



Seven Horizon2020 projects advise EU leaders how to prepare buildings for the energy transition

This briefing aims at communicating to EU leaders, policymakers and all interested stakeholders, the essential policy recommendations that will prepare buildings for the energy transition.

The contributing projects, funded by the Horizon 2020 programme, have been investigating ways to enable the mass adoption of energy efficiency measures and smartness, supporting the uptake of more renewable energy sources. This is done through the development of tools and methodologies such as: enabling ESCOs to develop demand response functionalities, improving and standardizing measurement and verification methods, de-risking and attracting private investments, creating new business models and expanding markets, and transforming energy efficiency and demand response into energy resources for TSOs and DSOs.

Behind the represented Horizon 2020 projects are over 240 experts from 22 research centres, 2 local authorities, 4 ESCOs, 2 technology development SMEs, 1 demand response aggregator, 3 financing institutions and investors, 3 asset management companies, 11 energy consultancies, 7 building professional associations and knowledge centres, and 39 Advisory Board Members. The represented projects and their goals are supported by over 93 letters of support and have collectively engaged, so far, directly more than 1585 stakeholders, out of which 405 are project developers, 32 investors, 99 financial institutions, 173 buildings professionals, 167 policymakers or national authorities, and 38 researchers in business and techno-economic fields. Project topics are highlighted below.

	SENSEI	Triple-A	NOVICE	QUEST	U-CERT	AmBIENCE	LAUNCH
Energy Efficiency							
Renewables							
Demand Response							
Business models							
Financing							
Standardisation							
Digitalisation							
Measurement and Verification							
Energy Performance Contracts							
Building Renovation							
Project Development							
Smart Readiness							
Operational performance							

Key policy recommendations

The transition to a forward-looking climate-neutral economy, announced in the European Green Deal, demands an action plan where public and private sector investments can be channelled towards climate-friendly technologies and business models.

The following recommendations are derived through in-depth understanding of the social, technical, economic and environmental dimensions of the energy transition, as viewed from the academic, business and policy perspectives of beneficiaries of Horizon2020 Grants.

While these recommendations are authoritative, they need to be complemented by the democratic and effective engagement of all actors involved in the value chain, such as local authorities, institutional bodies, stakeholders in the property and construction market, utilities, energy service companies (ESCOs), financing institutions, NGOs and citizens groups, in order to realize the intended results.



Electricity market reform

Design capacity markets so that energy efficiency can practically compete with supply side

options. Energy efficiency is automatically dispatched, reducing the need for more expensive supply-side capacity and lowering the costs of ensuring system adequacy to all bill payers.

Capacity mechanisms should be designed to reward energy efficiency projects for this energy system service, drawing upon lessons from New England and PJM systems in the United States.

The development of Demand Response programmes that fairly compensate all stakeholders (supplier, customer, BRP, aggregator) and do not favour additional generation capacity over DR

capacity. Some Member States allow aggregation but still have low participation in Demand Response programmes because the rules around participation are so complex and involve gaining consent from several competing parties. This leads to a preference for additional generation capacity rather than promoting demand side response opportunities.

Making the rules around participation simpler will encourage more demand response aggregators to participate and help grow the market.

Aggregation of loads is allowed for both generation and demand side response. Electricity markets regulations differ between Member States. Aggregation is not allowable in all countries and tends to favour aggregated energy generators rather than aggregated demand side response loads because system operators are more experienced at handling flexible generation capacity.

To encourage greater participation at the demand side, generators and demand side units must be able to compete on a level playing field.

Fair yet straightforward pre-qualification requirements to allow participation from new market entrants and aggregated loads. Pre-qualification requirements are often stringent which prevents new market entrants from participating. An example is that many companies require each unit in an



aggregated pool to be prequalified. This prevents participation from smaller clients and limits the market for demand response aggregators to very large or industrial sites.

Incentivize network operators to pilot ambitious pay-for-performance programmes. Drawing on US examples¹, policymakers in the EU can require utilities participating in Energy Efficiency Obligation Schemes (EEOs) to deliver some of their targets using the pay-for-performance approach, thus increasing access to novel financing options to mitigate the upfront cost burden to customers and to create new and compelling value propositions for customers, utilities, network operators and financing institutions. In Member States where there are capacity mechanisms, policymakers could pilot pay-for-performance schemes in the context of applying the Efficiency First principle. Distribution System Operators are well positioned to pilot pay-for-performance approaches as part of performance-based regulatory changes.

Accelerate the roll out of smart meters. To facilitate the large-scale roll-out of smart electricity metering across EU Member States, as foreseen by the 2009 Electricity Directive, policymakers are encouraged to drive a clear regulatory push, including mandatory measures, provision of financial incentives and strong policies on data privacy and security issues to enhance public acceptance that will facilitate smart meter deployment.

Incentivize electrified heating from renewable emission free resources. To reduce building emissions, the electrification of heating, especially if the electricity comes from a no-fuel source, should be incentivized. It leverages both the higher heat-generating efficiency of heat-pumps, and the - in many countries - lower carbon intensity of electricity compared to natural gas, which will continue to drop over time. Such incentivisation could be achieved through more fair taxation of electricity versus gas, e.g. reflecting the real-time carbon intensity, or through tariff structures that favour electrified heating. Cf: Renewable Heat Incentives in the UK, and the German heat-pump tariff.



Financing

Risk assessment and mitigation strategies of energy efficiency projects per country and per sector. The EU is encouraged to develop guidelines targeted to energy efficiency investments, like the Guide to Cost-Benefit Analysis of Investment Projects, Economic appraisal tool for Cohesion Policy 2014-2020. Risk Categories, risk factors, mitigation strategies and financial parameters (discount rates, price inflation) that play a major role in the Energy Efficiency financing should be defined for each country. These could be better integrated with the [EEFIG De-risking Energy Efficiency Platform](#).

¹ Pay-for-Performance programmes in North America are mostly driven by regulation, in particular utility energy efficiency obligations. In many cases, for example in California, state energy laws and obligations (e.g., Energy Efficiency Resource Standards) require innovative pilots and programmes to be applied to ensure the cost-effectiveness of these schemes funded by rate payers. Thus, the regulatory frameworks are structured to incentivize administrators to continually improve programmes, adjust portfolios based on evolving goals or market needs, and pilot innovative approaches.



Increase focus on financing of measures for smartness, not just efficiency. The EU targets related to building energy performance, hence also project financing, focus on reducing the energy consumption to achieve better EPC labels. More and better financial instruments should be in place to promote electrification of heating, especially in combination with self-generation and self-consumption, as a second strategy to reduce emissions.

This has the additional benefit that over time, emissions will continue to drop without further investments through the ever-decreasing carbon intensity of electricity.

Deploy Horizon 2020 results in EU Initiatives. Help direct private capital towards long-term, environmentally sustainable activities, and prevent false claims on the environmental nature of an investment product through EU Initiatives. Results, tools and reports from Horizon 2020 projects should be appraised and incorporated into Facilitating measures in EU's Initiatives such as The Smart Finance for Smart Buildings, the Investment Plan for Europe and the Clean Energy for all Europeans' package. Hence, the EU Taxonomy shall be the cornerstone of the European Commission's Sustainable Finance Action plan, underpinning new regulations.

Create a harmonization framework between project developers and financing schemes. State-of-the-art strategies have led to successful financing and completion of energy efficiency projects. Assess funding strategies of realistic and feasible EE investments and incorporate them into financial reports. Use that information to create harmonization frameworks to accelerate similar energy efficiency projects, by including means of financing in practice in the short or medium term, financing methods and approaches, evaluation and verification of the results.

Encourage access to third-party finance by supporting the creation of legal frameworks for energy performance contracting and ESCOs, creating financial mechanisms that give security and confidence to risk-averse third-party finance providers and standardising contractual documents, processes and risk assessment protocols. This could include specific guidelines for ESCO qualification, a review of MS compliance with Article 18 of the EED and how Member States, at various degrees of compliance, can grow their market. In addition, specific technical assistance or guarantee funds can be set aside within the Green Deal to facilitate the energy performance contracting process.

Encourage Member States to create instruments that serve as first-lost guarantee to mitigate end-clients' high credit risk. Support private investments in Energy Efficiency adopting commonly used techniques of risk mitigation at country level. Instead of promoting public Energy Efficiency funding, make private investments more attractive by encouraging Member States (MS) to establish public instruments that could secure assets providing credit enhancement and first-lost guarantee. Allocate specific funding at the European level so that MS can administer such guarantee funds. The EU could also encourage the adoption of financing schemes similar to the Italian Ecobonus (also known as the 110% tax credit) to boost energy efficiency project implementations at scale in other EU MS, whilst supporting local SMEs (auditors, project developers, ESCOs) in the process.

Creation of integrated financing approach to facilitate the market uptake of Horizon 2020 projects. A barrier to projects' exploitation has been identified as the gap between experimental research and innovation grants (Horizon 2020) on one side, and conservative bank-driven project development



funds with guarantees (such as ELENA) on the other. The integrated approach looks at private/public capital to invest in solutions that have proven successful and whose models have been assessed as solid, in this manner accelerating scale-up. The major change would involve the co-development of projects and the adoption of metrics in which the socio-environmental values complement the financial ones.



Technical streamlining

Support the digital transformation of the EU's built environment. Establish an EU level coordinated and structured approach by implementing the Smart Readiness Indicator (SRI) for buildings and aiming to evolve towards an in-use smart building/operational rating. Additionally, look at the potential for a European level digital building logbook to support standardisation and data collection between Member States.

Benchmarking and standardisation of energy efficiency projects. Establishment of EU official tools and guidelines for standardized methods and procedures in benchmarking energy efficiency projects. Outcomes and products of Horizon 2020 projects can be incorporated for a holistic approach of standardisation of EE projects. Standardization increases trust between key actors, enables the development of green products, and secures low interest rates and the growth of green financing.

Introducing green requirements for government-owned or -financed buildings, to help shifting market demand. More and more advanced technologies are installed in new and renovated buildings for optimizing building performance. Building technology is though just a means to an end, meaning that just installing more advanced technology will not cut it. Energy efficient building operation relies upon well-designed systems and continuously optimized operation. Based on the results of H2020 projects, digital quality management procedures for energy efficiency functionalities have been developed and are today part of certification schemes that, for the first time worldwide, certify the energy efficiency of building services in operation (e.g. COPILOT building certification and DGNB Buildings in Operation) .

Support the development of the Energy Performance Contracting markets around Europe by encouraging a transition to a demand-driven market. The ESCO markets around Europe vary considerably between Member States from the highly mature markets in Italy and Germany to the embryonic markets of Greece and Poland. Member States with policies that drive the demand for energy efficiency measures and put in place systems to support the use of performance contracting have experienced the fastest growth. Encouraging Member States to establish EPC facilitators and standard procurement frameworks for EPCs in the public sector will help to create a market “pull” and drive the growth of the ESCO market to meet the demand.





Energy Performance Certification

Support EU convergence in terms of building performance calculation methodology by using the CEN/ISO set of EPB standards. Building performance is governed by the same laws of physics globally. Historically, in the EU, building performance calculation methodologies (EPC Certificates) have been developed first at national level, more than 15 years ago, for the EPBD's implementation. Since, experience has shown that a coherent, transparent, holistic, level playing field and innovation-ready overarching EU level calculation methodology would act as catalyst at both technical and financial levels. For this specific purpose, the CEN/ISO set of EPB standards have been developed and are furthermore flexible for adequately integrating the EU's principle of subsidiarity.

Define a building performance label reflecting its emission level. The current Energy Performance Certificate (EPC) labelling focuses solely on a building's energy consumption. It thereby neglects the benefits of electrification and smart control that focus on reducing the emissions associated with the consumption. In contrast to energy consumption reduction measures, electrification in combination with smart control has the additional benefit of delivering increasingly more emission reductions over time thanks to the ever dropping carbon intensity of electricity. Besides, it can offer invaluable support and flexibility to the grid, to facilitate the integration of higher numbers of intermittent renewables.

Introduce additional indicators for unleashing the Energy Performance Certificates' full potential. Making energy use in buildings visible was a major breakthrough made by Energy Performance Certificates. The awareness raising efforts need to continue and make visible instant power, environmental impact (e.g. CO₂ emissions), indoor environmental quality (with its recognised impact on health, well-being and comfort, now even more relevant in the COVID-19 reality). This would enable the transparent monitoring and follow-up of non-energy benefits associated with building performance improvements / renovations while giving them concrete value.

Complement asset rating with measured performance and ultimately operational rating. The asset rating introduced by EPC certificates has achieved wonders if we consider how building evaluation has evolved in the past 20 years. It has though some inherent limitations when it comes to triggering building performance improvements / renovations. People need contextualized information for understanding and making the needed links between their behaviour and decision-making and building performance. Furthermore, people need a regular prompt to successfully make building performance intrinsic in daily life. Lord Kelvin said long ago "If you cannot measure it, you cannot improve it". People back then did not understand what temperature is and now after a few generations it is part of our basic awareness set of skills. Building performance (energy and non-energy) needs to go through the same process, however much faster if we are all to spend time in healthy, comfortable, smart, nearly-zero energy and carbon free indoor environments by 2050.



Project descriptions

Smart Energy Services Integrating the Multiple Benefits from Improving the Energy Efficiency of the European Building Stock



SENSEI elaborates innovative pay-for-performance (P4P) schemes, where payments for energy efficiency are based on proven and measured savings in real time. Based on this principle, SENSEI puts forth a novel business model that aggregates decentralized energy efficiency measures, and offers the value of energy demand reduction as a service to the grid, while also turning this value into an investable asset for private financing.

Enhancing at an Early Stage the Investment Value Chain of Energy Efficiency Projects



Triple-A is seeking to identify which investments can be considered as Triple-A investments, fostering sustainable growth, while also having an extremely strong capacity to meet their commitments. The overall aim of the Triple-A project is to assist financial institutions and project developers increase their deployment of capital in energy efficiency, making investments more transparent, predictable and attractive.

New Buildings Energy Renovation Business Models Incorporating Dual Energy Services



NOVICE has been testing the validity of an innovative new business model for Energy Service Companies (ESCOs) that combines both energy efficiency and demand response services into a single service offering. An Enhanced Energy Performance Contract (EPC) will guarantee building owners a minimum level of energy savings and occupant comfort whilst ensuring that a maximum value can be extracted from the flexibility potential of on-site energy assets.

Quality Management Investments for Energy Efficiency



QUEST' main goal is to promote investments in Sustainability and Energy Efficiency by identifying and empirically risk-grading factors that influence energetic performance of buildings, making it more profitable to invest in sustainable buildings. QUEST will develop a reliable quality management methodology for investors to evaluate their investments in efficient and sustainable buildings.



Towards a new generation of user-centred Energy Performance Assessment and Certification; facilitated and empowered by the EPB Center



U-CERT introduces an Energy Performance Assessment and Certification Scheme to value buildings in a holistic and cost-effective manner: Facilitating convergence of quality and reliability, enabling a technology neutral approach; encouraging the development and application of holistic user-centred innovative solutions; Encourage and support end-users in decision making (e.g. on deep renovation), nudge for better purchasing and instil trust by making visible added (building) value, using EPCs.

Active Managed Buildings with Energy Performance Contracting



AmBIENCE provides new concepts and business models for performance guarantees of Active Buildings, combining savings from energy efficiency measures with additional savings and earnings resulting from the active control of assets leveraging for instance price-based incentive contracts (Implicit Demand Response). The willingness to invest in additional sensorisation, ICT and Internet of things will be increased by offering adjacent other-than- energy services, e.g. related to comfort, security or maintenance.

Sustainable Energy Assets as tradable securities



LAUNCH enables large scale aggregation of sustainable energy assets (SEA) for financiers and supports contractors in growing their project pipeline. The final objective of the project is to accelerate the acceptance of SEAs as tradable securities.

