESS installed capacity 2024-2025]. Retrieved August 5, 2025, from https://www.solarpowereurope.org/press-releases/new-report-european-battery-storage-grows-15-in-2024-eu-energy-storage-action-plan-needed

systems can serve dual purposes: providing transportation and acting as distributed energy storage resources for buildings and the broader energy grid through Vehicle-to-Grid (V2G) technology.

V2G technology enables bidirectional energy flow between EVs and the electricity grid, allowing vehicles to:

- Store excess renewable energy when production exceeds demand
- Discharge electricity back to buildings or the grid during peak periods
- Provide grid stabilization services while parked
- Generate additional revenue streams for EV owners and building operators

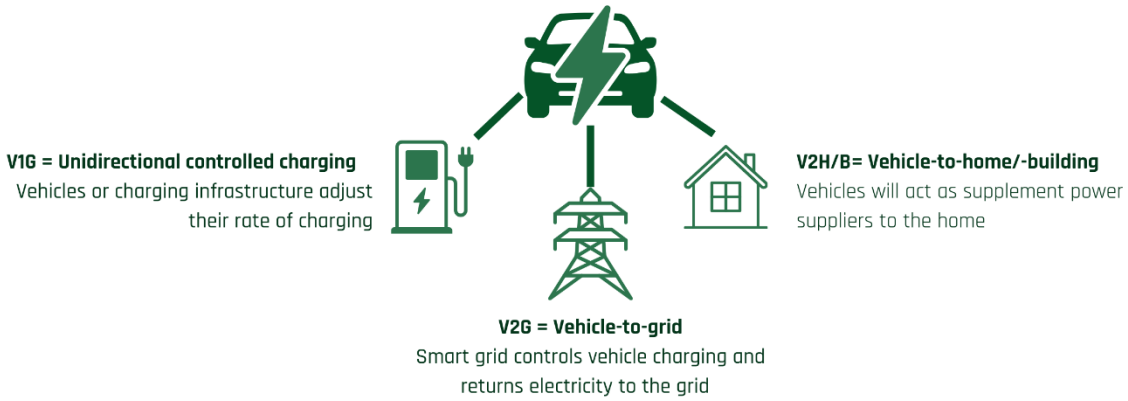


Figure 5: Advanced forms of smart charging[13]

While V2G technology is still in early deployment, several European cities are demonstrating its real-world viability.

Utrecht launched Europe's first large-scale V2G system with 50 Renault EVs in a ridesharing fleet. The initiative demonstrates how carsharing operators can generate revenue from parked vehicles while supporting grid stability in a city where 35% of rooftops have solar panels. Another example is Volkswagen trial for V2G technology in Hudiksvall with 200 ID. electric vehicles equipped with bidirectional DC chargers. The project evaluates how EVs can store clean energy for household use and return surplus electricity to the grid when economically beneficial.[14] These initiatives highlight the need for harmonised European regulations including fiscal incentives, revised grid fees, and simplified certification to enable EVs as distributed energy assets within the building prosumerism ecosystem.

Heat Pumps

Heat pumps represent one of the most significant technologies for building decarbonisation, providing both heating and cooling while drastically reducing energy consumption compared to conventional fossil fuel systems. Despite short-term market fluctuations, heat pumps remain the fastest-growing heating technology across Europe with over 25.5 million installed units in 19 reporting countries as of

[13] International Renewable Energy Agency (IRENA 2019), Innovation outlook: Smart charging for electric vehicles – Summary for policy makers, p.3

[14] European Commission, 'Two European cities advance vehicle-to-grid (V2G) solutions', Urban Mobility Observatory, 3 July 2025, https://urban-mobility-observatory.transport.ec.europa.eu/news-events/news/two-european-cities-advance-vehicle-grid-v2g-solutions-2025-07-04_en

2024. Annual sales reached approximately 2.31 million units in 2024, a decline of 22% compared to the previous year, largely due to reduced government incentives, a cooling economic climate, and lower gas prices.[15] Nonetheless, the occupation and policy momentum behind heat pumps continue to accelerate toward EU climate goals.

Key performance metrics include:

- **Energy efficiency**: Modern heat pumps achieve coefficients of performance (COP) of 3-5, meaning they produce 3-5 kWh of heating/cooling for every 1 kWh of electricity consumed[16]
- **Grid flexibility**: Smart heat pumps can shift 40-60% of their load to off-peak hours[17]
- **Carbon reduction**: Heat pumps reduce GHG emissions by at least 20% compared to gas boilers, with savings reaching up to 80% in countries with cleaner electricity.[18]

The integration of heat pumps with building energy management systems (BEMS) enables advanced demand response functionality. By dynamically adjusting heating or cooling schedules in response to periods of high renewable energy generation or low electricity prices, heat pumps can leverage the building's thermal mass as a form of energy storage. This thermal storage capacity allows shifting of heating or cooling loads for several hours, providing valuable grid support services while ensuring comfort for occupants. Such smart integration optimises energy use, reduces costs, and promotes the effective use of renewable electricity.

Demand Response Capable Appliances

Demand Response (DR)-capable appliances deliver significant value by enabling flexible energy consumption, which can reduce electricity costs and enhance grid reliability. These appliances include air conditioners, water heaters, as well as a wide range of residential devices such as washing machines, dishwashers, refrigerators, and tumble dryers.

In Europe, demand response (DR) facilitates the integration of variable renewable energy sources by reducing dependence on fossil-fuel backup and supporting demand–supply balancing in power systems. For households, DR can lower energy costs by shifting consumption to off-peak or low-price periods, particularly under dynamic and real-time electricity tariffs. The adoption of smart appliances is accelerating, with residential penetration expected to reach 16.1% by 2025 and expand further to 39.8% by 2029 across Europe.[19]

Water Heaters

Electric storage water heaters with DR controls can shift heating cycles to off-peak hours without impacting user experience. This shifting can reduce peak load and overall electricity costs. Heat pump water heaters (HPWHs) can cut residential water heating energy use by 60–70% compared to electric

[15] European Heat Pump Association (EHPA), *European Heat Pump Market Report 2025: Executive Summary*
[16] International Energy Agency (IEA). (2022). *The Future of Heat Pumps*, p.18
[17] California Energy Commission (2024) *Technical Evaluation of Air-to-Water Heat Pumps with Thermal Storage, Final Report*, Report Number ET22SWE0050, Table 1
[18] International Energy Agency (IEA). (2022). *The Future of Heat Pumps*, p. 13.
[19] Global Market Insights. (2025). Europe Demand Side Management Market Size - By Service, By Technology Solutions, By End Use, Analysis, Share, Growth Forecast, 2025 - 2034 https://www.gminsights.com/industry-analysis/europe-demand-side-management-market

resistance heaters.[20] This is a built-in cost-saving benefit that compounds when combined with DR controls.

Laundry Appliances and Dishwashers

These appliances, when equipped with DR capabilities and connected through smart home systems or aggregators, can be scheduled to operate during low-price periods. While specific quantified savings vary by household and tariff structure, the flexible energy consumption enabled by DR can reduce bills and align consumption with renewable generation patterns.

Refrigerators and Tumble Dryers

Though less flexible in use timing, advancements in smart grid communication and thermal storage allow moderate shifts in operation cycles to reduce peak demand impact, contributing to overall system-level grid benefits and potential consumer savings.

A significant breakthrough in European demand response was the launch of the EU Code of Conduct for Energy Smart Appliances on April 23, 2024. This voluntary initiative, developed by the European Commission's Joint Research Centre and DG Energy, aims to ensure cross-brand interoperability of home appliances. Ten major manufacturers—including Arçelik, Clivet, Daikin, Electrolux, Miele, Mitsubishi Electric, Panasonic, Vaillant Group, Vestel, and Viessmann—committed to developing interoperable connected products within a year.[21]

Capitalizing on Negative Electricity Pricing Opportunities

The transformation of buildings into prosumers presents unique opportunities to benefit from the increasingly frequent negative electricity pricing events detailed in our companion whitepaper "When Energy Pays You: The Paradox of Negative Electricity Prices."[22] As negative pricing hours quadrupled in Europe to 821 hours in 2023 and rose to 1,031 hours by September 2024, buildings equipped with battery energy storage systems (BESS) and smart demand response technologies are uniquely positioned to capitalize on these market anomalies. During negative price periods—when generators pay consumers to absorb excess electricity—prosumer buildings can charge their BESS at a profit, effectively being paid to store energy that can later be discharged during high-price periods. This arbitrage opportunity transforms what was once a market dysfunction into a revenue stream. Smart buildings with flexible loads can shift energy-intensive operations like EV charging, heat pump operation, and industrial processes to coincide with negative price windows, reducing operational costs while supporting grid stability. The convergence of building prosumerism and negative pricing creates a compelling economic case: buildings can simultaneously reduce their energy bills, generate revenue

[20] Salcido, V., Chen, Y., Cheslak, K., Taube, B., Franconi, E., Rosenberg, M., and Young, M., 2025. Demand Response in Residential Energy Code. Pacific Northwest National Laboratory, Richland, WA, prepared for the U.S. Department of Energy under contract DE-AC05-76RL01830. Available at: https://www.energycodes.gov/sites/default/files/2025-01/TechBrief_GEB_Demand_Response.pdf, p.9

[21] European Commission. (2024, April 23). Energy Smart Appliances: launch of an EU Code of Conduct for interoperability. European Commission. https://joint-research-centre.ec.europa.eu/jrc-news-and-updates/energy-smart-appliances-launch-eu-code-conduct-interoperability-2024-04-23_en

[22] Carneiro, S., & Tulgara, M. (2025). *When energy pays you: The paradox of negative electricity prices* (White Paper). Solas Capital AG. https://www.solas.capital

from grid services, and accelerate the integration of renewable energy by absorbing excess generation during periods of oversupply.

Grid-Interactive Efficient Buildings (GEB)

Grid-Interactive Efficient Buildings represent the convergence of energy efficiency and grid flexibility, transforming buildings from static energy consumers into dynamic grid assets. As illustrated in Figure 6, GEBs can modulate their load profiles in response to grid conditions, shifting from traditional static consumption patterns to flexible, responsive energy management.

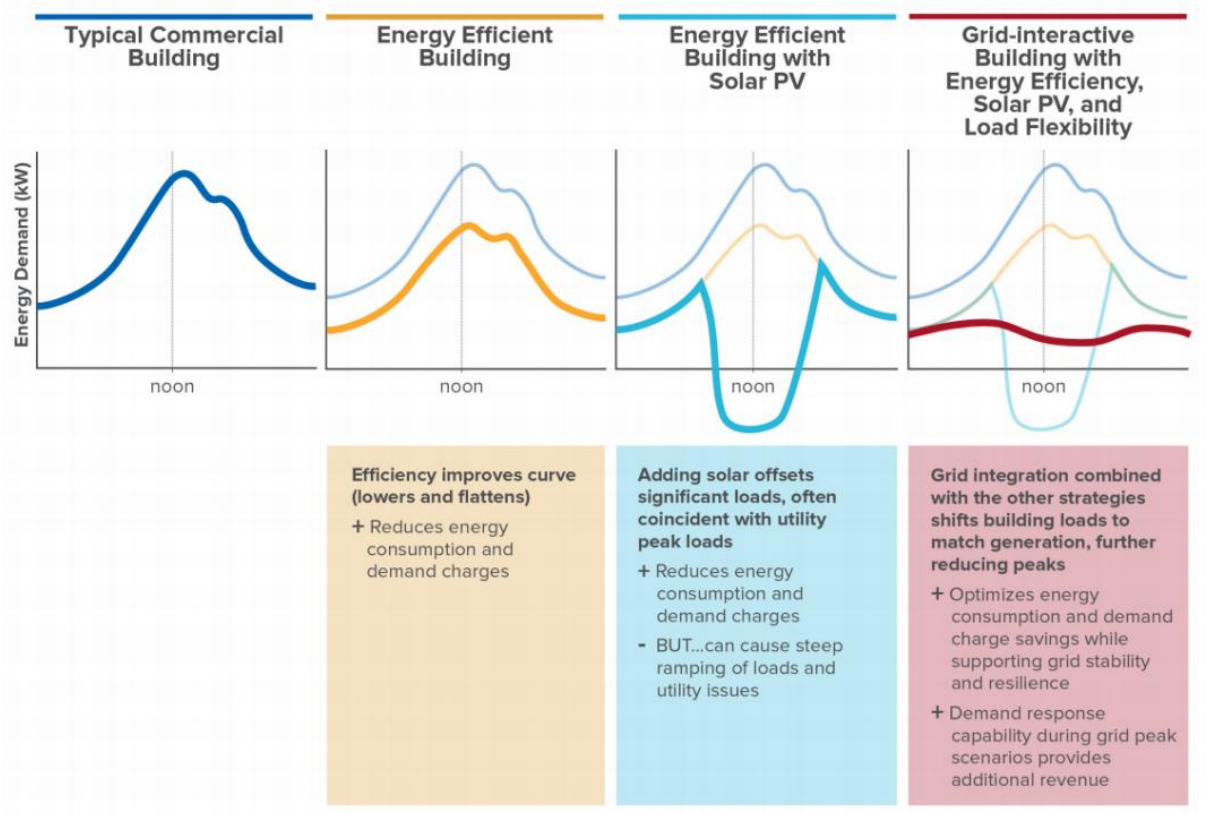


Figure 6: Grid Integrated Building: Load Profiles[23]

Efficiency First

GEBs build upon a foundation of high-performance building envelopes, efficient HVAC (Heating Ventilation, Airconditioning) systems, and LED lighting to minimize baseline energy consumption. This efficiency reduces the overall load that must be managed, making flexibility strategies more impactful.

Connected Systems

GEBs integrate multiple technologies including solar PV, battery storage, smart appliances, and EV charging into a unified, intelligent system. These components communicate through advanced building automation systems that orchestrate energy flows based on real-time grid signals, occupancy patterns, and weather forecasts.

[23] Perry, C., Bastian, H., & York, D. (2019). *Utility programs: State of the market* (ACEEE White Paper). American Council for an Energy-Efficient Economy. https://www.aceee.org/sites/default/files/pdfs/gebs-103019.pdf

Flexible Load Management

GEBs can shift, shed, or modulate electrical loads to support grid stability. During peak demand periods, buildings can:

- Pre-cool or pre-heat spaces before high-demand periods
- Delay non-critical processes like EV charging or appliance cycles
- Discharge stored energy from batteries to reduce grid draw
- Dim lighting in unoccupied areas

Grid Services Provision

Beyond self-optimisation, GEBs actively provide valuable services to the grid:

- **Demand Response**: Reducing consumption during grid stress events
- **Frequency Regulation:** Using battery systems to stabilize grid frequency
- **Voltage Support:** Managing reactive power through smart inverters
- **Renewable Integration:** Absorbing excess renewable generation during periods of oversupply

A notable European initiative currently deploying such buildings across 12 EU countries, integrating smart sensors, controls, and analytics to optimise building-grid interaction, supports two-way communication between occupants and the grid, and validates a broad portfolio of grid services such as demand-side flexibility, peer-to-peer energy trading, and system planning services. The initiative expects key outcomes including:

- 13.5% reduction in building energy consumption,
- 25% increase in flexibility,
- 17% reduction in greenhouse gas emissions
- up to 100% increase in self-consumption of renewable energy[24]

Energy Communities: Collective Prosumerism

The Renewable Energy Directive (EU) 2018/2001, revised in 2023, establishes a comprehensive legal framework requiring Member States to enable and support energy communities. This directive mandates that citizens, local authorities, and SMEs have the right to produce, consume, store, and sell renewable energy collectively. Member States must ensure non-discriminatory treatment of energy communities, remove unjustified barriers, and provide enabling frameworks that include simplified procedures for grid connection and fair compensation for energy fed into the grid.

[24] European Commission. Smart Grid-Efficient Interactive Buildings | EVELIXIA | Project | Fact Sheet. CORDIS, Horizon Innovation Actions, Project ID 101123238. Available at: https://cordis.europa.eu/project/id/101123238

In the building sector, including households, housing associations, small and medium-sized enterprises (SMEs), offices, and public institutions such as schools and hospitals, prosumers can either act individually or as part of collective initiatives such as energy communities or cooperatives, which pool resources and expertise to implement larger renewable energy projects. This collective approach can also improve access to financing and enhance community engagement.

Energy communities offer multiple advantages for participants and society:

- **Lower energy bills** through collective production and consumption
- **Reduced energy poverty** by making clean energy more accessible
- **Local green job creation** and economic development
- **Increased energy efficiency** through shared resources
- **Greater control** over local energy systems

The European Energy Communities Facility, launched in September 2024 is designed to democratize the energy transition and aims to support at least 140 energy communities by across Europe by 2028 with €45,000 grants and comprehensive capacity-building programs. This facility would transform the theoretical concept of energy communities into practical reality by providing not just funding, but also technical expertise, training modules, and ongoing support in local languages.[25]

Energy Efficiency: The Foundation of Building Prosumerism

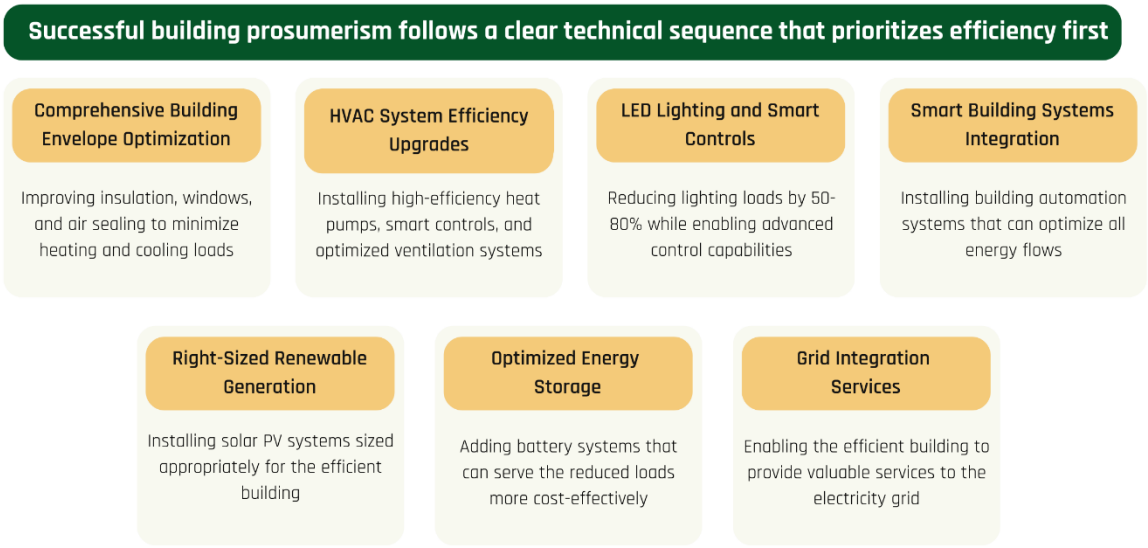
The Role of Energy Efficiency in Prosumer Economics

While this whitepaper has focused on the technologies that enable buildings to become active prosumers, it's essential to understand that energy efficiency serves as the fundamental foundation that makes effective prosumerism possible and economically viable.

Energy efficiency is not merely one component of building prosumerism—it is the cornerstone that enables all other prosumer technologies to function optimally. Without first reducing a building's baseline energy consumption through comprehensive efficiency measures, the economics of renewable generation, energy storage, and smart systems become significantly less attractive. An efficient building requires smaller renewable energy systems to achieve energy independence, needs battery storage to provide the backup duration, and can offer more valuable grid services because its reduced consumption creates greater flexibility.

Consider the economics: a building that reduces its energy consumption by 40% through efficiency retrofits can achieve the same level of energy independence with 40% less solar capacity and battery storage. This dramatic reduction in system size translates directly to lower capital costs and faster payback periods, making prosumerism accessible to a much broader range of building owners.

[25] European Energy Communities Facility, *Guidelines for applicants: Call for proposals 2025,* Grant Agreement No 101167230 (GNE Finance, April 2025) https://energycommunitiesfacility.eu/.



This sequence ensures that each technology layer builds upon the previous optimisation, creating compounding benefits and optimal economic returns.

Solas Capital: Financing the Efficiency-Prosumer Transformation

The Role of Energy Efficiency in Prosumer Economics

The transformation of buildings from energy consumers to profitable prosumers requires sophisticated financing mechanisms that understand the integrated nature of efficiency and prosumer technologies. This is where Solas Capital plays a crucial facilitating role in the European market.

As Europe's leading specialist in energy efficiency project finance, Solas Capital has recognized that the most successful prosumer buildings are those that begin with comprehensive efficiency optimisation. Through their specialised project finance investment strategy Solas Capital provides the financial solution that makes integrated efficiency-prosumer transformations accessible to building owners across Europe.

The Financing Gap That Solas Capital Addresses

Traditional financing approaches often treat efficiency, renewable generation, and storage as separate investments, overlooking the powerful synergies between them. Banks typically lack the expertise to assess this integrated value proposition, while conventional project finance views individual building projects as too small to qualify. Solas Capital closes this gap by delivering integrated financing for comprehensive building transformations. Through long-term financing, aligned with the lifetime economics of prosumer systems, Solas enables zero-upfront-cost implementations via its *Energy-as-a-Service* model.

Through their partnerships with leading Energy Service Companies / Project Developers across Europe, Solas Capital is directly facilitating the transformation of thousands of buildings into profitable prosumers. This approach unlocks a substantial market opportunity in the multi-billion-dollar building decarbonisation sector, leveraging proven technologies with established performance track records. For institutional investors, Solas offers access to predictable, long-term cashflows backed by contracted

energy savings and revenue streams, providing stable returns while contributing to the essential transition toward net-zero buildings.

Conclusion

Buildings are undergoing a revolutionary transformation from passive energy consumers to active prosumers in the European energy system. This white paper has demonstrated how the convergence of multiple technologies—rooftop solar PV, battery energy storage systems, electric vehicles, heat pumps, and demand response appliances—is enabling buildings to become profit centers rather than cost centers.

The success of this transformation depends on recognizing energy efficiency as the essential foundation that makes prosumerism economically viable and technically optimal. Buildings that begin their prosumer journey with comprehensive efficiency optimisation achieve superior economic returns, enhanced grid integration capabilities, and greater environmental impact.

Specialized financing solutions like those provided by Solas Capital are crucial to scaling this transformation. By offering integrated financing that combines efficiency retrofits with prosumer technologies, such providers enable building owners to access the full value potential of optimised, grid-interactive buildings.

However, challenges remain. The current 1% annual building renovation rate must increase dramatically to meet climate goals. Investment in grid infrastructure and smart metering must accelerate to enable full prosumer participation. Consumer awareness and engagement need strengthening to realize the full potential of these technologies.

The path forward requires coordinated action from policymakers, technology providers, investors, and building owners. As buildings transform from bill-payers to profit-makers, they will play a central role in Europe's energy transition, contributing to energy security, affordability, and sustainability. The prosumer revolution is not just an opportunity—it is an imperative for achieving Europe's energy security goals and it's 2050 carbon neutrality ambition.

About Sebastian Carneiro

Sebastian Carneiro is the Chief Executive Officer and Co-founder of Solas Capital AG, a specialised investment advisory firm that pioneers financing solutions for decentralised energy efficiency and behind-the-meter assets across Europe. Sebastian has over 15 years of experience in project finance, including his previous role as Director at Europe's largest private energy efficiency fund. As a CFA Charterholder and engineer by trade, Sebastian is driven by developing innovative investment solutions that accelerate the deployment of green assets and make the energy transition a reality.

About Maria Tulgara

Maria Tulgara is an Investment Analyst at Solas Capital AG in Zurich, with previous experience as a Risk Management Analyst in Luxembourg. She holds a Master's degree in economics and finance from the University of Luxembourg and a Bachelor's in Business Mathematics from the University of Mannheim. With her analytical background and various experience, Maria brings valuable insights.

About Solas Capital

At Solas Capital we provide specialised financing solutions for demand-side energy projects, bridging the gap between institutional investors and high-impact energy efficiency projects. Unlike traditional renewable energy investments focusing on supply, we specialise in reducing energy demand at scale—an often-overlooked but equally important pillar to reach Net-Zero.

We focus on the building sector—responsible for 40% of Europe's energy consumption—and industrial efficiency, providing capital to project developers to offer zero upfront cost solutions. Our team of experts structures funding solutions for distributed energy transition projects across Europe, delivering cost savings while reducing fossil fuel dependence.

Our asset-backed private credit strategy offers investors fixed-income like returns from EU Taxonomy aligned assets while accelerating Europe's transition to a carbon-neutral economy. We firmly believe that the best energy is the energy we don't use.

www.solas.capital

info@solas.capital

Solas Capital AG
Seestrasse 353
8038, Zurich
Switzerland

References

1. European Commission (Directorate-General for Energy), 2025. Commission sets the EU's building sector on a pathway towards greater energy efficiency and decarbonisation. Commission sets the EU's building sector on a pathway towards greater energy efficiency and decarbonisation
2. IEA (2025). Global Energy Review 2025. International Energy Agency. https://www.iea.org/reports/global-energy-review-2025/electricity, p.21-22
3. Directive (EU) 2024/1275 of the European Parliament and of the Council of 24 April 2024 on the energy performance of buildings (recast) [2024] OJ L202/75, art 10.

Disclaimer

This white paper is a marketing document which intends only to provide a general overview of investment strategies of energy efficiency and distributed renewable energy investments. This document is not intended to be, nor should it be construed or used as an offer to sell, or a solicitation of any offer to buy any securities, which offer may only be made at the time a qualified offeree receives a confidential final private placement memorandum describing the offering (the "issue document"). In the event of any conflict between information contained herein and information contained in the issue document, the information in the issue document will control and supersede the information contained herein. The information herein is not intended to provide, and should not be relied upon for accounting, legal or tax advice or investment recommendations. You should make an independent investigation of the information described herein, including consulting your tax, legal, accounting or other advisors about the matters discussed herein. Some figures may refer to the past or simulated past performance and past performance is not a reliable indicator of future results. Some figures maybe forecasts only and forecasts are not a reliable indicator of future performance. The information provided in this document have not been independently verified. The information contained herein is provided for informational purposes only, is not complete, and does not contain certain material information about Solas Capital and the presented investment strategies, including important disclosures and risk factors associated with the strategies. There can be no guarantee that the presented investment objectives or results –comparable or not to past performance –will be achieved.