



Boosting the Renovation Wave with Pay-for-Performance schemes



This project has received funding from the European Union's Horizon 2020 Research and Innovation programme under Grant Agreement No 847066.



Smart Energy Services to Improve the Energy Efficiency of the European Building Stock

Abstract

According to the European Commission, reaching new climate goals would require the building sector to cut its greenhouse gas (GHG) emissions by 60% by 2030.¹

To achieve this reduction deep energy renovations should be fostered, and the annual energy renovation rate should at least double by 2030. The retrofit investments needed to meet these objectives cannot be financed from the public sector alone and would require substantial private sector involvement. Current legislation is insufficient to support these goals and the Commission will make legislative proposals to upgrade the climate and energy framework in 2021.

The Commission has recognised the potential of pay-for-performance schemes to accelerate building renovation in its “Renovation Wave” communication.² This briefing provides background information on these schemes and recommendations on how legislators could improve the EU climate and energy framework and put pay-for-performance schemes at the service of the EU’s Renovation Wave.

Policy area	Relevance of P4P schemes
1. Energy savings obligations	The use of metered savings methodologies combined with pay-for-performance schemes would improve the credibility of energy savings estimates.
2. Energy markets	The deployment of pay-for-performance schemes could participate in implementing the “energy efficiency first” principle.
3. Building legislation	The deployment of pay-for-performance schemes could participate in increasing the range of financing solutions available for public and private building owners.



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1 What P4P schemes are

Pay-for-performance (P4P) schemes compensate energy efficiency resources based on a comparison of metered energy consumption and modelled counterfactual energy consumption, *i.e.*, consumption in the absence of the energy efficiency action.³



Pay: Some of the payments are delivered after the energy efficiency improvements have been made and once energy consumption has been tracked during a certain performance period.



Performance: Energy consumption is metered before and after the project. Ex post estimates of energy savings are used as the indicator for the energy efficiency project's performance.



Aggregation: Aggregators or programme implementers often act as intermediaries between end users and the organisation delivering payments.

2 Added value of P4P schemes

2.1 Transferring the performance risk

Most traditional energy efficiency programmes provide subsidies for the installation of measures, as a one-off payment. Where subsidies are linked to the energy saved, the amount of energy savings is usually “deemed”, meaning that a fixed amount of savings is associated with the delivery of the measure. This provides an incentive for the private sector to install as many measures as cheaply as possible, without necessarily ensuring high quality installation and with no concern over the use and maintenance of equipment.

P4P schemes redirect the incentives to obtaining as many energy savings as possible. In principle, this should result in a higher quality of installation and maintenance and a more targeted deployment of measures where they can deliver the largest savings amounts.



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TRADITIONAL SUBSIDY SCHEME



Deemed savings
(assumption about
impact of measure)



One-off payment
(usually upon
installation)

PAY-FOR-PERFORMANCE SCHEME



Savings established
by comparing
metered energy
consumption to
baseline



Payment
proportional to
energy saved,
delivered “as the
savings occur”

Figure 1 – Comparison between traditional and P4P support schemes

With P4P schemes the performance risk is shifted from those who fund the programmes (taxpayers or ratepayers) to the aggregators or programme implementers.

2.2 Recognising the value of energy efficiency for the energy system

As the electrification of end uses accelerates, with mass adoption of heat pumps and electric vehicles, and renewable energy sources come to dominate electricity generation, the value of demand-side resources to energy systems will increase substantially.

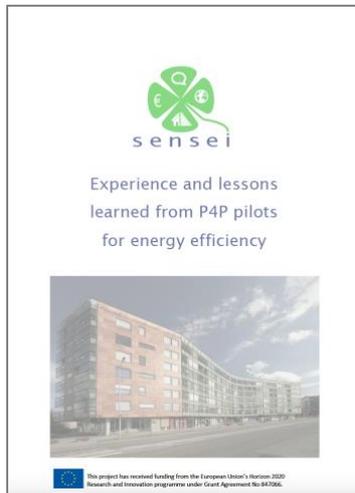
The resources required to ensure electricity system adequacy will be different, depending on the time of day, the weather, seasonal factors and location. In this environment, energy efficient buildings can play a significant role in reducing electricity system cost.

By building on advanced monitoring & verification methodologies (advanced M&V), P4P schemes can reward energy efficiency for the services it provides to the energy system and distinguish between time- and location- specific savings.



3 Practice with P4P schemes

In the U.S., regulators and utilities are piloting the use of advanced M&V, combined with pay-for-performance financing schemes in the building sector.

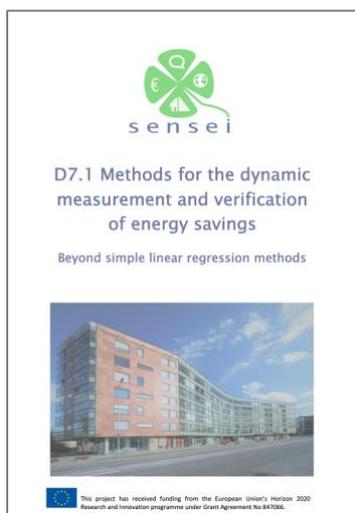


For more information about the global P4P practice, please download SENSEI's report:

Experience and lessons learned from pay-for-performance (P4P) pilots for energy efficiency.

<https://zenodo.org/record/3887823#.YFsUF-Yo-8V>

In Europe, pay-for-performance schemes based on metered savings accounting methodologies are not yet used in the building sector, but several initiatives are exploring their potential.⁴ The SENSEI project has for example developed a next generation energy efficiency meter named “ensight” based on machine learning.



For more information about the ensight tool, please download SENSEI's report:

Methods for the dynamic measurement and verification of energy savings

<https://zenodo.org/record/4695123#.YlkqwOuxWTd>



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4 P4P and the Renovation Wave

The SENSEI project aims to reward buildings' energy efficiency as an energy resource and a new grid service. It is looking at ways to combine pay-for-performance (P4P) arrangements with the energy performance contracting model. The policy framework is important to trigger these innovations. To date, P4P programmes targeting buildings have mostly been run by utilities that are subject to Energy Efficiency Obligation Schemes (EEOS) in the US, but more applications could be imagined. As the Commission is preparing a climate and energy policy package, several areas could be explored to encourage the development of P4P schemes.

4.1 Energy savings obligations

Under Article 7 of the Energy Efficiency Directive (EED), Member States must trigger a certain amount of energy savings among energy end users from national policy measures. Article 7 led to the multiplication of energy efficiency obligation schemes (EEOSs), which involve energy companies in the realisation of energy savings.

A large number of Member States are not expected to have achieved their 2014-2020 Article 7 obligations.⁵ In addition, there are “credibility issues in relation to the eligibility, additionality, materiality and double counting” for some policy measures.⁶ Although the Commission and Member States acknowledge the need for “a proper measurement and verification of reported energy savings”,⁷ evaluation practices are not standardised at EU level.

The use of metered savings methodologies combined with pay-for-performance schemes would improve the credibility of energy savings estimates.

The P4P approach requires a different form of M&V methodology to most energy efficiency programmes that rely on “deemed savings” estimates. The calculation of savings relies on accurate and timely meter data, and on the modelling of counterfactual energy consumption, *i.e.*, what would have happened without the programme intervention. This implies minimum requirements for the metering infrastructure and a set of detailed specifications for the modelling of the counterfactual. These specifications include how to collect and incorporate data on baseline energy consumption, variations in the weather, changes in circumstances (*e.g.*, changes in commercial use or the purchase of an electric vehicle) and exceptional events (*e.g.*, outages, or population-wide shocks such as the COVID-19 pandemic).



The revision of the EED should specify how P4P schemes could fit with the methodological requirements outlined in Annex V of the EED. This will encourage Member States to consider requiring obligated utilities in EEOs to deliver some of their targets using the P4P approach. The application of metered savings approaches should become more relevant during the 2021-2030 Article 7 EED energy savings obligation. As the Renovation Wave leads to deeper building renovations, the value of a clearer understanding of the impact of energy efficiency measures will increase, the ability to identify impacts in the data will improve and the costs of metering as a proportion of total costs will decline.

4.2 Energy markets

The Commission does not foresee a revision of electricity legislation in 2021 but has announced a number of steps to implement the “energy efficiency first” principle.⁸

The fact that energy efficiency is not adequately compensated for the benefits it brings to the energy system acts as a barrier to its deployment. It deprives it of valuable funding while passing up opportunities to reduce the resource costs of delivering adequate, reliable and secure energy systems. This is at odds with the “energy efficiency first” principle,⁹ which requires treating energy supply and demand solutions on an equal footing, considering their respective costs and benefits.

The deployment of P4P schemes could participate in implementing the “energy efficiency first” principle.

For example, in countries where there are capacity mechanisms, policymakers could pilot P4P in the context of applying the principle to these policy measures. Furthermore, where there are local network constraints, regulators could provide incentives to distribution network operators to pilot P4P approaches as part of performance-based regulatory changes.

4.3 Building legislation

Building codes stemming from the Energy Performance of Buildings Directive (EPBD) leave a large share of buildings out of the scope of minimum requirements. The Commission is therefore considering introducing minimum energy performance requirements on existing buildings.¹⁰ Building owners would need to achieve a certain performance by a deadline and/or at trigger points (such as sales, new rental contract, etc.).



The Commission is also considering an extension of the energy savings obligation currently applying on central government buildings in Article 5 of the EED. The Commission is looking into the possibility to extend this obligation to additional public buildings and social infrastructure.

The deployment of P4P schemes could participate in increasing the range of financing solutions available for public and private building owners.

P4P schemes can reward projects mixing behavioural, operational and physical interventions. They can support private sectors and public authorities, including local authorities.



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¹ Compared to 2015. European Commission. (2020, September). *Stepping up Europe's 2030 climate ambition – Investing in a climate-neutral future for the benefit of our people*. COM(2020) 562 final.

² European Commission. (2020, October). *A Renovation Wave for Europe – greening our buildings, creating jobs, improving lives*. COM(2020) 662 final.

³ SENSEI. (2020). *Experience and lessons learned from pay-for-performance (P4P) pilots for energy efficiency*. <https://zenodo.org/record/3887823#.YFsUF-Yo-8V>

⁴ Green Finance Institute. (2021). *Towards a protocol for metered energy savings in UK buildings*.

⁵ European Commission. (2020, October). *2020 assessment of the progress made by Member States towards the implementation of the Energy Efficiency Directive 2012/27/EU and towards the deployment of nearly zero-energy buildings and cost-optimal minimum energy performance requirements in the EU in accordance with the Energy Performance of Buildings Directive 2010/31/EU*. COM(2020) 954 final.

⁶ Forster, D., Kaar, A. L., Rosenow, J., Leguijt, C., & Pató, Z. (2016). *Study evaluating progress in the implementation of Article 7 of the Energy Efficiency Directive*. Final Report for DG Energy.

⁷ European Commission. (2019, January). *Report of the work of the task force on mobilising efforts to reach the EU energy efficiency targets for 2020*.

⁸ European Commission. (2020, July). *Powering a climate-neutral economy: An EU Strategy for Energy System Integration*. COM(2020) 299 final.

⁹ The principle is enshrined in several pieces of legislation. For more information, see Horizon 2020 funded ENFIRST project (2020). ENFIRST. (2020). *Defining and contextualizing the E1st principle*. Deliverable D2.1 of the ENFIRST project, funded by the H2020 programme, grant agreement number: 839509. <https://enefirst.eu/wp-content/uploads/D2-1-defining-and-contextualizing-the-E1st-principle-FINAL-CLEAN.pdf>

¹⁰ European Commission. (2020, September). *Commission staff working document. Impact assessment accompanying COM(2020) 562 final*. SWD(2020) 176 final.

