

Clustering Workshop “Smart Energy Services”



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

Benefits and challenges of Pay-for-Performance programs for energy efficiency: The SENSEI project

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The SENSEI project

SENSEI – Smart Energy Services to Improve the Energy Efficiency of the European Building Stock (<https://senseih2020.eu/>)

Duration: September 2019 – February 2023

Scope: SENSEI examined if and how Pay-for-Performance (P4P) programs implemented in the USA and Canada could be replicated in the European Union.



Examples of P4P programs

Programme	Pure P4P?	Payment schedule	Price setting	Contract duration
Jersey Clean Energy Program - Pay-for-Performance Commercial & Industrial program	No, hybrid.	1. After planning. 2. After installation. 3. After 1 year.	\$0.09/kWh. \$0.90/therm. Bonus for higher savings.	1 year.
Ontario Save on Energy – Energy Performance Program	No, hybrid.	Yearly.	\$0.04/kWh.	2.5 years.
Seattle City Light – Deep Retrofit Pay for Performance program	Yes, 100% P4P.	Yearly.	\$0.08/kWh. \$0.18/therm. Bonus for higher savings.	Path 1: 3 years. Path 2: 5 years, baseline recalculated each year.
Energy Trust of Oregon – Pay for Performance Pilot	No, hybrid.	1. After installation. 2. After 1 year.	\$0.15/kWh. \$1.80/therm.	1 year.
Puget Sound Energy – Pay for Performance pilot	No, hybrid.	Yearly.	\$0.35/kWh. \$5.00/therm. Bonus for higher savings.	5 years, including 4-year performance period.

Examples of P4P programs

Programme	Pure P4P?	Payment schedule	Price setting	Contract duration
District of Columbia Sustainable Energy Utility – Pay for Performance program	Yes, 100% P4P.	One-off payment.	Project-specific.	1 year.
Bay Area Regional Energy Network – Small and Medium Commercial Buildings Pay-for-Performance program	No, hybrid.	Yearly.	Price result of bid process. Bonus for higher savings.	2 years with possibility to extend.
New York State Energy Research and Development Authority – Business Energy Pro	Yes, 100% P4P.	Quarterly.	Price result of bid process. Favours long lifetimes.	5 years, including a 3-years performance period.
Pacific Gas and Electric Company – Residential Pay-for-Performance programs	Yes, 100% P4P.	Monthly.	Project-specific. Full-lifetime reward.	2 years.

The role of energy efficiency in the power system

While the most often suggested demand-side option for efficiently handling the stability and adequacy challenges of the power grid is **demand flexibility**, i.e. the fast-responding adaptation of power consumption to the variable, a renewables-based generation, the SENSEI project examined the role that **energy efficiency**, i.e. the persistent and maintained changes in power consumption compared to a baseline level, can play in a renewables-based electricity system.



The role of energy efficiency in the power system

The main argument of SENSEI is that an energy retrofit project can be regarded as a **grid resource** if it helps in either phasing out old, polluting power plants that are only kept commissioned for the provision of capacity reserves or reducing curtailment of renewable-based power generation to improve the grid's hosting capacity for renewables.



P4P links energy efficiency with the power system

P4P can be used to offer a premium to energy efficiency projects when their implementation leads to load shape changes that are beneficial for the power grid's operation.

Adopting P4P is necessary because all other alternatives for ensuring the power grid's reliability – capacity reserves and demand response – are compensated based on their performance.

Treating energy efficiency on equal basis with the alternative options that system operators have at their disposal means that energy efficiency should be rewarded based on actual impacts.



P4P as catalyst for innovation

P4P programs create a market for aggregation, along with all the governance structures and technical capabilities to support it. As a result, P4P can incentivize the development of the know-how and infrastructure necessary for energy **retrofit project aggregation**.

P4P pilots constitute an effective use of public finance to discover best practices for the aggregation of a large number of energy efficiency projects into portfolios, and they can act as a workbench for developing financing tools and risk allocation mechanisms.





*Member States can reduce risk perception and scale up market incentives such as energy-saving tariffs, **pay-per-performance** public support schemes and energy-saving tenders to attract private intermediaries and aggregators. Member States should also explore innovative financing solutions through on-tax and **on-bill** schemes or property-linked finance, as well as taxation tools to generate economic incentives to finance building renovation.*

Existing energy efficiency obligation schemes under Article 7 of the Energy Efficiency Directive can be effectively used for all types of buildings to engage new intermediaries like utilities, deliver technical expertise and offer aggregated services to reduce transaction and administrative costs.



In view of the need for increased private financing for energy efficiency, the Commission will:

- *launch, in cooperation with Member States, a high-level European Energy Efficiency Financing Coalition with the financial sector, based on the successful Energy Efficiency Financial Institutions Group (EEFIG);*
- *examine possible additional measures to trigger further private investments, e.g. through mortgage portfolio standards or [pay-for-performance schemes](#).*

Key results

SENSEI has demonstrated (SENSEI Deliverable D4.2) that:

- Energy efficiency is valuable when its impact is aligned with persistent needs of the power grid that reflect the regularity and seasonality of power demand at the aggregated level.
- The design of a program that compensates energy efficiency for its contribution to the grid does not need a radically new toolset, but can be done using the tools that power system operators already use.

The methodology has been open-sourced and can be accessed at <https://github.com/hebes-io/evalue>.



Key results

SENSEI introduces the concept of a P4P program facilitator: a third party that is responsible for the execution of a P4P program on behalf of the corresponding program owner:

- SENSEI Deliverable D6.3 : Lessons from EPC facilitators
- SENSEI Deliverable D6.5: Lessons from Demand Response aggregators



Key results

SENSEI has contributed significantly to the advancement of automated Measurement and Verification (M&V) methods by producing a methodology appropriate for P4P applications: (a) it ignores changes in energy consumption that can be accounted for by changes in activity/occupancy levels, (b) it can deal with intermittent energy consumption, and (c) it can adapt to changes in the intensity of energy consumption, such as, for example, when fewer people use the building due to restrictions imposed to deal with the COVID 19 pandemic.

The methodology has been open-sourced and can be accessed at <https://github.com/hebes-io/eensight>.



Recommendations for pioneering P4P pilots

- Ensure that the P4P program has a sufficient critical mass to cover all transaction costs. This requires a sizeable portfolio of buildings, including a decent share of large commercial and public buildings.
- Standardize energy retrofit contracts, in analogy with power purchase agreements for renewable energy installations, to develop a large pipeline of green assets that can be bundled together cost-efficiently.
- Earmark government guarantees to enable the "bankability" of the program, with a pool of public buildings integrated into the building portfolio to give the start-up phase a boost.



Recommendations for pioneering P4P pilots

- Adopt a valuation approach in line with an investor's valuation standards and set up the financing structure of the program between investors and the facilitator.
- Make use of the current momentum of ESG (Environmental, Social, Governance) and SRI (Socially Responsible Investing) funds when financing a P4P program.
- It is of utmost importance to recognize Energy Efficiency as a valuable resource by Utilities and System Operators that are tasked with providing services to the energy system. The "metered savings" methodology of the Energy Efficiency Directive (EED) should also be required, at least partially, to support performance-based programs.



Thank you for your attention!

You can learn more at senseiH2020.eu, where you will find all project [deliverables](#), our [news](#), the community [newsletter](#), and the documentation on the [eensight tool](#).

Twitter: @SENSEIH2020



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